



**Minutes of 30th meeting of Academic Council held on
Friday the 28th July, 2023**

The 30th meeting of Academic Council was held on **Friday the 30th July, 2023** at 11.00 am in the Board Room of YCCE, Nagpur. The following members attended the meeting.

1	Dr. U.P. Waghe, Principal & Chairman	13	Dr. Mrs. R.D. Wajgi, HoD Computer Technology
2	Prof. Dr. N.C. Sivaprakash IISc., Bangalore	14	Dr. R.C. Dharmik, HoD, Information Technology
3	Dr.P.D. Pachpor Professor, Deptt. of Civil Engineering, SRCOEM, Ramdeo Tekdi, Gittikhadan, Nagpur	15	Dr. Mrs. M.A. Adak, HoD Mathematics and Humanities
4	Dr. S.A. Dhale. Principal, Priyadarshini College of Engineering, Digdoh Hills, CRPF Hills, Nagpur	16	Dr. Mrs. H.V. Ganvir, HoD Physics
5	Dr. Sanjay Kelo Principal, Nararjuna Insitute of Engineering, & Technology & Management, Satnavari,	17	Prof. Megha Sawangikar, Deptt. of Chemistry
6	Shri Amol Deshpande, Sr. Manager - HR, Mahindra & Mahindra Ltd., Mumbai	18	Prof. D.R. Raut, CoE, YCCE,
7	Dr. S.P. Raut HoD, Civil Engineering	19	Dr. Ms. U.H. Gawande, Dean (R&D)
8	Dr. J.P. Giri HoD, Mechanical Engineering	20	Dr. Manali Kshirsagar, Director Technical & Advisor, YCCE
9	Dr. S.G. Kadwane, HoD , Electrical Engineering	21	Mr. Kumar Mansukhani
10	Dr. R.D. Thakare HoD Electronics Engineering	22	Dr. Mrs. Manjusha P. Gandhi, Chairman, BoS GE & FYC
11	Prof. A.V. Choudhari, As stt. HoD, Electronics &Telecomm. Engg	23	Dr. S.S. Choudhary, Dean OBE
12	Dr. Lalit Damahe HoD CSE	24	Mr. Niraj Wakhare, TPO, YCCE, Nagpur



Nagar Yuwak Shikshan Sanstha's
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11	Dr. Mrs. S.V. Rathkantiwar, Dean (IRO), YCCE, Nagpur.	24	Dr. A.V. Patil, Dean (Acad. Mat.) & Member Secretary
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Leave of Absence granted to			
1	Shri Swapnil Shukla, Senior Talent Partner (APAC Region) GitHub (Microsoft), Hyderabad.	5	Dr. Arvind Bhagatpatil, Dean (P D)
2	Shri Urvish Pandey Lead - Campus Recruitment & University Relations, Mastercard India, Pune-M.S.	6	Dr. Mrs. G.M. Dhopavkar Dean (T&P)
3	Dr. S.V. Prayagi, Registrar, YCCE	7	Prof. Aniket P. Munshi, Dean (SA)
4.	Dr. M.S. Narlawar, HoD, Electronics & Telecommunication Engineering	8	Dr. Mrs. P.U. Waghe, HoD, Chemistry

Item 30.01: Welcome of new members

The Chairman of the Academic Council, Dr. U.P. Waghe welcomed the members of the Academic Council

Item 30.02 To confirm the Minutes of 29th Meeting of the Academic Council

The Academic Council unanimously approved the minutes of 29th meeting of Academic Council held on 25th February, 2023.

The Academic Council also unanimously approved the ATR of 29th meeting of Academic Council.

Item 30.03 To discuss and approve the suggestions of Board of Studies for changes in Schemes of Examination and course contents of Autonomous 2022 scheme for UG and PG Programs

The Chairpersons of various Boards of Studies presented the minutes of the meetings



to Academic Council.

The changes proposed by various boards regarding the syllabi of the courses of "Autonomous 2022" scheme are as below :-

❖ **The minor changes in the course contents suggested by the BoS for UG/PG programmes**

Civil Engineering :

S.N.	Sem	Course Code	Course Name	Contents	
				Added	Deleted
1	VI	CV2362	New Engineering Materials	1.In Unit no. 5, Content on Geo polymers, Geo synthetics and its application in Civil Engineering need to be added; 2. In unit 3: Construction chemicals may be added 3) In unit 6, use of IS :11384"Metals Steels HYSD, TMT, Tendons, Light Gauge Steel, Steel Fastenings, New Alloy Steels, Protective Coatings to Reinforcement." may be added.	In unit 6, steel composites sections may be deleted.
2	VII	CV2429	PE IV- Watershed Management	1.Unit V: Case studies on Arable and Non-Arable lands	1.Unit II: fundamentals, tips, myths 2.Unit V: Conservation Bench terracing, ditches, land levelling, hydraulic measures, retaining wall, alley cropping and trillage, Half-moon Terraces, Geojute, retaining walls, wattling, crib number method, Watershed committees for reviewing and reporting, Research requirements and post project management in watershed 3.UnitVI: Curve number method
3	VI	CV2404 -	Hydrology & Water Resources Engineering	1.Unit1-Infiltration, Infiltration indices 2.Unit 3-Gumbel's method 3.Unit5:Phreatic lines(graphical method)	1.Unit-I: classification of streams, Measurement of discharge of a stream by Area-slope and Area-velocity methods 2. Unit III: Statistical Methods: Statistics in hydrological analysis, probability and probability distribution. 3. Unit IV: Canal Irrigation : types of canal system, stable canal, unstable canal, grading, lined, canal network



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Branch	SoE	Sem	Course Code & Name
Computer Technology	2022	3	22ADS205 - 'Computer Architecture and Organization' of the B.Tech 2022 SoE of AIDS
Information Technology	2022	5 IT	Dot Net Full stack Development Merged unit I, II and III and restructured the syllabus
	2022	5 CSD	<ul style="list-style-type: none">Virtual Reality (OE) : Content are modified so that syllabus is comfortable for other branches studentsCyber Laws and Professional Ethics : More contents related to Cyber Laws are added
Computer Science & Engg.	2022	III	22CSE303– Object Oriented Programming - Exclude the topics – Introduction to AWT, Working with Windows, Graphics and Text
	2022	V	CSE2343- Introduction to Cloud Computing - Unit 2 should include Replication and Billing
	2022	VII	CSE-2423Machine Learning Techniques - Logistic regression to be included

❖ **The changes in the Books suggested by the BoS as below**

Branch	SoE	Course Code & Name

❖ **The changes in the laboratory Courses suggested by the BoS as below**

Branch	SoE	Course Code & Name
IT	2022	<ul style="list-style-type: none">Java Full stack DevelopmentDot Net Full stack Development
Computer Science & Engg.	2022	CSE2318- PE I-Lab: Mobile operating system - Add Scenerio Based practicals



- ❖ **Following new courses/MOOCs courses are suggested by BoS for students for the session 2023-24.**

Branch	Course Name
Civil Engg.	Professional Elective through cousera “Mastering Bitumen for Better Roads and Innovative Applications”
Compute Technology	<ul style="list-style-type: none">• New Industry aligned Professional electives Java full stack, .net full stack are included at VII semester offered by Global Logic Hitachi under train the trainer.• New Industry aligned electives Mobile OS (for AIDS) and Machine Learning using Tensorflow (for CT) by Google are introduced at V sem level.• Introduction to Logic Building and Programming is introduced at 1st year level for SoE23 for both CT and AIDS under Professional Core
Information Technology	MOOC courses on Artificial Intelligence of 8th semester IT and CSD of SOE 2023 is added as per the guidelines provided by the NEP2020.
Computer Science & Engg.	New course in professional electives added VII - CSE2415 - PE III: Block Chain Technology VII - CSE2429 –PE- IV:Java FullStack Development VII - CSE2431- PE- IV: .Net FullStack Development VII - CSE2445 - PE V: Big Data Analytics

A.C. approved changes in course contents and changes in the text/reference books, laboratory and MOOC Courses for the courses mentioned above. These changes will be incorporated with immediate effect.

Item 30.04 To discuss and approve the outcomes of Feedback & result analysis suggested by BoS and ATR

The Academic Council suggested that the CO/PO attainment shall be presented in BoS meeting and discussed in A.C. meeting in a specific format as provided by Dean (OBE) at the end of academic year. Subject to following corrections Academic council approved the outcomes of Feedback & result analysis suggested by BoS and its ATR.

- In Mechanical Engineering the target value of CO should be raised



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- For General Engineering PO target set is very high and therefore shall be rationalized.
- General Engineering should address their own courses only and need not address allied courses belonging to engineering departments.
- The target set should be low for 1st year courses.
- Academic Council suggested to present First year results after declaration of results of Re-sit examination.

Item 30.05 To discuss and approve the Scheme of Examination Autonomous 2023 scheme for UG as per NEP and GoM guidelines and PG Scheme

DAM presented the guidelines issued by college for devising SoE 2023 as per GoM GR on NEP 2020 dated 04.07.23. 1st to Final year SoE 2023. All BoS chairman including FYC presented the detailed syllabi of B.Tech first year and second year to Academic Council. During discussion on SoE 2023, Academic Council suggested following modifications.

- 1) The multidisciplinary minor to be design for improving employability.
- 2) The assessment methods for vocational courses and liberal learning courses (LLC) to be properly designed.
- 3) Academic Council suggested the following for distinguishing between 3 Credit, 2 Credit, Theory and Practical Courses, VSC and LLC.
 - a) For 3 credit theory course syllabus to be of 6 units, MSEs of 1½ hrs of 3 questions, ESEs of 3 hrs and of 6 questions.
 - b) For 2 credit theory course syllabus to be of 4 units, MSEs of 1 hr of 2 questions, ESEs of 2 hrs and of 4 questions.
 - c) For 2 credit VSC or LLC to be presented without assigning LTP and 2 to 4 lectures per week may be assigned for these courses.



Academic Council approved Scheme of Examination 2023 (SoE 2023) as proposed and permitted of being implemented w.e.f. A.Y. 2023-24 onwards for first to Final year UG programmes.

Item 30.06 To discuss and finalize the changes, if any, in Academic Regulations

Following agenda points were put up by Academic Council for approval.

- 1) Process of "Credit Transfer" for those who have completed one or more semester/Courses from other colleges under this scheme.
- 2) Permission to take re-exam in Honor/Minor course

Academic Council unanimously approved the changes of Academic Regulations & Principal Direction.

Item 30.07 To discuss and approve the report of Controller of Examinations for Even Term 2022-23 including the list of candidates who have become eligible for award of UG and PG degrees.

The report of the Controller of Examinations was put up before the members of the Council. Members discussed and accepted.

The Academic Council approved the report of Controller of Examinations for Even Term 2022-23

Item 30.08 To discuss and approve the changes, if any, in Examination Manual.

There were no changes in examination manual.

Item 30.09 To discuss and approve the report of Dean (Academic Matters) for Even Term 2022-23.

The report of the Dean (Academic Matters) was put before the members and discussed.

The Academic Council approved the report of the Dean (Academic Matters) for the Even Term of 2022-23.



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Item 30.10 To discuss and approve the report of Research Centre Activities for Even Term 2022-23.

- 1) The report of the Research Centre Activities was put before the members and was discussed by the Academic Council.
- 2) The Academic Council discussed the Pre Ph.D. SoE for course work as per the latest directions of RTMNU Nagpur

The Academic Council approved the report of the Dean (R&D) for the Even Term of 2022-23.

Item 30.11 To discuss and approve the report of the Training and Placement Cell for Even Term 2022-23.

The report of the Training and Placement cell was put before the members. The report of Training and Placement cell for Even Term 2022-23 was discussed by the Academic Council

- The Academic Council suggested the placement value in T&P report should be presented against the total number of students.

The Academic Council approved the report of Training and Placement Cell for the Even Term of 2022-23.

Item 30.12 To discuss new UG/PG programme for A.Y. 2023-24 and certificate courses for the A.Y. 2023-24

Following Scheme of Examinations of forthcoming UG/PG programme were discussed in the Academic Council,

- SoE 2023 for UG B.Tech Programme VLSI Design & Technology
- SoE 2023 for PG M.Tech Programme VLSI Design
- SoE 2023 for PG MTech Data Science (CT Department)
- SoE 2023 for PG MTech Automation & Robotics (ME Deptt)
- SoE 2023 for PG MBA Programme,



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Academic Council approved the SoEs of various UG/PG programmes and permitted the implementation from A.Y. 2023-24. Academic council authorized Chairman Dr. U.P. Waghe to take necessary steps to get further approvals from Government and other statutory authorities as and when necessary.

Item 30.13 Any other matter with the permission of the chair.

As there was no other matter for the discussion, the meeting was adjourned.

The meeting concluded with thanks to the Chair.

Date: 01 August, 2023

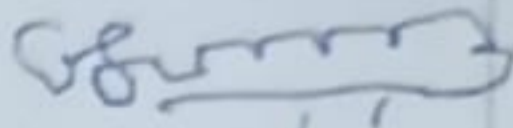
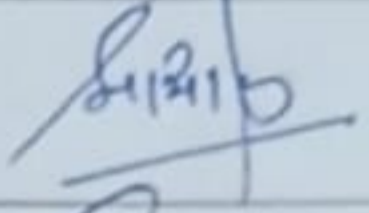
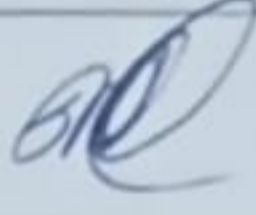

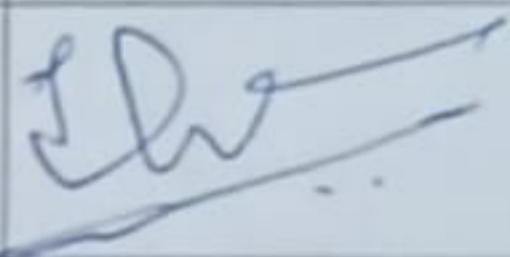

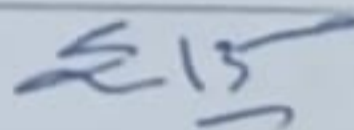

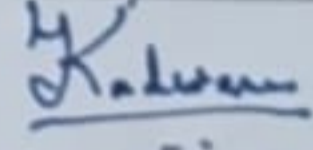
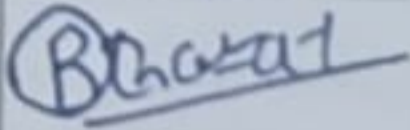
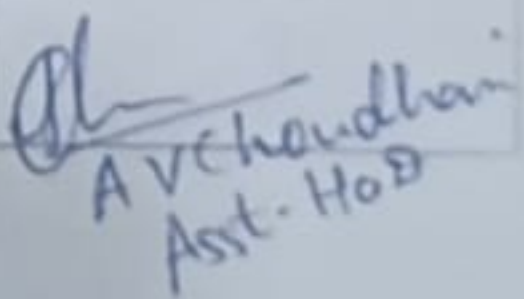
(Dr. A.V. Patil)
Dean (Academic Matters)

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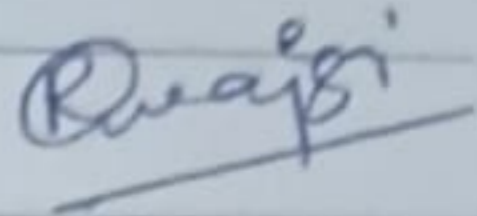
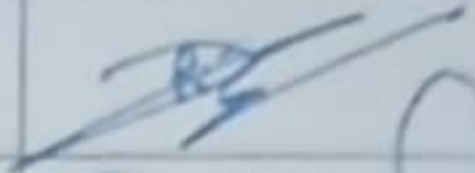
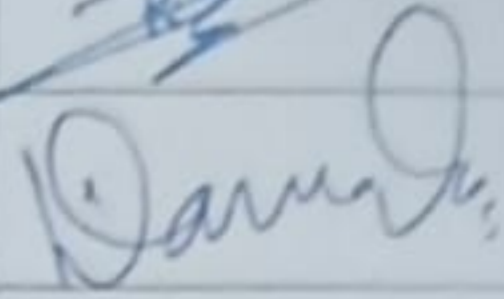
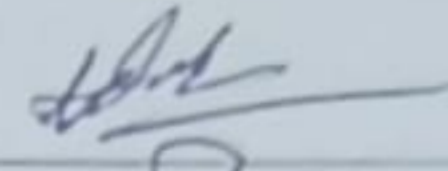
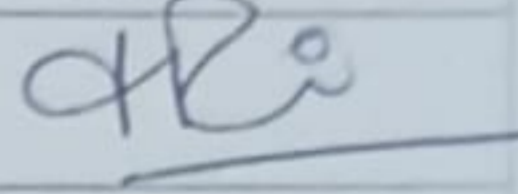
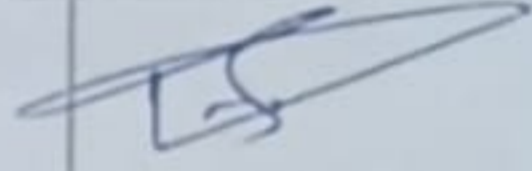
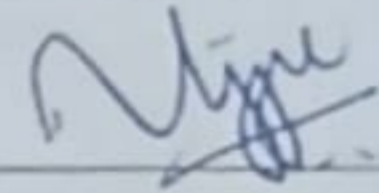

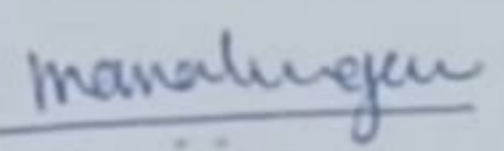
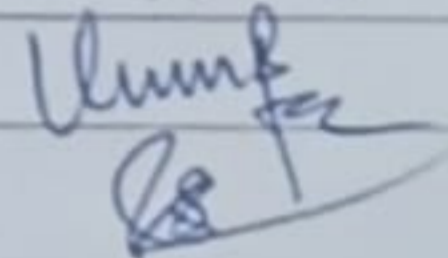
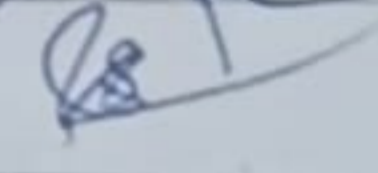
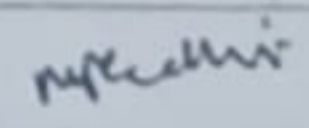
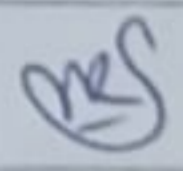
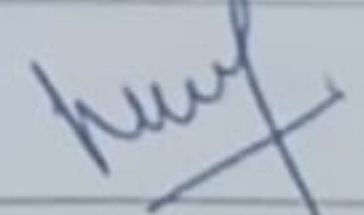
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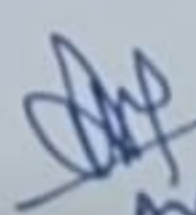
Attendance of Academic Council 2021-24

Date: 28/07/2023

Category	SN	MEMBERS	Address	Signature
The Principal as Chairman	1	Dr. U.P. Waghe	Professor in Civil Engg, YCCE, Nagpur; and Principal	
Nominee of VC	2	Dr. S.A. Dhale	Principal, Priyadarshini College of Engineering, Digdoh Hills, CRPF Hills, Nagpur	
Nominee of VC	3	Dr. Sanjay Kelo	Principal, Nararjuna Insitute of Engineering, & Technology & Management, Satnavari, Amravati Road, Nagpur	
Nominee of VC	4	Dr.P.D. Pachpor	Professorl, Deptt. of Civil Engineering, Shri Ramdeobaba College of Engineering and Management, Ramdeo Tekdi, Gittikhadan, Katol Road, Nagpur	
4 outside experts from Industry, Commerce Law, Education, Medicine, Engg. etc, to be nominated by the Governing Body	5	Prof. Dr. N.C. Siva Prakash, Professor, IISc, Bangalore	Department of Instrumentation and Applied Physics, Indian Institute of Science, Bangalore 560 012	
	6	Shri Amol Deshpande,	HR advisor, M/s Lumiradx Ltd., Pune	
	7	Shri Swapnil Shukla,	Senior Talent Partner (APAC Region) GitHub (Microsoft), Hyderabad.	-
	8	Shri Urvish Pandey	Lead - Campus Recruitment & University Relations, Mastercard India, Pune-M.S.	-
All HODs	9	Dr. S.P. Raut	Head, Dept of Civil Engg, YCCE, Nagpur	
	10	Dr. J.P. Giri	Head, Dept of Mech Engg, YCCE, Nagpur	
	11	Dr. S.G. Kadwane	Head, Dept of Electrical Engg, YCCE, Nagpur	
	12	Dr. R.D. Thakare	Head, Dept of Electronics Engg, YCCE, Nagpur	
	13	Dr. M.S. Narlawar	Head, Dept of Eletronics and Telcomm, YCCE, Nagpur	

A V Chaudhari
Asst. HoD

	14	Dr. Mrs. R.D. Wajgi	Head, Dept of Computer Tech, YCCE, Nagpur	
	15	Dr. R.C. Dharmik	Head, Dept of Information Tech, YCCE, Nagpur	
	16	Dr. L.B. Damahe	Head, Dept of Computer Science & Engineering, YCCE, Nagpur	
	17	Dr. Mrs. M.A. Adak	Head, Dept. of Mathematics and Humanities, YCCE, Nagpur	
	18	Dr. Mrs. H.V. Ganvir	Head, Dept. of Physics, YCCE, Nagpur	
	19	Dr. Mrs. P. U. Waghe	Head, Dept of Chemistry, YCCE, Nagpur	for MSI
4 teachers of the college representing different categories of teaching staff by rotation on the basis of seniority of service in the college.	20	Dr. S.V. Prayagi	Registrar, YCCE	—
	21	Dr. A.R. Bhagat Patil	Asso. Professor in Computer Technology, YCCE, Nagpur; and Dean (P&D)	—
	22	Prof. D.R. Raut	Associate Professor in Civil Engg, YCCE, Nagpur; and Controller of Examinations	
	23	Dr. Ms. U.H. Gawande	Dean (R&D), YCCE, Nagpur.	
Invitee	24	Dr. Mrs. G.M. Dhopavkar	Dean (T&P), YCCE, Nagpur.	—
	25	Dr. Aniket P. Munshi	A.P. in Electrical Engg, YCCE, Nagpur	—
1 faculty member nominated by the Principal (Member Secretary)	26	Dr. A.V. Patil, Dean (Academic Matters)	Professor in Civil Engg, YCCE, Nagpur; and Dean Academic Matters	
Special Invitee	27	Dr. Manali Kshirsagar	Director Technical & Advisor	
	28	Mr. Kumar Mansukhani		
	29	Dr. S.S. Choudhary, Dean OBE	Dean (OBE), YCCE, Nagpur.	
	30	Dr. Mrs. P.A. Gandhi	First Year Coordinator, YCCE, Nagpur	
	31	Dr. Mrs. S.V. Rathkantiwar	Dean (IRO), YCCE, Nagpur.	
	32	Mr. Niraj Wakhare	TPO, YCCE, Nagpur	


 23/08/23
 Dean (Acad)
 Yashwantrao Chavan
 College of Engineering
 Wanadongri Hingna Road
 NAGPUR - 441 110



**Minutes of 31st meeting of Academic Council held on
Saturday the 16th March,2024**

The 31st meeting of Academic Council was held on **Saturday the 16th March,2024** at 11.00 am in the Electronics Engineering Board Room of YCCE, Nagpur. Following members attended the meeting.

1	Dr. U.P. Waghe, Principal & Chairman	12	Dr. Lalit Damahe HoD CSE
2	Prof. Dr. N.C. Sivaprakash IISc., Bangalore	13	Dr. R.C. Dharmik, HoD, Information Technology
3	Dr.P.D. Pachpor Professor, Deptt. of Civil Engineering, SRCOEM, Ramdeo Tekdi, Gittikhadan, Nagpur	14	Dr. Mrs. M.A. Adak, HoD Mathematics and Humanities
4	Dr. S.A. Dhale. Principal, Priyadarshini College of Engineering, Digdoh Hills, CRPF Hills, Nagpur	15	Dr. Mrs. H.V. Ganvir, HoD Physics
5	Shri Swapnil Shukla, Senior Talent Partner (APAC Region) GitHub (Microsoft), Hyderabad.	16	Dr. Mrs. P. U. Waghe Head, Dept of Chemistry, YCCE, Nagpur
6	Dr. S.P. Raut HoD, Civil Engineering	17	Dr. S.V. Prayagi Registrar, YCCE, Nagpur
7	Dr. J.P. Giri HoD, Mechanical Engineering	18	Dr. A.R. Bhagat Patil Asso. Prof. in C.T., YCCE, Nagpur; and Dean (P&D)
8	Dr. S.G. Kadwane, HoD , Electrical Engineering	19	Prof. D.R. Raut, CoE, YCCE,
9	Dr. R.D. Thakare HoD Electronics Engineering	20	Dr. Ms. U.H. Gawande, Dean (R&D)
10	Dr. M.S. Narlawar HoD, Electronics &Telecomm. Engg	21	Dr. Mrs. G.M. Dhopavkar Dean (T&P), YCCE, Nagpur.
11	Dr. Mrs. R.D. Wajgi, HoD Computer Technology	22	Dr. Aniket P. Munshi Dean (SA), YCCE, Nagpur



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23	Mr. Kumar Mansukhani Management Representative	25	Dr. Mrs. S.V. Rathkantiwar, Dean (IRO), YCCE, Nagpur.
24	Dr. Mrs. Manjusha P. Gandhi, Chairman, BoS GE & FYC	26	Dr. A.V. Patil, Dean (Acad. Mat.) & Member Secretary
24	Mr. Niraj Wakhare, TPO, YCCE, Nagpur	27	Dr. Mrs. Smriti Verma HOD. DMSE, YCCE, Nagpur

Leave of Absence granted to			
1	Dr. Sanjay Kelo Principal, Nararjuna Insitute of Engineering, & Technology & Management, Satnavari, Amravati Road, Nagpur	4	Dr. Mrs. Manali Kshirsagar Director Technical & Advisor YCCE, Nagpur
2	Shri Amol Deshpande, Sr. Manager - HR, Mahindra & Mahindra Ltd., Mumbai	5	Dr. S.S. Choudhary, Dean OBE, YCCE, Nagpur
3	Shri Urvish Pandey Lead - Campus Recruitment & University Relations, Mastercard India, Pune-M.S.		

Item 31.01: Welcome of new members

The Chairman of the Academic Council, Dr. U.P. Waghe welcomed the members of the Academic Council for 31st meeting of Academic Council

Item 31.02 To confirm the Minutes of 30th Meeting of the Academic Council

The Academic Council unanimously approved the minutes of 30th meeting of the Academic Council held on 28th July, 2023.

The Academic Council also unanimously approved the ATR of 30th meeting of Academic Council.



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Item 31.03 To discuss and approve the suggestions of Board of Studies for changes in Schemes of Examination and course contents of Autonomous 2022, SoE_2023 scheme for UG and PG Programs

The Chairpersons of various Boards of Studies presented the minutes of the meetings to Academic Council.

The changes proposed by various boards regarding the syllabi of the courses of "Autonomous 2022 & SoE_2023" scheme are as below :-

- ❖ **The minor changes in the course contents suggested by the BoS for UG/PG programmes**

Civil Engineering :

S.N.	Sem	Course Code	Course Name	Contents	
				Added	Deleted
1	II	22STR204	Advanced Steel Structures	Analysis and Design of Tower in unit V	Analysis and Design of Bunkers from unit V

Electrical Engineering :

S.N.	Sem	Course Code	Course Name
1	I	23EL1101	Basic Electronics and Electrical Engineering
2	I	23EL1102	Basic Electrical Engineering

Computer Technology :

1. Minor changes were suggested in the syllabus of course 'Big data and Hadoop' of the 7th semester course of the program B.Tech in AIDS. Experts have suggested to re frame the Unit I and Unit VI
2. Minor changes were suggested in the syllabus of 'Deep Learning' of the 7th semester course of the program B.Tech in AIDS
3. Experts have suggested to add some language independent tools for the course 'Introduction to Logic Building and Programming' ex : Scratch

Information Technology :

SEM	Course	Suggestions
5 th	Database Management Systems	Unit2 should be on NoSQL(MONGODB)



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4 th	Cyber laws	Redesign the content based on Cyber Crime and Security
4 th	Audit course on Open Source tool for Graphics	Effectively cover three open source graphics tool instead of six, rearrange the syllabus accordingly

Computer Science & Engineering SoE_20-21:

semester	Course	Suggestions
VII	CSE2445- PE V: Big Data Analytics	Spark architecture , SparQL, Cassandra can be included in syllabus
VII	CSE-2423 Machine Learning Techniques	Optimization Techniques and Linear Programming should be included

General Engineering (FYC) _SoE_2023:

- 1) Reshuffling in the syllabus of Calculus and Vector(23GE1101/23GE1201) and addition of topic Differentiation under the integral sign has done, as suggested by the faculties.
- 2) Reshuffling in the syllabus of Engineering Chemistry, Applied Chemistry has done as suggested by the faculties.
- 3) Course Name Integral transform and partial differential equations has changed to Integral transform All the changes were accepted by the experts.
- 4) Applications of motion of charged particles in electric and magnetic field (Bainbridge mass spectrograph) has been added in courses Applied Physics and Engineering Physic

❖ **The changes in the Books suggested by the BoS as below**

Branch	SoE	Course Code & Name
CSE	20-21	CSE-2423 Machine Learning Techniques Suggestion : Pattern Recognition,4th edition, Sergios Theodoridis
		CSE2445- PE V: Big Data Analytics Suggestion : Reference book to be added – seven databases in seven weeks

❖ **The changes in the laboratory Courses suggested by the BoS as below**



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Branch	SoE	Course Code & Name
CT	2022	<ol style="list-style-type: none">1. In the list of experiments of the course Software Engineering in the SoE of B.Tech 2022 of undergraduate program, practical based on deployment of software, complete lifecycle of software, is added and approved by the experts2. List of pure lab course, 'Advance Web Technology', in the SoE B.Tech 2022 of program AIDS is proposed and approved by the experts3. In the list of experiments of the course Operating Systems in the SoE of B.Tech 2022 of undergraduate program, practical based on OpenMP, thread programming and shell scripting is added and approved by experts.

❖ **Following new courses/MOOCs courses are suggested by BoS for students for the session 2023-24.**

Branch	Course Name
Civil Engineering.	Professional Elective through cousera "Construction Management "
Electrical Engineering	Professional Elective through cousera "Energy Production, Distribution and Safety"
Computer Technology	Professional Elective through cousera "Java-script and React Basics".
Information Technology	Professional Elective through cousera " "Software Testing and Automation"
Computer Science & Engg.	Professional Elective through cousera TH "Programming with Javascript(Meta)" PR- React Basics (Meta)

During the discussion in Academic Council, the members opinions were recorded as below,

- *Academic Council strongly suggested that before inviting industry experts for delivery of theory or practical courses, the HoD & BoS shall go through the credentials of expert and shall justify the Rol of inviting a particular industry expert.*



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- *Academic Council suggested that the student must be examined to have PoC (Proof of Concepts) after attending any value-added course training programme to track the success of the same.*
- *Academic Council suggested that a certificate shall be awarded to students at the end of successful completion of value-added course.*
- *Academic Council strongly suggested to conduct National HACKATHON or similar competition as a regular event every year in to address burning contemporary burning issues to make students industry ready.*
- *Academic Council strongly suggested to add, "Competitive Programming" in curriculum of CT, IT, CSE, AIDS, AIML, CSD, CSE(IoT)*

The Academic Council approved changes in course contents and changes in the text/reference books, laboratory and MOOC Courses for the courses mentioned above. These changes will be incorporated with immediate effect. Appropriate measures shall also be taken to incorporate other important observations of AC.

Item 31.04 To discuss and approve the outcomes of Feedback & result analysis suggested by BoS and ATR

The issues related to CO-PO attainment and result analysis were discussed by Academic Council and in view of unavailability of data from CoE office, it was suggested that the same related to ODD term shall be presented along with EVEN term in next AC Meeting.

- The Academic Council expressed serious concern about the delay in CO/PO attainment because of lack of data from CoE office.
- The Academic Council expressed serious concern about the delay in result analysis from CoE office.

Academic Council permitted the presentation of CO-PO attainment and result analysis of ODD term and EVEN term in next Academic Council meeting.

Item 31.05 To discuss and approve the Scheme of Examination Autonomous 2023 scheme for UG as per NEP and GoM guidelines and PG Scheme

DAM presented the first to final year SoEs of all UG programmes as per the guidelines issued by college for devising SoE 2023 as per GoM GR on NEP 2020 dated 04.07.23. It was explained to the Academic Council, that the SoE include



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basic 160+14 MDM i.e. 176 credits Scheme along with additional Exit programme, Minor Programme, Honor programme etc.

Academic Council approved Scheme of Examination 2023 (SoE 2023) prepared in all respect, as proposed and permitted of being implemented w.e.f. A.Y. 2023-24 in FY and w.e.f. A.Y. 2024 -25 for second year for first to Final year UG programmes.

Item 31.06 To discuss and finalize the changes, if any, in Academic Regulations

Following Academic regulations were discussed by the A.C.,

- 1) Principal Direction 1 of 2024_Credit Transfer As Per NEP-2020 towards KKSU Ramtek_Courses
- 2) Principal Direction 2 of 2024_Credit transfer as per NEP-2020 towards SWAYAM NPTEL Courses
- 3) Academic council strongly suggested to incorporate evaluation mechanism while assessing the grades of COURSERA courses. Academic Council also suggested that at least one faculty member shall also enrol along with the students for facilitating proper evaluation in MSE-ESE Examination.
- 4) Academic Council also suggested that for every COURSERA course offered the discussion in BoS shall be mandatory in addition to CO framing and also CO/PO mapping and attainment is advised.
- 5) It was suggested that every department shall nominate credit transfer co-ordinator for smooth conduction of the scheme.

Academic Council unanimously approved the changes of Academic Regulations & Principal Direction subject to suggested modifications.

Item 31.07 To discuss and approve the report of Controller of Examinations for Odd Term 2023-24 including the list of candidates who have become eligible for award of UG and PG degrees.

The report of the Controller of Examinations was put up before the members of the Council. Members discussed the same and accepted with the suggestions related to result analysis delays.

The Academic Council approved the report of Controller of Examinations for Odd Term 2023-24



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Item 31.08 To discuss and approve the changes, if any, in Examination Manual.

There were no changes in examination manual.

Item 31.09 To discuss and approve the report of Dean (Academic Matters) for Odd Term 2023-24

The report of the Dean (Academic Matters) was put before the members and discussed.

The Academic Council approved the report of the Dean (Academic Matters) for the Odd Term of 2023-24.

Item 31.10 To discuss and approve the report of Research Centre Activities for Odd Term 2023-24.

- 1) The report of the Research Centre Activities was put before the members and was discussed by the Academic Council.
- 2) Academic Council strongly suggested to carry out immediate indexing of YCCE Journal.

The Academic Council approved the report of the Dean (R&D) for the Odd Term of 2023-24.

Item 31.11 To discuss and approve the report of the Training and Placement cell for Odd Term 2023-24.

The report of the Training and Placement cell was put before the members. The report of Training and Placement cell for Odd Term 2023-24 was discussed by the Academic Council

The Academic Council approved the report of Training and Placement Cell for the Odd Term of 2023-24.



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Item 31.12 To discuss and approve the Annual report of IQAC (Internal Quality Assurance Cell) for session 2022-23.

The report of the I.Q.A.C. was put before the members and was discussed by the Academic Council.

The Academic Council approved the report of IQAC for the Academic Year of 2022-23.

Item 31.13 To discuss new UG/PG programme for A.Y. 2024-25

Following addition / alteration in UG/PG programme for A.Y. 2024-25 were discussed in the Academic Council,

Proposed increase intake UG

1. Computer Technology	-	60 to 120
2. A.I.D.S.	-	60 to 120
3. Information Technology	-	120 to 180

Proposed increase intake PG

1. M.B.A.	-	60 to 120
-----------	---	-----------

Proposed of new UG programmes

Civil Engineering (working professional)	-	30 intake
Electrical Engineering (working professional)	-	30 intake
Computer Technology (working professional)	-	30 intake

Introduction of Foreign National / OCI/PIO Admission Quota

1) CSE	-	27 additional intake
2) ETC	-	27 additional intake
3) AIDS	-	18 additional intake
4) CE	-	18 additional intake
5) ME	-	18 additional intake

Proposed Closure of PG Programme

1. M.Tech VLSI



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Academic Council approved Addition /Alterations of various UG/PG programmes and permitted the implementation from A.Y. 2024-25. Academic council authorized Chairman Dr. U.P. Waghe to take necessary steps to get further approvals from Government and other statutory authorities as and when necessary.

Item 31.13 Any other matter with the permission of the chair.

Following two issues were discussed with a permission of chair

1) *Permission to form new Academic Council & Board of Studies for A.Y. 2024-25 to 2026-27.*

Academic Council permitted formation of new A.C. & BoS for A.Y. 2024-25 to 2026-27 and authorized Chairman Dr. U.P. Waghe to take necessary steps.

2) *Thanks to outgoing Academic Council A.Y. 2021-2024*

The Academic Council placed on record, it's sincere gratitude to all committee members for their valuable suggestions and support during the meeting of Academic Councils in AY 2021-22, 2022-23 and 2023-24.

The meeting concluded with thanks to the Chair.

Date: 18 March, 2024

(Dr. A.V. Patil)
Dean (Academic Matters)

YESHWANTRAO CHAVAN COLLEGE OF ENGINEERING
Hingna Road, Wanadongri, Nagpur-411 110.

Attenance of 31st Academic Council

Date : 16.03.2024

Category	SN	MEMBERS		Signature
The Principal as Chairman	1	Dr. U.P. Waghe	Professor in Civil Engg, YCCE, Nagpur; and Principal	
Nominee of VC	2	Dr. S.A. Dhale	Principal, Priyadarshini College of Engineering, Digdoh Hills, CRPF Hills, Nagpur	
Nominee of VC	3	Dr. Sanjay Kelo	Principal, Nararjuna Insitute of Engineering, & Technology & Management, Satnavari, Amravati Road, Nagpur	-
Nominee of VC	4	Dr.P.D. Pachpor	Professor, Deptt. of Civil Engineering, Shri Ramdeobaba College of Engineering and Management, Ramdeo Tekdi, Gittikhadan, Katol Road, Nagpur	
4 outside experts from Industry, Commerce Law, Education, Medicine, Engg. etc, to be nominated by the Governing Body	5	Prof. Dr. N.C. Siva Prakash, Professor, IISc, Bangalore	Department of Instrumentation and Applied Physics, Indian Institute of Science, Bangalore 560 012	
	6	Shri Amol Deshpande,	HR advisor, M/s Lumiradx Ltd., Pune	-
	7	Shri Swapnil Shukla,	Senior Talent Partner (APAC Region) GitHub (Microsoft), Hyderabad.	
	8	Shri Urvish Pandey	Lead - Campus Recruitment & University Relations, Mastercard India, Pune-M.S.	-
All HODs	9	Dr. S.P. Raut	Head, Dept of Civil Engg, YCCE, Nagpur	
	10	Dr. J.P. Giri	Head, Dept of Mech Engg, YCCE, Nagpur	
	11	Dr. S.G. Kadwane	Head, Dept of Electrical Engg, YCCE, Nagpur	
	12	Dr. R.D. Thakare	Head, Dept of Electronics Engg, YCCE, Nagpur	
	13	Dr. M.S. Narlawar	Head, Dept of Eletronics and Telcomm, YCCE, Nagpur	
	14	Dr. Mrs. R.D. Wajgi	Head, Dept of Computer Tech, YCCE, Nagpur	
	15	Dr. R.C. Dharmik	Head, Dept of Information Tech, YCCE, Nagpur	
	16	Dr. L.B. Damahe	Head, Dept of Computer Science & Engineering, YCCE, Nagpur	
	17	Dr. Mrs. M.A. Adak	Head, Dept. of Mathematics and Humanities, YCCE, Nagpur	

YESHWANTRAO CHAVAN COLLEGE OF ENGINEERING
Hingna Road, Wanadongri, Nagpur-411 110.

Attenance of 31st Academic Council

Date : 16.03.2024

Category	SN	MEMBERS		Signature
	18	Dr. Mrs. H.V. Ganvir	Head, Dept. of Physics, YCCE, Nagpur	
	19	Dr. Mrs. P. U. Waghe	Head, Dept of Chemistry, YCCE, Nagpur	
4 teachers of the college representing different categories of teaching staff by rotation on the basis of seniority of service in the college.	20	Dr. S.V. Prayagi	Registrar, YCCE	
	21	Dr. A.R. Bhagat Patil	Asso. Professor in Computer Technology, YCCE, Nagpur; and Dean (P&D)	 16/03/24
	22	Prof. D.R. Raut	Associate Professor in Civil Engg, YCCE, Nagpur; and Controller of Examinations	
	23	Dr. Ms. U.H. Gawande	Dean (R&D), YCCE, Nagpur.	
Invitee	24	Dr. Mrs. G.M. Dhopavkar	Dean (T&P), YCCE, Nagpur.	
	25	Dr. Aniket P. Munshi	Dean (SA), YCCE, Nagpur	
1 faculty member nominated by the Principal (Member Secretary)	26	Dr. A.V. Patil, Dean (Academic Matters)	Professor in Civil Engg, YCCE, Nagpur; and Dean Academic Matters	
Special Invitee	27	Dr. Manali Kshirsagar	Director Technial & Advisor	—
	28	Mr. Kumar Mansukhani		
	28	Dr. S.S. Choudhary, Dean OBE	Dean (OBE), YCCE, Nagpur.	
	29	Dr. Mrs. M.P. Gandhi	First Year Coordinator, YCCE, Nagpur	
	29	Mr. Niraj Wakhare	TPO, YCCE, Nagpur	
	30	Dr. Mrs. S.V. Rathkantiwar	Dean (IRO), YCCE, Nagpur.	
	30	Dr. Mrs. Smriti Verma	HOD. DMSE, YCCE, Nagpur	

Dr. A. V. Patil
Dean (AM) & Member Secretary A.C.

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Civil Engineering

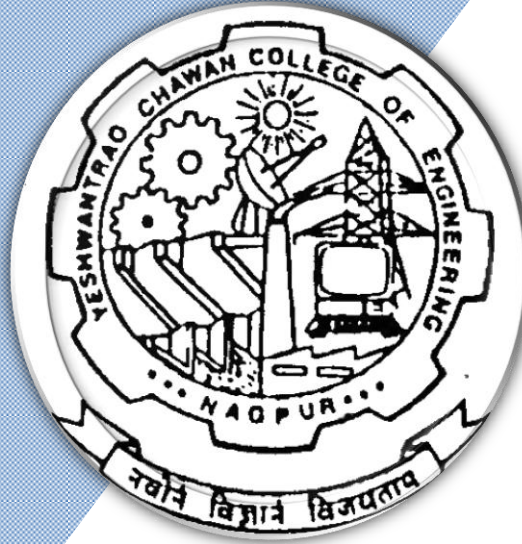
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Bachelor of Technology

SoE & Syllabus 2023

1st to 4th Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering



B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Civil Engineering)

B. Tech. in Civil Engineering

SoE No.
23CV-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1104	Applied Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1105	Lab: Applied Chemistry	P	0	0	2	2	1		60	40	
4	1	HS/AEC1	GE	23GE1112	Professional Communication	T	2	0	0	2	2	30	20	50	2
5	1	HS/IKS	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	2
6	1	BES	CV	23CV1101	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	1	BES	CV	23CV1102	Lab: Engineering Mechanics	P	0	0	2	2	1		60	40	
8	1	BES	IT	23IT1103	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	2
9	1	BES	IT	23IT1104	Lab: Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go	...	...	...	...	...	2		60	40	
11	1	CC1	GE		Liberal Learning Course (LLC1)	...	...	...	...	...	2		60	40	
TOTAL FIRST SEM							15	0	6	21	22				
SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1202	Differential Equations, Matrices and Statistics	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1208	Engineering Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1209	Lab: Engineering Physics	P	0	0	2	2	1		60	40	
4	2	BES	ME	23ME1201	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	2	BES	ME	23ME1202	Lab : Engineering Graphics	P	0	0	4	4	2		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	BES	ME	23ME1207	Lab : FAB Shop	P	0	0	2	2	1		60	40	
8	2	PC	CV	23CV1203	Strength of Materials	T	3	0	0	3	3	30	20	50	3
9	2	PC	CV	23CV1204	Lab : Strength of Materials	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	...	...	...	...	...	2		60	40	
11	2	CC2	GE		Liberal Learning Course (LLC2)	...	...	...	...	...	2		60	40	
TOTAL SECOND SEM							13	0	10	23	22				

Liberal Learning Course

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	1	CC1	GE	23LLC1101	Music (Vocal)
2	1	CC1	GE	23LLC1102	Music (Instrumental)
3	1	CC1	GE	23LLC1103	Indian Classical Dance
4	1	CC1	GE	23LLC1104	Other forms of Dances
5	1	CC1	GE	23LLC1105	Painting
6	1	CC1	GE	23LLC1106	Theatre and acting
7	1	CC1	GE	23LLC1107	Photography
8	1	CC1	GE	23LLC1108	Yoga
9	1	CC1	GE	23LLC1109	Chess
10	1	CC1	GE	23LLC1110	Athletics
11	1	CC1	GE	23LLC1111	Basket Ball
12	1	CC1	GE	23LLC1112	Judo
13	1	CC1	GE	23LLC1113	Elements of Japanese Language
14	1	CC1	GE	23LLC1114	Elements of German Language
15	1	CC1	GE	23LLC1115	Elements of French Language
16	1	CC1	GE	23LLC1116	Elements of Spanish Language
17	1	CC1	GE	23LLC1117	Basics of Vedic Maths
18	1	CC1	GE	23LLC1118	Skilling in Microsoft Visio and Inkscape

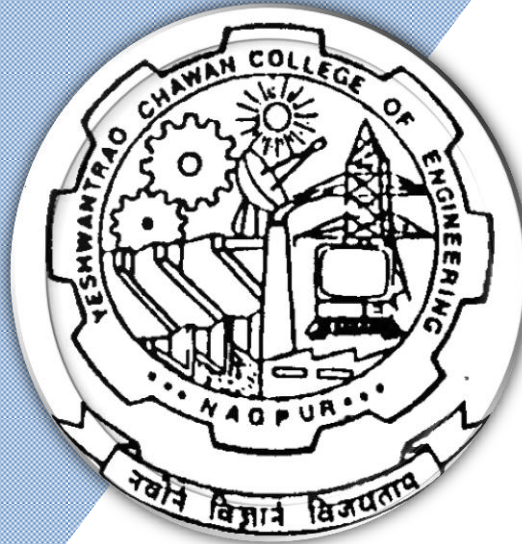
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Bachelor of Technology

SoE & Syllabus 2022

1st to 8th Semester

(Department of Civil Engineering)

B. Tech in Civil Engineering

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B.TECH SCHEME OF EXAMINATION 2022
 (Scheme of Examination w.e.f. 2022-23 onward)
 (Department of Civil Engineering)
B. Tech in Civil Engineering

SoE No.
22CV-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER															
1	1	BS	GE/MTH	22CV101	Calculus and Vector	T	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/CHE	22CV102	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/CHE	22CV103	Lab: Engineering Chemistry	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22CV104	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	CV/CV	22CV105	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hrs
6	1	BES	CV/CV	22CV106	Lab: Engineering Mechanics	P	0	0	2	2	1		60	40	
7	1	BES	EE/EE	22CV107	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	IT/IT	22CV108	Programming for Problem Solving	T	3	0	0	3	3	30	20	50	3 Hrs
9	1	BES	IT/IT	22CV109	Lab: Programming for Problem Solving	P	0	0	2	2	1		60	40	
TOTAL							18	1	6	25	22				

List of Mandatory Learning Course (MLC)															
1	1	HS	GE/HUM	GE2131	Universal Human Value	A	2	0	0	2	0				
2	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	A	2	0	0	2	0				

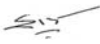

SECOND SEMESTER															
1	2	BS	GE/MTH	22CV201	Differential Equation, matrices and Statistics	T	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/PHY	22CV202	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/PHY	22CV203	Lab: Engineering Physics	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22CV204	Social Science	T	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	ME/ME	22CV205	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hrs
6	2	BES	ME/ME	22CV206	Lab: Engineering Graphics	P	0	0	4	4	2		60	40	
7	2	BES	CT/CT	22CV207	Elements of AIML	T	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	ME/ME	22CV208	FAB Shop	P	0	0	2	2	1		60	40	
9	2	BES	CV/CV	22CV209	Strength of Materials	T	3	0	0	3	3	30	20	50	3 Hrs
10	2	BES	CV/CV	22CV210	Lab: Strength of Materials	P	0	0	2	2	1		60	40	
TOTAL							16	1	10	27	22				

List of Mandatory Learning Course (MLC)															
1	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	A	2	0	0	2	0				
2	2	BES	GE/CHE	GE2132	Environmental Science	A	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activities decided by course teacher, TA3 - 3 marks on class attendance

TA** = for Practical : MSPA will be 15 marks each

		June 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Civil Engineering)

B. Tech in Civil Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	BS	GE	22CV301	Integral Transforms and Partial Differential Equations	T	3	0	0	3	3	30	20	50	3 Hrs
2	3	HS	GE/HUM	22CV302	Fundamentals of Management and Economics	T	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	CV	22CV303	Geotechnical Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
4	3	PC	CV	22CV304	Lab:- Geotechnical Engineering	P	0	0	2	2	1	60	40		
5	3	PC	CV	22CV305	Fluid Mechanics	T	3	1	0	3	3	30	20	50	3 Hrs
6	3	PC	CV	22CV306	Lab:- Fluid Mechanics	P	0	0	2	2	1	60	40		
7	3	PC	CV	22CV307	Water Supply Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
8	3	PC	CV	22CV308	Lab:- Water Supply Engineering	P	0	0	2	2	1	60	40		
9	3	PC	CV	22CV309	Building Construction and Building Materials	T	3	0	0	3	3	30	20	50	3 Hrs
10	3	PC	CV	22CV310	Lab:- Computer Aided Drawing	P	0	0	2	2	1	60	40		
11	3	PC	CV	22CV311	Environmental Sustainability, Pollution and Management	T	3	0	0	3	3	30	20	50	3 Hrs
TOTAL THIRD SEM							18	1	8	26	25				

List of Mandatory Learning Course (MLC)

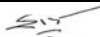

1	3	HS	T&P	MLC123	YCAPP3 :	A	3	0	0	3	0				
2	3	BES	CV	MLC101	Application of Python Programming in Civil Engineering	A	2	0	0	2	0				

FOURTH SEMSTER

1	4	PC	CV	22CV401	Wastewater Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
2	4	PC	CV	22CV402	Reinforced Concrete Structures	T	3	1	0	3	3	30	20	50	3 Hrs
3	4	PC	CV	22CV403	Concrete Technology	T	3	0	0	3	3	30	20	50	3 Hrs
4	4	PC	CV	22CV404	Lab:- Concrete Technology	P	0	0	2	2	1	60	40		
5	4	PC	CV	22CV405	Surveying	T	3	0	0	3	3	30	20	50	3 Hrs
6	4	PC	CV	22CV406	Lab:- Surveying	P	0	0	2	2	1	60	40		
7	4	PC	CV	22CV407	Structural Analysis	T	3	0	0	3	3	30	20	50	3 Hrs
8	4	PC	CV	22CV408	Lab:- Structural Analysis	P	0	0	2	2	1	60	40		
9	4	PC	CV	22CV409	Transportation Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
10	4	PC	CV	22CV410	Lab:- Transportation Engineering	P	0	0	2	2	1	60	40		
TOTAL FOURTH SEM							18	1	8	26	22				

List of Mandatory Learning Course (MLC)

1	4	HS	T&P	MLC2124	YCAPP4 :	A	3	0	0	3	0				
2	4	BES	CV	MLC102	Quantity ,Estimation and Management	A	2	0	0	2	0				

		June 2022	1.00	Applicable for AY 2022-23 Onwards
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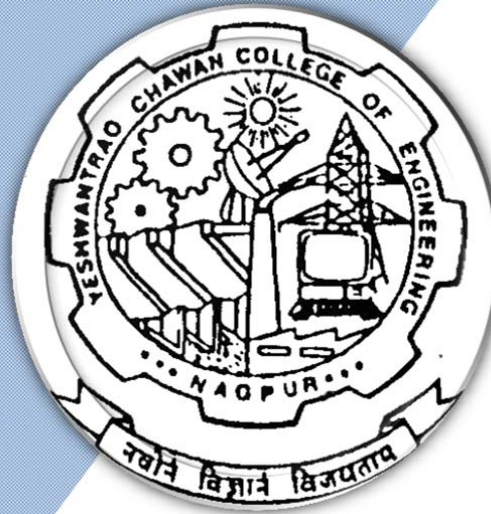
Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110



**Bachelor of Engineering
SoE & Syllabus 2018
3rd to 8th Semester
Civil Engineering**



B.E. SCHEME OF EXAMINATION 2018-19
 (Revised Scheme of Examination w.e.f. 2020-21 onward)

Civil Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration
						L	T	P	Hrs		MSEs*	TA**	ESE	
TOTAL FIRST & SECOND SEM										47				
Third Semester														
1	3	BS	GE2201	Engineering Mathematics III	T	3	0	0	3	3	30	30	40	3
2	3	PC	CV2201	Strength of Materials	T	3	0	0	3	3	30	30	40	3
3	3	PC	CV2202	Lab:- Strength of Materials	P	0	0	2	2	1		60	40	
4	3	PC	CV2203	Geotechnical Engineering	T	3	0	0	3	3	30	30	40	3
5	3	PC	CV2204	Lab:- Geotechnical Engineering	P	0	0	2	2	1		60	40	
6	3	PC	CV2205	Fluid Mechanics	T	3	0	0	3	3	30	30	40	3
7	3	PC	CV2206	Lab:- Fluid Mechanics	P	0	0	2	2	1		60	40	
8	3	PC	CV2207	Water Supply Engineering	T	3	0	0	3	3	30	30	40	3
9	3	PC	CV2208	Lab:- Water Supply Engineering	P	0	0	2	2	1		60	40	
TOTAL						15	0	8	23	19				

Fourth Semester														
1	4	BS	GE2204	Advance Mathematical Techniques	T	3	0	0	3	3	30	30	40	3
2	4	PC	CV2251	Concrete Technology	T	3	0	0	3	3	30	30	40	3
3	4	PC	CV2252	Lab:- Concrete Technology	P	0	0	2	2	1		60	40	
4	4	PC	CV2253	Surveying	T	3	0	0	3	3	30	30	40	3
5	4	PC	CV2254	Lab:- Surveying	P	0	0	2	2	1		60	40	
6	4	PC	CV2255	Structural Analysis	T	4	0	0	4	4	30	30	40	3
7	4	PC	CV2256	Lab:- Structural Analysis	P	0	0	2	2	1		60	40	
8	4	PC	CV2257	Transportation Engineering	T	3	0	0	3	3	30	30	40	3
9	4	PC	CV2258	Lab:- Transportation Engineering	P	0	0	2	2	1		60	40	
TOTAL						16	0	8	24	20				

Audit Courses														
1	4	HS	GE2121	Env Studies for 4 Sem. CV,ME,EE,IT	A	3	0	0	3	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

		June 2020	1.02	Applicable for AY 2020-21 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	



B.E. SCHEME OF EXAMINATION 2018-19
 (Revised Scheme of Examination w.e.f. 2020-21 onward)

Civil Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Fifth Semester														
1	5	HS	GE2311	Fundamental of Management	T	3	0	0	3	3	30	30	40	3
2	5	PC	CV2301	Reinforced Concrete Structures	T	3	0	0	3	3	30	30	40	4
3	5	PC	CV2302	Advanced Structural Analysis	T	3	0	0	3	3	30	30	40	3
4	5	PC	CV2303	Lab:- Analysis and Design Studio	P	0	0	2	2	1	60	40		
5	5	PE		Professional Elective-I	T	3	0	0	3	3	30	30	40	3
6	5	PE		Lab:- Professional Elective -I	P	0	0	2	2	1	60	40		
7	5	OE		Open Elective - I *	T	3	0	0	3	3	30	30	40	3
8	5	OE		Open Elective - II *	T	3	0	0	3	3	30	30	40	3
TOTAL						18	0	4	22	20				

Professional Elective - I

1	5	PE-I	CV2311	PE-I : Advanced Surveying
	5	PE-I	CV2312	PE-I Lab : Advanced Surveying
2	5	PE-I	CV2313	PE-I : Computer Applications in Civil Engineering
	5	PE-I	CV2314	PE-I Lab : Computer Applications in Civil Engineering
3	5	PE-I	CV2315	PE-I : Building Construction and Materials
	5	PE-I	CV2316	PE-I Lab : Building Construction and Materials
4	5	PE-I	CV2317	PE-I : Matrix Analysis of Structures
	5	PE-I	CV2318	PE-I Lab : Matrix Analysis of Structures
5	5	PE-I	CV2319	PE-I : Advanced Concrete Technology
	5	PE-I	CV2320	PE-I Lab : Advanced Concrete Technology
6	5	PE-I	CV2321	PE-I : Water Treatment
	5	PE-I	CV2322	PE-I Lab : Water Treatment
7	5	PE-I	CV2323	PE-I : Environmental Management
	5	PE-I	CV2324	PE-I Lab : Environmental Management
8	5	PE-I	CV2325	PE-I : Soil Characterization & Identification
	5	PE-I	CV2326	PE-I Lab : Soil Characterization & Identification
9	5	PE-I	CV2327	PE-I : Geographical Information Systems
	5	PE-I	CV2328	PE-I Lab : Geographical Information Systems

Open Electives -I

1	5	OE-I	CV2331	OE-I : Building Services Engineering
2	5	OE-I	CV2332	OE-I : Construction Techniques
3	5	OE-I	CV2333	OE-I : Introduction to Environmental Management
4	5	OE-I	CV2334	OE-I : Basics of Transportation Engineering
5	5	OE-I	CV2335	OE-I : Basics of Water Resource Engineering
6	5	OE-I	CV2336	OE-I : Elements of Water Power Engineering

Open Electives -II

1	5	OE-II	CV2341	OE II : Elements of Earthquake Engineering
2	5	OE-II	CV2342	OE II : Introduction to Finite Element Method
3	5	OE-II	CV2343	OE II : Air Pollution and Solid Waste Management
4	5	OE-II	CV2344	OE-II : Environmental & Social Impact Assessment
5	5	OE-II	CV2345	OE II : Disaster Management

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activities decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

		June 2020	1.02	Applicable for AY 2020-21 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	



B.E. SCHEME OF EXAMINATION 2018-19

(Revised Scheme of Examination w.e.f. 2020-21 onward)

Civil Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Sixth Semester														
1	6	HS	GE2312	Fundamental of Economics	T	3	0	0	3	3	30	30	40	3
2	6	PC	CV2351	Steel Structures	T	3	0	0	3	3	30	30	40	4
3	6	PC	CV2352	Lab:- Building Design Drawing	P	0	0	2	2	1	60	40		
4	6	PC	CV2353	Hydraulic Engineering	T	3	0	0	3	3	30	30	40	3
5	6	PC	CV2354	Lab:- Hydraulic Engineering	P	0	0	2	2	1	60	40		
6	6	PC	CV2355	Foundation Engineering	T	3	0	0	3	3	30	30	40	3
7	6	PE-II		Professional Elective -II	T	3	0	0	3	3	30	30	40	3
8	6	OE-II		Open Elective - III **	T	3	0	0	3	3	30	30	40	3
9	6	OE-IV		Open Elective - IV **	T	3	0	0	3	3	30	30	40	3
10	6	STR	CV2360	Industry Visit and its report	P	0	0	0	0	1		100		
TOTAL						21	0	4	25	24				

Audit Courses														
1	6	IT	IT1121	Industrial Programmin Language	A	3	0	0	3	0				

Professional Elective - II

1	6	PE-II	CV2361	PE-II : Building Services										
2	6	PE-II	CV2362	PE-II : New Engineering Materials										
3	6	PE-II	CV2363	PE-II : Construction Management And Machinery										
4	6	PE-II	CV2364	PE-II : Earthquake Engineering										
5	6	PE-II	CV2365	PE-II : Optimization Techniques										
6	6	PE-II	CV2366	PE-II : Introduction to Remote Sensing										
7	6	PE-II	CV2367	PE-II : Environmental Geotechniques										
8	6	PE-II	CV2368	PE-II : Traffic Engineering										
9	6	PE-II	CV2369	PE-II : Water Transmission and Distribution Systems										

Open Electives -III

1	VI	OE-III	CV2371	OE-III : Building Services Engineering										
2	VI	OE-III	CV2372	OE-III : Construction Techniques										
3	VI	OE-III	CV2373	OE-III : Introduction to Environmental Management										
4	VI	OE-III	CV2374	OE-III : Basics of Transportation Engineering										
5	VI	OE-III	CV2375	OE-III : Basics of Water Resource Engineering										
6	VI	OE-III	CV2376	OE-III : Elements of Water Power Engineering										

Open Electives -IV

1	VI	OE-IV	CV2381	OE-IV : Elements of Earthquake Engineering										
2	VI	OE-IV	CV2382	OE-IV : Introduction to Finite Element Method										
3	VI	OE-IV	CV2383	OE-IV : Air Pollution and Solid Waste Management										
4	VI	OE-IV	CV2384	OE-IV : Environmental & Social Impact Assessment										
5	VI	OE-IV	CV2385	OE-IV : Disaster Management										

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

		June 2020	1.02	Applicable for AY 2020-21 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

Seventh Semester



B.E. SCHEME OF EXAMINATION 2018-19
(Revised Scheme of Examination w.e.f. 2020-21 onward)

Civil Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Chairperson				Dean (Acad. Matters)		Date of Release		Version		AY 2020-21 Onwards				
Seventh Semester														
1	7	PC	CV2401	Estimating & Costing	T	3	0	0	3	3	30	30	40	3
2	7	PC	CV2402	Lab:- Estimating & Costing	P	0	0	2	2	1	60	40		
3	7	PC	CV2403	Wastewater Engineering	T	3	0	0	3	3	30	30	40	3
4	7	PC	CV2404	Hydrology and Water Resources Engineering	T	3	0	0	3	3	30	30	40	3
5	7	PE-III		Professional Elective -III	T	3	0	0	3	3	30	30	40	3
6	7	PE-IV		Professional Elective -IV	T	3	0	0	3	3	30	30	40	3
7	7	PE-V		Professional Elective -V	T	3	0	0	3	3	30	30	40	3
8	7	STR	CV2409	Mini Project	P	0	0	4	4	2	60	40		
9	7	STR	CV2410	Campus Recruitment Training (CRT)	P	0	0	0	0	2	100			
TOTAL						18	0	6	24	23				

Professional Elective - III

1	7	PE-III	CV2411	PE-III : Prestressed Concrete
2	7	PE-III	CV2412	PE-III : Advanced RCC
3	7	PE-III	CV2413	PE-III : Numerical Methods and Computational Techniques
4	7	PE-III	CV2414	PE-III : Environmental Impact Assessment
5	7	PE-III	CV2415	PE-III : Energy Conversion and Management
6	7	PE-III	CV2416	PE-III : Geotechnical Investigation & Ground Improvement Techniques
7	7	PE-III	CV2417	PE-III : Earth and Earth Retaining Structures
8	7	PE-III	CV2418	PE-III : Urban Transportation Planning
9	7	PE-III	CV2419	PE-III : Advanced Hydraulics

Professional Elective - IV

1	7	PE-IV	CV2421	PE-IV : Natural Resources Management
2	7	PE-IV	CV2422	PE-IV : Finite Element Method
3	7	PE-IV	CV2423	PE-IV : Introduction to Structural Dynamics
4	7	PE-IV	CV2424	PE-IV : Wastewater Treatment
5	7	PE-IV	CV2425	PE-IV : Environmental Legislation and Management System
6	7	PE-IV	CV2426	PE-IV : Advanced Foundation Engineering
7	7	PE-IV	CV2427	PE-IV : Geosynthetics
8	7	PE-IV	CV2428	PE-IV : Advanced Transportation Engineering
9	7	PE-IV	CV2429	PE-IV : Watershed Management

Professional Elective - V

1	7	PE-V	CV2431	PE-V : Maintenance and Rehabilitation Engineering
2	7	PE-V	CV2432	PE-V : Project Planning and Management
3	7	PE-V	CV2433	PE-V : Modern Surveying Technique
4	7	PE-V	CV2434	PE-V : Advanced Steel Design
5	7	PE-V	CV2435	PE-V : Design of Bridge Structures
6	7	PE-V	CV2436	PE-V : Industrial Waste Water Treatment and Reuse
7	7	PE-V	CV2437	PE-V : Finite Element methods in Geotechnical Engineering
8	7	PE-V	CV2438	PE-V : Pavement Design
9	7	PE-V	CV2439	PE-V : Water Power Engineering
10	7	PE-V	CV2440	PE-V : Structural Engineering Practices

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

		June 2020	1.02	Applicable for AY 2021-22 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	



B.E. SCHEME OF EXAMINATION 2018-19
 (Revised Scheme of Examination w.e.f. 2020-21 onward)

Civil Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Eighth Semester														
1	8	STR	CV2451	Major Project	P	0	0	12	12	9		60	40	
2	8	STR	CV2452	Extra curricular Activity Evaluation	P	0	0	0	0	1		100		
TOTAL						0	0	12	12	10				
GRAND TOTAL						88	0	42	130	163				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

		June 2020	1.02	Applicable for AY 2021-22 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

Mechanical Engineering

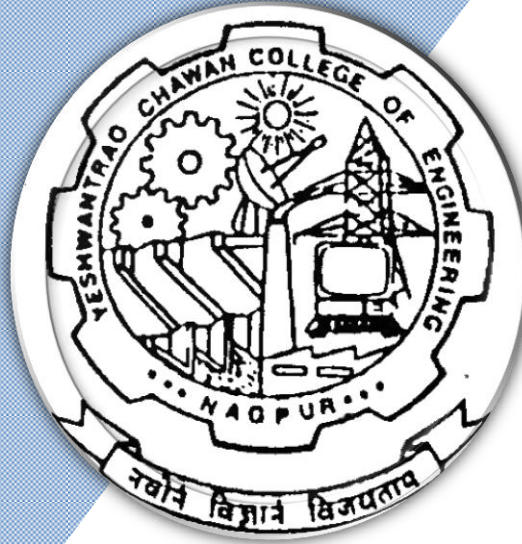
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Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

3rd Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
 (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2023
 (Scheme of Examination w.e.f. 2023-24 onward)
 (Department of Mechanical Engineering)
B. Tech. in Mechanical Engineering

SoE No.
23 ME-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
2	3	VEC-II	ME	23ME1301	Computer Aided Design	T	2	0	0	2	2	30	20	50	3
3	3	CEP	ME	23ME1302	LAB: Industrial Case Study	P	0	0	2	4	2		60	40	
4	3	PC	ME	23ME1303	Manufacturing Processes	T	3	0	0	3	3	30	20	50	3
5	3	PC	ME	23ME1304	LAB: Manufacturing Processes	P	0	0	2	2	1		60	40	
6	3	PC	ME	23ME1305	Mechanics of Materials	T	3	1	0	4	4	30	20	50	3
7	3	PC	ME	23ME1306	LAB:- Mechanics of Materials	P	0	0	2	2	1		60	40	
8	3	PC	ME	23ME1307	Kinematics of Machineries	T	3	0	0	3	3	30	20	50	3
9	3	OE - I	OE		Open Elective -I	T	2	0	0	2	2	30	20	50	3
10	3	MDM - I	ME		MD Minor Course-I	T	2	0	0	2	2	30	20	50	3
TOTAL							17	1	6	26	22				

List of Mandatory Learning Course (MLC)															
1	3	HS	T&P	MLC2123	YCAP3 : YCCE Communication Aptitude Preparation	A	3	0	0	3	0				

Open Elective - I

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chem. & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management

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(Department of Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

23GE1301: Fundamentals of Management & Economics

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Develop the Managerial Perspective and perform the various functions of management for optimum utilization of Engineering Resources
2. Identify and Analyze the role of Financial Accountancy and Marketing Management in the Organization
3. Develop perspective about economy based on logical reasoning and estimate the economic outcomes.
4. Interprets comparative advantage of resources.

Unit I:

7 Hrs.

Principles of Management: Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Staffing and Controlling, Motivational Theories, Concept of Leadership.

Unit II:

8 Hrs.

Marketing and Financial Management: Marketing and Financial Management –Marketing Theories and Concept-Marketing Mix, Market Segmentation, Targeting and Positioning and Functions Financial Management and Accountancy- Accountancy Rules and Capital, Preparation of Books of Account- Journal posting of Transaction into ledger and preparation of trial Balance, Introduction of Trading Account, Profit and loss account and balance sheet.

Unit III:

7 Hrs.

Introduction to Microeconomics: Nature and Scope of Microeconomics, Demand Analysis: Meaning and determinants of demand, law of demand, Elasticity of Demand - types and degrees, Utility analysis, Law of diminishing marginal utility, supply- law of supply, Law of Variable proportions and Return to Scale, Classification of market structure.

Unit IV:

8 Hrs.

Introduction to Macroeconomics: Nature and Scope of Macroeconomics, Concept of GDP, GNP, NDP, NNP, Measurement of GDP; Economic Growth and development, Money – definition, types and function of money, Inflation – meaning, types, causes and measure to control, concept of deflation, functions of central and commercial bank, Sources of public revenue - direct and indirect taxes.

Total Lecture

30 Hours

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B. Tech in Mechanical Engineering

Textbooks:

1	Principle of Management, 9 th edition, Harold Koontz Ramchandra, Tata McGraw hills
2	Marketing Management: Planning, Implementation and Control, 3rd Edition, Ramaswamy V.S. and Namakumari S, Macmillian
3	Fundamentals of Accounting Gupta R.L. & Radhaswamy ;
4	Modern Economics, 13th Edition, H. L. Ahuja, S. Chand Publisher, 2009
5	Modern Economic Theory, 3rd edition, K. K. Devett, S. Chand Publisher, 2007
6	Principle of Economics, 7 th edition, Mankiw N. Gregory, Thomson, 2013

Reference Books:

1	Foundations of Financial Markets and Institutions, 3 rd Edition, Fabozzi, Prentice Hall
2	Fundamentals of Financial Instruments, 2 nd Edition, Parameshwaran, Wiley India
3	Marketing Management, 3 rd Edition, Rajan Saxena, Tata McGraw Hill
4	Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher, 2009
5	International Trade, 12 th edition, M. L. Zingan, Vindra Publication, 2007
6	Macro Economics, 11 th edition, M. L. Zingan, Vindra Publication, 2007
7	Monitory Economics:, 1 st Edition, M. L. Sheth, Himayalaya Publisher, 1995

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042

MOOCs Links and additional reading, learning, video material

1	https://onlinecourses.nptel.ac.in/noc22_mg104/preview
2	https://archive.nptel.ac.in/courses/110/101/110101131/
3	https://onlinecourses.nptel.ac.in/noc23_mg122/preview
4	https://onlinecourses.nptel.ac.in/noc21_hs52/preview
5	https://onlinecourses.nptel.ac.in/noc22_hs67/preview

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**SoE No.
23ME-101**

B. Tech in Mechanical Engineering

III SEMESTER

23ME1301 : Computer Aided Design

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. Understand and Apply the detail drawing of a given object.
2. Interpret and Prepare the drawing.
3. Construct details and assembly different mechanical systems.
4. Create an assembly drawing into detailed drawing using modeling software

Unit I:	6 Hrs.
Drawing Standards: Drawing Sheets, Name Blocks, Lines, Sections, Dimensioning, Dimensioning of Tolerances, Standard Components, Machining Symbols, Welding Symbols, Heat Treatment, Manufacturing, Allowances, and Materials	
Unit II:	7 Hrs.
Study Qualitative Selection of type / Size (Excluding Design Calculations) and Standard Practices for the Following Elements Threads, Bolts, Nuts, Washers, Rivets, Welds, Keys and Keyways, splines, and Couplings	
Unit III:	7 Hrs.
Assembly and Dismantling Principles using CAD Software: Fits and Tolerances (Standards, Types Application, and Selection), Tolerance Charting, Surfaces Finishing Requirements for Assembly, Steam Engine parts – Stuffing boxes, Crossheads, Eccentrics, Piston, Valves and Pumps.	
Unit IV:	8 Hrs.
Geometry suitable for Assembly, Assembly / Dismantling Tools using CAD Software Bearing Assemblies- Bushed journal bearing, Foot-step bearing, and Plummer block Machine tool parts – Lathe Tail-stock, Square Tool Post, Machine Vices	
Unit V:	9 Hrs.
Study of some Standard Assemblies using CAD Software Assembly Drawings: Principles, Techniques, and Standards for Preparing Component Drawings, Subassembly Drawing, Full Assembly Drawing, Exploded Views. Other machine parts – Screws jacks, Square Tool post, and Petrol engine connecting rod. Simple designs of a steam - Stop valve, Spring-Loaded Safety Valve, and Feed Check Valve	
Unit VI:	8 Hrs.
Production Drawing Using CAD Software: Name Plates, Part List, Revisions Etc., Essential Parts/ Formats Required for Production Drawings, Process Sheet	
	Total Lecture
	45 Hours

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B. Tech in Mechanical Engineering

Textbooks:

1.	K L Narayana, P Kannaiah and K Venkata Reddy, Machine Drawing, 3rd edition, New Age Publications, 2006.
2.	N D Bhatt, Engineering Drawing, Charotar Publications, 2000.

Reference Books:

1.	N Sidheswar, P Kannaiah and V V S Sastry, Machine Drawing, Tata McGraw Hill, 1980.
2.	K L Narayana, P Kannaiah and K Venkata Reddy, Production Drawing, 2nd edition, New Age Publications, 2009.
3.	P S Gill, A Textbook of Machine Drawing, S.K. Kataria & Sons Publishers, 2013.
4.	R K Dhawan, Machine drawing, S. Chand Publications, 1998.
5.	Basudev Bhattacharyya, Machine Drawing, Oxford University Press, 2011.
6.	G Pohit, G Ghosh, Machine Drawing with Auto CAD, Pearson Education India, 2004.
7.	Ajeet Singh, Machine Drawing, Tata McGraw Hill, 2012.
8.	Gopalkrishna K. R, Machine Drawing, Subhas Publications, Bangalore, 1985.
9.	Naryana K.L., Kannaiah R., Venkata Reddy K "Production Drawing", New Age Int.Pub, 1st

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1	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf
2	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
3	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf

MOOCs Links and additional reading, learning, video material

1.	https://nptel.ac.in/courses/112103019/
2.	https://nptel.ac.in/syllabus/112106075/

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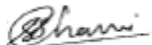
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B. Tech in Mechanical Engineering

23ME1302 : LAB - Industrial Case Study

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23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

23ME1303 : Manufacturing Processes

Course Outcomes :

Upon successful completion of the course the students will be able to

1. The student will be able to illustrate the moulding process and compare various casting processes.
2. The student will be able to analyse various Forming processes and become familiar with the working of dies.
3. The student will be able to evaluate different welding processes.
4. The student will be able to describe unconventional machining processes.

Unit I:

7 Hrs.

Casting Process: Introduction, Pattern making: Types, materials used, Pattern making allowances, color codes. Core making: - Types, core material & its properties. Molding: Types of sand molds, molding sand composition, molding sand properties, molding machines. Gating design – Elements of gating systems, pouring time, riser design (Analytical treatment). Real time estimation of pouring time for casting.

Unit II:

7 Hrs.

Foundry mechanism: Special casting processes such as investment Casting, Centrifugal Casting, Shell Molding, CO Molding, Slush Casting, Die Casting, Cleaning, inspection & casting defects. Identification of various defects and possible causes with remedies through the fish bone diagram.

Unit III:

7 Hrs.

Forming Processes: Mechanics of forming processes (including analytical treatment), Determination of forging forces, equipment (Hammer/Press) capacity required. Rolling, Forging, Extrusion & Wire Drawing. Melting furnaces – Types, Electric furnace, Induction furnace, Cupola-construction & operation. Prerequisite for commencing furnace operation for Cupola.

Unit IV:

8 Hrs.

Sheet Metal Working: Sheet Metal Working, Terminology, Types of Operation, Classification of Dies. Intro to Design Parameters and Types of Presses. Optimum utilization of metal strip in SMW

Unit V:

8 Hrs.

Joining processes: Introduction to Welding, Soldering, Brazing Processes. Types of Welding, Arc Welding & Gas Welding Processes, Defects & Inspection of Welding Joints, Electrodes, Weldability of Metals, Welding equipments of Fixtures. Advance Welding Methods: Introduction to TIG, MIG, spot welding, Welding Design (Analytical Treatment)- Heat Input, Heat Flow, Cooling Rate Calculations. Identification of various defects & possible causes with remedies through fish bone dig.

Unit VI:

8 Hrs.

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Jigs & fixture: Introduction, locating & clamping - principle of location, principle of pin location, locating devices, radial or angular location, V - location, bush location. Drilling Jigs: - Types of drilling jigs - Template jig, plate type jig, open type jig, swinging leaf jig, Box type jig, channel type jig . Jig feet. Milling Fixtures: - Essential features of a milling fixtures, milling machine vice, Indexing jig & fixtures, Automatic clamping Devices

Total Lecture 45 Hours

Textbooks:

1. P.n.Rao, Manufacturing Technology (Forming & Welding), ed 2009, Tata Mc. Grew Hill Education Pvt. Ltd., New Delhi, 2009.
2. Ghosh and Malik ,Manufacturing Science, East West Second edition, 2010.
3. Hajra Choudhary, Workshop Technology (Volume-I), The McGraw-Hill Companies 2nd ED-2010

Reference Books:

1. S Kalpakjian & Schmid ,Manufacturing Engineering & Technology, Pearson education Canada. 2 ed 2010
2. W Chapman, Workshop Technology: Vol. I –III, St. Martin's Press, 5 ed 2019.
3. M Begman, Manufacturing Processes, Ballinger Pub. Co

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- 1 <http://103.152.199.179/YCCE/SUPPORTED%20FILE/SUPPORTED%20file/SERIES20WISE%20BOOKS/MECHANICAL%20ENGINEERING>

MOOCs Links and additional reading, learning, video material

1. <https://archive.nptel.ac.in/courses/112/107/112107083/>
2. <https://www.youtube.com/watch?v=Xf08dgnlwXg>
3. <https://nptel.ac.in/courses/112107089>

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B. Tech in Mechanical Engineering

III SEMESTER

23ME1304 : Lab Manufacturing processes

Course Outcomes

Upon successful completion of the course the students will be able to

1. The student will be able to illustrate the molding process and compare various casting processes.
2. The student will be able to Analyze various Forming processes and become familiar with the working of dies.
3. The student will be able to evaluate different welding processes.
4. The student will be able to Describe unconventional machining processes

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1	Preamble about Foundry practices used in industries.
2	Study of various moulding processes along with preparation of moulding sand.
3	Preparation of wooden pattern in pattern making shop along with study of different types of wooden pattern.
4	To determine grain fineness number of given moulding sand.
5	Demonstration of mould making along with study of foundry tools.
6	Preparation of mould cavity along-with steps involved in mould making.
7	Study of various types of melting furnaces and cupola in detail.
8	Preparation of job on punching press and design of blanking and piercing die.
9	Performance on various welding machines such as MIG, TIG along-with study of different welding processes.
10	Preparation of casting job along-with study of different casting processes.
11	Report/Case Study of foundry visit.
12	A Visit: A visit to a foundry shop for more understanding of the casting practices

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B. Tech in Mechanical Engineering

III SEMESTER

23ME1305 : Mechanics of Materials

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Apply the basic concepts of stress, strain and their variations under different types of loading to calculate Stresses.
2. Construct bending moment, shear force diagram for statically determinate beams and determine stress distribution.
3. Compute slope and deflection in statically determinate beam and calculate strain energy under varying load conditions.
4. Evaluate the torsional shear stress in shaft and examine the buckling failure in columns

Unit I:

8 Hrs.

Concept of simple stresses and strains : Introduction, Stress, strain, types of stresses, stress - strain diagram for brittle & ductile material, elastic limit, Hooks law, modulus of elasticity, modulus of rigidity, factor of safety, analysis of tapered rod, analysis of composite section, thermal stress and strain, thermal stresses with heat flow in cylinders and plates. Longitudinal strain & stress, lateral stresses and strains, Poisson's ratio, volumetric stresses and strain with uni-axial, bi-axial & tri-axial loading, bulk modulus, relation between Young's modulus and modulus of rigidity, Poisson's ratio and bulk modulus. Contemporary issues

Unit II:

7 Hrs.

Shear force and bending moments in Beam: Types of beam (cantilever beam, simply supported beam, overhung beam etc.), Types of loads (Concentrated and UDL), shear force and bending moment diagrams for different types of beams subjected to different types of loads, sign conventions for bending moment and shear force, shear force and bending moment diagrams for beams subjected to couple, Relation between load, shear force and bending moment. Contemporary issues

Unit III:

8 Hrs.

Stresses in beams: Pure bending, theory of simple bending with assumptions & expressions for bending stress, derivation of bending equation, bending stresses in symmetrical sections, section modulus for various shapes of beam sections. **Shear stresses in beams**: - Concept, derivation of shear stress distribution formula, shear stress distribution diagram for common symmetrical sections, maximum and average shear stress Contemporary issues.

Unit IV:

7Hrs.

Deflection of beams: Derivation of differential equation of elastic curve, Deflection & slope of cantilever, simply supported, overhung beams subjected to concentrated loads, UDL, Relation between slope, deflection & radius curvature McCauley's method, area moment method to determine deflection of beam. **Strain energy and impact**: Concept of strain energy, derivation and use of expressions for

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deformation of axially loaded members under gradual sudden and impact loads. Strain energy stored in bending & torsion. Castigliano's theorem. Contemporary issues

Unit V:

8 Hrs.

Torsion of circular shafts, Column & Struts: Derivation of torsion equation. Torsional shear stress induced in the shaft, when it is subjected to torque. Torque transmitted by solid & hollow circular shaft. Derivation of maximum, minimum principal stresses and maximum shear stress induced in shaft when it is subjected to bending moment, torque & axial load.

Unit VI:

7 Hrs.

Combined Stresses: Definition of principal planes & principal stresses, analytical method of determining stresses on oblique section when member is subjected to direct stresses in one plane in mutually perpendicular two planes, when member is subjected to shear stress and direct stresses in two mutually perpendicular planes, Mohr's circle for representation of stresses. Derivation of maximum and minimum principal stresses & maximum shear stresses when the member is subjected to different types of stresses simultaneously (i.e. combined stress) Contemporary issues

Total Lecture

45 Hours

Textbooks:

1. Strength of Materials, Ramamrutham S., 16th Edition (2010) , Dhanpat Rai Publishing
2. Strength of Materials Beer and Johnston 4th Edition (2009) McGraw-Hill
3. Popov E. P, "Engineering Mechanics of Solids", Prentice-Hall of India, New Delhi, 2007.

Reference Books:

1. Strength of Materials Timoshenko and Young Seventh Edition 1984 , CSB Publisher
2. Applied Strength of Materials, Sixth Edition SI Units Version, Robert L. Mott, Joseph A. Untener, CRC Press, 2017
3. Subramanian R., "Strength of materials", 2nd Edition (2010) Oxford University Press, New Delhi,
4. Shames I.H. "Introduction to Solid Mechanics", PHI Publication, 3rd Edition, 2002
5. William A.Nash, "Theory and Problems of Strength of materials, Schaum's Outline series", Tata McGraw-Hill, New Delhi, 2007.

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- 2 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf

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MOOCs Links and additional reading, learning, video material

1. <https://nptel.ac.in/courses/112107146>
2. <https://nptel.ac.in/courses/112106141>
3. <https://archive.nptel.ac.in/courses/105/105/105105108/>

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23ME-101

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III SEMESTER

23ME1306 : Lab Mechanics of Materials

Course Outcomes

Upon successful completion of the course the students will be able to

1. Apply the basic concepts of stress, strain and their variations under different types of loading to calculate Stresses.
2. Construct bending moment, shear force diagram for statically determinate beams and determine stress distribution.
3. Compute slope and deflection in statically determinate beam and calculate strain energy under varying load conditions.
4. Evaluate the torsional shear stress in shaft and examine the buckling failure in columns

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1	Demonstration of UTM
2	Tension test on a mild steel rod
3	Compression test on Aluminium specimen
4	Hardness test on metals with Rockwell Hardness tester
5	Flexure test on Wooden beam
6	Spring stiffness test
7	Torsion test on mild steel rod
8	Impact Test
9	Demonstration of Fatigue Test

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

23ME1307 : Kinematics of Machineries

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Apply the basic concepts of stress, strain and their variations under different types of loading to calculate Stresses.
2. Construct bending moment, shear force diagram for statically determinate beams and determine stress distribution.
3. Compute slope and deflection in statically determinate beam and calculate strain energy under varying load conditions.
4. Evaluate the torsional shear stress in shaft and examine the buckling failure in columns

Unit I:

8 Hrs.

Simple mechanisms: Lower and higher pairs, degrees of freedom, various types of mechanisms, their inversions and applications, universal joints, introduction to spatial linkages

Unit II:

7 Hrs.

Quantitative kinematics analysis of mechanism: Quantitative kinematics analysis of mechanism: - Displacement, Velocity and Acceleration analysis of planer mechanism by graphical method as well as analytical method [complex number method/matrix method], Instantaneous center method, Kennedy's theorem

Unit III:

8 Hrs.

Cam and follower : Concepts of cam mechanism, comparison of cam mechanism with linkages. Types of cams and followers and applications. Synthesis of cam for different types of follower motion like constant velocity, parabolic, SHM, cycloid etc. Analysis of follower motion for cams with specified contours like eccentric cam, tangent cam and circular arc cam with concave and convex curvature. Pressure angle in cam, parameters affecting cam performance

Unit IV:

7 Hrs.

Gears : Concept of motion transmission by toothed wheels, comparison with cams and linkages, various tooth profiles, their advantages and limitations, gear tooth terminologies, concept of conjugate action, law of conjugate action, kinematics of in volute gear tooth pairs during the contact duration, highlighting locus of the point of contact, arc of contact, numbers of pairs of teeth in contact, path of approach and path of recess, interference, undercutting for in volute profile teeth

Unit V:

8 Hrs.

Gear Trains : Kinematics of helical, bevel, spiral, worm gears, rack and pinion gears, kinematics analysis, and torque analysis of simple epicyclical and double epicyclical gear trains

Unit VI:

7 Hrs.

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Static force analysis: Static force analysis: Free body diagram, condition of equilibrium. Analysis of all links of given linkage, cam, gear mechanism and their combinations without friction

Total Lecture 45 Hours

Textbooks:

1. Theory of mechanism and machines Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi, 2014
2. Theory of mechanism and machines Khurmi and Gupta, S chand publication
3. Mechanisms and machines J.S.Rao ,R.V.Dukupati new age international limited.
4. Theory of machines V.P.Singh, Dhanpat Rai & Co.

Reference Books:

1. Theory of machines Thomas beven, Pearson Education.
2. Theory of machines Sandor & Erdman, Tata Mc. Graw Hill Education Pvt. Ltd

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- 1 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf
- 2 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
- 3 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf

MOOCs Links and additional reading, learning, video material

1. <https://www.youtube.com/watch?v=EVqBzOGQlkl>
2. https://onlinecourses.nptel.ac.in/noc24_me44/preview
3. <https://www.youtube.com/watch?v=kXXfz6acsyU>

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23ME-101**

B. Tech in Mechanical Engineering

III SEMESTER Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1ME101 : Computer-Aided Design
MDM-I	3	(MDM1ME101) Engineering Materials
MDM-II	4	(MDM2ME102) Basics of Mechanism
MDM-III	5	(MDM3ME103) Basics of Machine Design
MDM-IV	6	(MDM4ME104) Computer Aided Design
MDM-V	7	(MDM5ME105) Product Design and Development
MDM-VI	8	(MDM6ME106) INDUSTRY 5.0

Track 2

Courses	Sem	MDMT2ME201 : Robotics and Computer Integrated Manufacturing
MDM-I	3	(MDM1ME201) Introduction to Robotics
MDM-II	4	(MDM2ME202) Industrial Robotics
MDM-III	5	(MDM3ME203) Computer Integrated Manufacturing
MDM-IV	6	(MDM4ME204) Subtractive Manufacturing
MDM-V	7	(MDM5ME205) Additive Manufacturing
MDM-VI	8	(MDM6ME206) Supply Chain Management

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B. Tech in Mechanical Engineering

III SEMESTER

Track 1 - Computer Aided Design

MDM1ME101 : Engineering Materials

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Distinguish between ferrous and Non-ferrous materials. Illustrate crystal structures for various materials and Differentiate or Distinguish between ferrous and Non-ferrous materials.
2. Discuss the various applications of steel and cast iron.
3. Discuss the various super alloys.
4. Demonstrate the basics of powder Metallurgy for powder metallurgical components.

Unit I:

8 Hrs.

Introduction to Materials: Introduction to materials, classification of materials. Properties and applications of materials. Crystalline nature of metals, specially microscopic and macroscopic examinations of metals. Alloys and solid solutions, types and their formations.

Contemporary Issues related to Topic

Unit II:

8 Hrs.

Steel and Cast Iron: Classification and application of plain carbon steels. Composition and application of Tool Steels & Stainless Steels. Cast Iron – Classification, White cast Iron, Gray Cast Iron, Nodular Cast Iron, Malleable Cast Iron.

Contemporary Issues related to Topic

Unit III:

7 Hrs.

Super alloys: Introduction, Classification, Applications and properties of Ni, Fe, Co based super alloys and their thermo-mechanical treatments.

Contemporary Issues related to Topic

Unit IV:

7 Hrs.

Powder Metallurgy: Powder manufacture and Conditioning, Production of Sintered Structural Components

Contemporary Issues related to Topic

Total Lecture

30 Hours

Textbooks:

1. Dr. V.D. Kodgire, Material Science and Metallurgy, Edition, 1st Jan 2011, Everest Publication House
2. Dr. B K Agrawal, Introduction to Engineering Metallurgy, 21st revised edition, 2007, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi.

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Reference Books:

1.	Sidney H. Avner, Introduction to Physical Metallurgy, 29st revised edition, 2009, Mc. Graw Hill Publication, NewDelhi, 1964
2.	Yu Lakhtin, Engineering Physical Metallurgy and Heat Treatment, 21st revised edition, 1988, Mir publishers, Moscow, Russia
3.	E C Rollason, Metallurgy for Engineers, 4 th Revised edition 1987, E. Arnold

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	
2	

MOOCs Links and additional reading, learning, video material

1.	https://nptel.ac.in/courses/112101098
2.	https://nptel.ac.in/courses/112101099

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23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

Track 2- Robotics and Computer Integrated Manufacturing

MDM1ME201 : Introduction to Robotics

Course Outcomes :

Upon successful completion of the course the students will be able to:

1. Describe the components and working principles of robots.
2. Program robots using different programming languages.
3. Demonstrate proficiency in using computer vision techniques for robot applications.
4. Identify and analyze real-world applications of robotics with ethical and societal implications.

Unit I:

8 Hrs.

Fundamentals of Robotics: Introduction to Robotics: Definition, history, and applications, Components of a Robot: Sensors, actuators, controllers, and effectors, Basics of Robot Kinematics, Basics of Robot Dynamics.

Contemporary Issues related to Topic

Unit II:

8 Hrs.

Robot Programming: Introduction to Robot Programming: Programming languages used in robotics, Robot Operating System (ROS): Basics of ROS, nodes, topics, messages, Motion Planning: Path planning algorithms, obstacle avoidance, Robot Simulation: Introduction to simulation environments like Gazebo/MATLAB Robotics Toolbox/Robot Analyzer.

Contemporary Issues related to Topic

Unit III:

7 Hrs.

Robot Perception: Introduction to Robot Perception: Sensors used in robotics - vision, proximity, touch, etc., Computer Vision: Image processing techniques, object detection, and recognition, Sensor Fusion: Integration of data from multiple sensors for better perception, Localization and Mapping: SLAM (Simultaneous Localization and Mapping) algorithms.

Contemporary Issues related to Topic

Unit IV:

7 Hrs.

Applications and Future Trends: Industrial Robotics: Applications in manufacturing, assembly, and automation, Service Robotics: Applications in healthcare, agriculture, and domestic tasks, Research Trends in Robotics: Emerging technologies like soft robotics, swarm robotics, and bio-inspired robotics, Ethical and Societal Implications of Robotics: Discussions on job displacement, privacy concerns, and ethical considerations.

Contemporary Issues related to Topic

Total Lecture

30 Hours

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SoE No.
23ME-101

B. Tech in Mechanical Engineering

Textbooks:

1.	Robot Engineering An Intergrated approach 2004 Klafter R.D., Chmielewski T.A. and Negin M Springer
2.	Industrial Robotics: Technology, Programming and Applications, 2012 Mikell P. Groover, Mitchel Weiss, Roger N. Nagel, Nicholas G. Odrey and Ashish Dutta 2nd Edition, Tata McGraw Hill, 2012.
	Automation in Production system 2002 Mikell P. Groover Prentice-Hall of India Pvt. Ltd., New Delhi, 2002
3.	Bruno S and Sciavicco L, Robotics: Modelling, Planning and Control, Springer (2009)
4.	Robot Engineering An Intergrated approach 2004 Klafter R.D., Chmielewski T.A. and Negin M Springer

Reference Books:

1.	Robotics control, sensing, vision, and intelligence
2.	Robotics Technology and Flexible Automation
3.	Introduction to Robotics Mechanics and Control
4.	Industrial Robotics, By Ganesh S. Hegde • 2006, Laxmi Publications, June 2006

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

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2	

MOOCs Links and additional reading, learning, video material

1.	https://nptel.ac.in/courses/112101098
2.	https://nptel.ac.in/courses/112101099

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23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

Open Elective -I : Basket

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chem. & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management

Open Elective syllabus link : <https://ycce.edu/syllabus/>

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(Department of Mechanical Engineering)



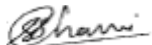
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23ME-101

B. Tech in Mechanical Engineering

III SEMESTER

Mandatory Learning Course (Audit Course)

MLC2123 : YCAP3

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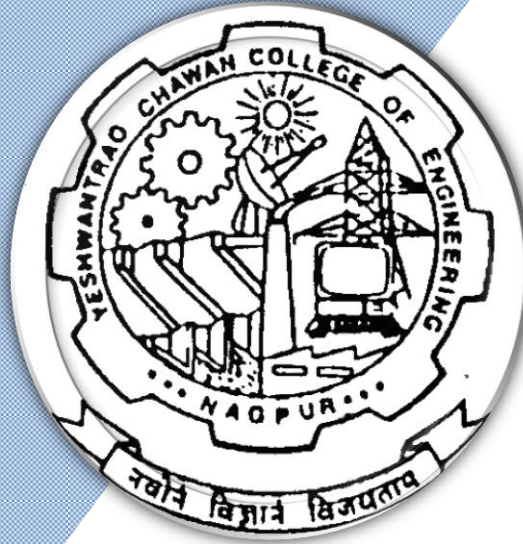
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Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2023

4th Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering



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B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Mechanical Engineering)

B. Tech. in Mechanical Engineering

SoE No.
23 ME-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration
							L	T	P	Hrs		MSEs*	TA**	ESE	
FOURTH SEMESTER															
1	4	BS	GE	23GE1402	Integral Transform	T	3	0	0	3	3	30	20	50	3
2	4	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
3	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
4	4	VEC - I	CV	23CV1411	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
5	4	PC	ME	23ME1401	Machining Processes	T	3	0	0	3	3	30	20	50	3
6	4	PC	ME	23ME1402	Lab - Machining Processes	P	0	0	2	2	1		60	40	
7	4	PC	ME	23ME1403	Lab - Computer Aided Design	P	0	0	2	2	1		60	40	
8	4	VSEC - III	ME	23ME1404	Lab - Machine Drawing	P	0	0	4	4	2		60	40	
9	4	OE - II	OE		Open Elective -II	T	2	0	0	2	2	30	20	50	3
10	4	MDM - II	ME		MD Minor Course-II	T	2	0	0	2	2	30	20	50	3
TOTAL							16	0	8	24	20				

List of Mandatory Learning Course (MLC)															
1	4	HS	T&P	MLC2124	YC4P4 : YCCE Communication Aptitude Preparation	A	3	0	0	3	0				

Open Elective - II

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management

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III /IV SEMESTER

23GE1302/23GE1402 : Integral Transforms

Course Outcomes:

Upon successful completion of the course the students will be able to

- 1 Apply the knowledge of Laplace and Fourier transforms to solve the continuous problems.
2. Apply the knowledge of Z transforms to solve the discrete mathematical equations.
3. Determine Fourier series expansion of periodic functions, Fourier Transform.
4. Use appropriate methods to solve partial differential equations.

Unit I:

7 Hrs.

Laplace Transforms : Definition and examples of Laplace transforms, properties of Laplace transforms, Examples by using properties of Laplace transforms, Unit step function, periodic function.

Unit II:

8 Hrs.

Inverse of Laplace Transform: Definition and examples of Inverse Laplace transforms, Inverse Laplace transform by using properties, Partial fraction method to find Inverse Laplace transforms, convolution theorem, Applications of Laplace transform to solve ordinary differential equations.

Unit III:

7 Hrs.

Z-Transform: Some elementary concepts, Definition of Z-Transform, Examples of Z-Transform, Properties (without proof), Inversion by partial fraction decomposition and residue theorem, Applications of Z-transform to solve difference equations with constant co-efficient.

Unit IV:

8 Hrs.

Fourier Series: Periodic Functions, standard results, Fourier series expansion, Convergence of Fourier Series, Fourier Series for even and odd function, Change of interval, half range Fourier Series, Examples on half range sine and cosine series.

Unit V:

8 Hrs.

Fourier Integral: Fourier Integral of a function formula and examples, Fourier Cosine integral, Fourier Sine integral, Complex Fourier integral, Evaluation of integration using Fourier integral.

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Unit VI:	7 Hrs.
Fourier Transforms: Fourier Transform, Fourier sine and cosine transformation and its examples, Properties of Fourier sine and cosine transform and its examples, Application of Fourier sine and cosine transform on Partial differential equation, Parseval's Identity.	
Total Lecture	45 Hours

Textbooks:	
1	Erwin Kreyzig, Advance Engineering Mathematics, 9 th Edition, John Wiley and Sons, INC.
2	Dr. B. S. Grewal, Higher Engineering Mathematics, 40 th edition, Khanna Publisher.
3	H.K. Dass, Advanced Engineering Mathematics, 8 th revised edition, S. Chand, Delhi.

Reference Books:	
1	Chandrika Prasad, Mathematics for Engineers, 19 th Edition, John Wiley and Sons, INC.
2	L. A. Pipes and Harville, Applied Mathematics for Engineers, 3 rd Edition, McGraw Hill.
3	P.N. and J. N. Wartikar, A text book of Applied MATHematics, 3 rd edition, Pune Vidyarthi Griha Prakashan
4	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10 th edition, Laxmi Prakashan.

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1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Mathematics%20and%20Humanities/

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/111106111
2	https://onlinecourses.nptel.ac.in/noc22_ma41/preview
3	https://archive.nptel.ac.in/courses/111/101/111101153/

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IV SEMESTER

23GE1401 : Entrepreneurship Development

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Appreciate role of entrepreneurs in society and develop entrepreneurial abilities by providing information about skill sets.
2. Develop an understanding of how and what form of business organization to choose for start up.
3. Stimulate to innovate, develop prototypes or ideas by applying theory into practice.
4. Identify the Support rendered by various Government Agencies.

Unit I:

7 Hrs.

Entrepreneur & Entrepreneurship: Meaning of Entrepreneur, Evolution of the concept – Theories and Models, Types of Entrepreneur, Stages in entrepreneurial process- Idea Generation, Screening, Selection and Managing Resources.

Unit II:

8 Hrs.

Legal Compliances for Incorporating Start up: Fundamentals of choosing the Business Organization form for startup, Incorporation of Partnership, LL.P & Co – operative, Incorporation of One Person Company, Pvt. Ltd., Pub. Ltd. and not for profit company, Financing the legal Venture and Legal Compliances.

Unit III:

7 Hrs.

Entrepreneurship and IP Strategy: Intellectual Property : Definition and Concept of Trade Mark, Patent, Copyright, Industrial Design, IP Strategy and Entrepreneurship.

Unit IV:

8 Hrs.

Support to Entrepreneurs: Financing new ventures, Business Incubators – Government Policy for Small Scale Enterprises, Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Subcontracting.

Total Lecture

30 Hours

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Student activities:

1. Interview at least four entrepreneurs or businessman and identify Traits of successful entrepreneurs.
2. Analyse case studies of any two successful entrepreneurs.
3. Download product development and innovative films from internet.
4. Identify your hobbies and interests and convert them into business idea

Textbooks

1. Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.
2. Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", 9th Edition, Cengage Learning 2014.
3. Corporate Law, 33rd ed. 2016, Taxman New Delhi.
4. Narayanan, V. K., Managing technology and innovation for competitive advantage, first edition, Pearson education, New Delhi, (2006)
5. Idris, K. (2003), Intellectual property: a power tool for economic growth, second edition, WIPO publication no. 888, Switzerland
6. Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.
7. Ramaiya's Guide to the Companies Act, 18th ed. 2014, Lexis Nexis New Delhi.

Reference Books

1. Mehta, Monica- The Entrepreneurial Instinct : How everyone has the innate ability to start a successful small business – McGraw – Hill Education, New Delhi 2012, ISBN 978-0-07-179742-9
2. Prasanna Chandra "Protect Preparation, Appraisal, Implementation" Tata McGraw Hill. New Delhi
3. S Anil Kumar "Entrepreneurship Development" New Age International Publishers
4. Nishith Dubey "Entrepreneurship Development" PHI Learning

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- 1 <http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0>
- 2 <https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042>

MOOCs Links and additional reading, learning, video material

- 1 https://onlinecourses.swayam2.ac.in/cec23_mg24/course- entrepreneurship development
- 2 https://onlinecourses.nptel.ac.in/noc23_mg74/announcements?force=true-entrepreneur
- 3 https://onlinecourses.nptel.ac.in/noc23_mg126/announcements?force=true- Business fundamentals for entrepreneurship

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IV SEMESTER

23GE1405 : Marathi Language

Course Objectives

1. मराठी भाषेच्या समृद्धीची जाणीव करून देणे.
2. विद्यार्थ्यांमध्ये भाषा कौशल्याचा विकास करणे आणि त्यातून रोजगाराच्या संधीचा शोध घेणे.

Course Outcomes

3. भाषेचा जीवन व्यवहारात योग्य पद्धतीने वापर करण्याचा प्रयत्न करणे.
4. संत साहित्याच्या शिकवणुकीमुळे मानवता आणि मानवी व्यवहाराची सांगड घालणे, नैतिक मूल्ये रुजविणे.
5. विद्यार्थ्यांना रोजगाराभिमुख बनविणे.

Unit:1

गद्य विभाग

8 Hours

१. भारतीय लोकशाहीचे भवितव्य काय? - डॉ. बाबासाहेब आंबेडकर
२. काळी आई - व्यंकटेश माडगूळकर
३. संत तुकारामांचे अभंग - निर्मलकुमार फडकुले
४. माझी शाळा - प्रकाश खरात
५. समतेचे वारकरी संत गाडगेबाबा आणि राष्ट्रसंत तुकडोजी महाराज - अशोक राणा
६. लोककल्याणकारी राजा : - शरयू तायवाडे

Unit:2

पद्य विभाग

8 Hours

१. ज्ञानेश्वरांचे अभंग - संत ज्ञानेश्वर
२. वनसुधा - वामन पंडित
३. नवा शिपाई - केशवसुत
४. मेंढरं - विठ्ठल वाघ
५. पोरी - अनुराधा पाटील
६. गाव - हेमंतकुमार कांबळे

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Unit:3	<u>व्यावहारिक मराठी</u>	7 Hours
१. म्हणी		
२. मुलाखतलेखन	- डॉ. वैशाली धनविजय	
३. वाक्प्रचार		
४. जाहिरातलेखन	- डॉ. अजय देशपांडे	
Unit:4	<u>रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये</u>	7 Hours
१. प्रत्यक्ष मुलाखत कौशल्य		
२. वाचन कौशल्य - (अ) बातमी वाचन (ब) कथा वाचन		
३. ऑनलाईन कौशल्य - (अ) ग्राहक सेवा केंद्राशी संवाद, (ब) ऑनलाईन अर्ज करणे		

Reference Books

- पाठ्यपुस्तक : शब्दसाधना - भाग १
- रोजगाराभिमुख मराठी व्यावहारिक कौशल्ये

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IV SEMESTER

23GE1406 : Hindi Language

Course Objectives

- विद्यार्थियों में देशभक्तिपरक एवं पारिवारिक मूल्यों का विकास |
- विद्यार्थियों पर्यावरण-संरक्षण के प्रति सजग करना |
- एकांकी, कहानी, निबंध आदि विधाओं के मध्य का अंतर अवगत कराना |
- हिंदी के प्रयोजनमूलक स्वरूप से परिचित कराना |
- विद्यार्थियों को आधुनिक प्रौद्योगिकी (तकनीक) का प्रयोग करने में सक्षम बनाना |.

Course Outcomes

- पौराणिक अथवा ऐतिहासिक घटनाओं को तार्किक आधार पर स्वीकार करेंगे | अपने परिवेश के उचित और अनुचित व्यवहारों के प्रति आकलन शक्ति बढ़ेगी |
- एकांकी, कहानी, निबंध आदि विधाओं के मध्य का अंतर बताने में सक्षम होंगे |
- कविता का रसास्वादन करने में समर्थ होंगे |
- 'अनुवाद' के स्वरूप एवं प्रक्रिया से अवगत होंगे |
- 'मार्गिक नक्शे' का दैनिक जीवन में उपयोग करने में सक्षम होंगे |

Unit:1	गद्य विभाग	8 Hours
१. भाईसाहब (कहानी)	- प्रेमचंद	
२. स्मृति (निबंध)	- श्रीराम शर्मा	
३. गिल्लू (रेखाचित्र)	- महादेवी वर्मा	
४. अभाव (कहानी)	- विष्णु प्रभाकर	
५. महाभारत की साँझ (एकांकी)	- भारतभूषण	

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६. उखड़े खंभे (व्यंग्य)।

- हरिशंकर परसाई

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Unit:2	<u>पद्य विभाग</u>	8 Hours
१. कबीर के दोहे	- कबीरदास	
२. ले चल यहाँ भुलावा देकर	- जयशंकर प्रसाद	
३. स्नेह-निर्झर बह गया	- हैसूर्यकांत त्रिपाठी "निराला"	
४. प्रथम रश्मि	- सुमित्रानंदन पंत	
५. जीवन का झरना	- आरसीप्रसाद सिंह	
६. कविता के साथ	- दामोदर खड़से	
Unit:3	<u>अन्य पाठ्य सामग्री</u>	7 Hours
१. मुहावरे और लोकोक्तियाँ: पाठ्यपुस्तक में मुहावरे और लोकोक्तियाँ का अर्थ एवं वाक्य प्रयोग		
२. विज्ञापन कला : अर्थ, परिभाषा, प्रकार, शीर्षक का महत्त्व, विज्ञापन के प्रयोजन, सत्य, लक्ष्य, विज्ञापन की भाषा, अच्छे विज्ञापन के गुण इत्यादि ।		
Unit:4	<u>कौशल्य आधारित घटक</u>	7 Hours
१. वाचन कौशल्य (समाचार-वाचन, कहानी-वाचन)		
२. सोशल मीडिया के शिष्टाचार		
३. ऑनलाइन आवेदन, ग्राहक-सेवा केंद्र से संवाद		

Reference Books

3. पाठ्यपुस्तक : "पलाश"

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23ME-101

B. Tech in Mechanical Engineering

III/IV SEMESTER

23CV1311/23CV1411

Environmental Sustainability, Pollution and Management

Course Outcomes :

Upon successful completion of the course, the students will be able to

The student will be able to

1. Gain insights into the efforts to safeguard the Earth's environment and resources.
2. Develop a critical understanding of the contemporary environmental issues of concern
3. Have an overview of pollution, climate change and national and global efforts to address adaptation and mitigation to changing environment through environmental management.
4. Learn about the major international treaties and our country's stand on and responses to the major international agreements.

Unit:1	Environment and Sustainable Development	8 Hours
The man-environment interaction; Overview of natural resources: renewable, and non-renewable energy resources; Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators, challenges and strategies for SDGs; Environmental issues: Global change, Climate Change and Mitigation.		
Unit:2	Environmental Pollution and Health	7 Hours
Understanding pollution: Production processes and generation of wastes, Air pollution, Water pollution, Soil pollution and solid waste, Noise pollution, Thermal and Radioactive pollution. Impact on biotic and abiotic things.		
Unit:3	Environmental Management	8 Hours
Environmental management system: ISO 14001, Concept of Circular Economy, Life cycle analysis; Cost-benefit analysis, Environmental audit and impact assessment; Waste Management and sustainability; Ecolabeling /Eco mark scheme		
Unit:4	Environmental Treaties and Legislation	7 Hours
Introduction to environmental laws and regulation, An overview of instruments of international cooperation, Major International Environmental Agreements, Major Indian Environmental Legislations, Major International organizations, and initiatives		
Total Lecture		30 Hours

Text books

1	Chiras, D. D and Reganold, J. P. (2010). Natural Resource Conservation: Management for a Sustainable Future.10th edition, Upper Saddle River, N. J. Benjamin/Cummins/Pearson
2	Rajagopalan, R. (2011). Environmental Studies: From Crisis to Cure. India: Oxford University Press
3	Krishnamurthy, K.V. (2003) Textbook of Biodiversity, Science Publishers, Plymouth, UK
4	Jackson, A. R., & Jackson, J. M. (2000). Environmental Science: The Natural Environment and Human Impact. Pearson Education
5	Pittock, Barrie (2009) Climate Change: The Science, Impacts and Solutions. 2nd Edition. Routledge.
6	Theodore, M. K. and Theodore, Louis (2021) Introduction to Environmental Management, 2nd Edition. CRC Press
7	Kanchi Kohli and Manju Menon (2021) Development of Environment Laws in India, Cambridge University Press

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Reference Books	
1	Headrick, Daniel R. (2020) Humans versus Nature- A Global Environmental History, Oxford University Press
2	Gilbert M. Masters and W. P. (2008). An Introduction to Environmental Engineering and Science, Ela Publisher (Pearson)
3	William P. Cunningham and Mary A. (2015). Cunningham Environmental Science: A global concern, Publisher (Mc-Graw Hill, USA)
4	Varghese, Anita, Oommen, Meera Anna, Paul, Mridula Mary, Nath, Snehlata (Editors) (2022) Conservation through Sustainable Use: Lessons from India. Routledge.
5	Central Pollution Control Board Web page for various pollution standards. https://cpcb.nic.in/standards
6	Barnett, J. & S. O'Neill (2010). Maladaptation. Global Environmental Change—Human and Policy Dimensions 20: 211–213
7	Richard A. Marcantonio, Marc Lame (2022). Environmental Management: Concepts and Practical Skills. Cambridge University Press
8	Ministry of Environment, Forest and Climate Change (2019) A Handbook on International Environment Conventions & Programmes. https://moef.gov.in/wp-content/uploads/2020/02/convention-V-16-CURVE-web.pdf
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B. Tech in Mechanical Engineering

IV SEMESTER

23ME1401 : Machining Processes

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Demonstrate and design the tool geometry of SPCT, mechanism of chip formation and principle of orthogonal/oblique cutting.
2. Analyze the cutting tool geometry of MPCT, mechanism of chip formation, mechanism used and working principle with applications.
3. Identify basic parts and operations of machine tools including lathe, shaper, planer.
4. Categorize basic parts and operations of machine tools including boring, milling, and grinding machines.
5. Select a machining operation and corresponding machine tool for a specific application in real-time.

Unit I:

8 Hrs.

Mechanics of Machining and Machinability: Introduction to machining, geometry of SPCT. Mechanism of chip formation, Orthogonal and Oblique cutting, Use of chip breaker in machining, Merchant Circle. (Application of force analysis Analytical treatment expected), thermal aspects of machining, Cutting Fluids, Machinability, Estimation of Tool life, Tool materials.

Unit II:

7 Hrs.

Lathe: Kinematic systems and operations of lathes, attachments for various operations, machine specifications, basis for selection of cutting speed, feed and depth of cut, time estimation for turning operations such as facing, step turning, taper turning, threading, knurling. Capstan and Turret Lathe and special purpose Machines: Construction, Operation and selection of Machining Parameters, Machining Centers, Tool Heads and indexers

Unit III:

8 Hrs.

Shaper: Introduction, type, specification, description of machines, hydraulic drives in shapers, cutting parameters, attachments for shaper, work holding devices, shaper operations. Planer: Introduction, specifications, description, type of planner, Mechanism for planner: Driving mechanism, feeding mechanism, planner cutting tools, cutting parameters Slotter: Introduction, specifications, description, type of drives for slotter, types of slotting

Unit IV:

7 Hrs.

Milling: Kinematic systems and operations of milling machines, attachments for Milling. Cutting parameters, Types of milling cutters, Tool geometry & their specifications. Indexing- simple, compound and differential. Screw threads and Gear Manufacturing Methods. Applications of milling in gear production process.

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Unit V:	8 Hrs.
Grinding operations: Grinding operations, grinding wheel, specifications & selection, cylindrical & centre less grinding operation, surface grinding, tool & cutter grinding, time estimation for grinding operations. Super finishing process: Honing, Lapping, super finishing, polishing, buffing, metal spraying, galvanizing and electroplating. Process parameters and attainable grades of surface finish, surface roughness measurement. Applications of these process in product development	
Unit VI:	7 Hrs.
Drilling: Reaming: Broaching: Unconventional Machining and Joining Processes: Characteristics, Operation, applications, Limitation and selection of process parameters of the following processes, Abrasive Jet Machining, Ultrasonic Machining, Water Jet Machining, EDM, and ECM. Plasma Arc welding, Electron Beam, and Electron Laser Beam welding. Real time applications of unconventional processes.	
	Total Lecture 45 Hours

Textbooks:

1. Workshop Technology - Part I, Chapman W.A. Fifth edition CBS Publishers
2. Manufacturing Technology (Metal Cutting & Machine Tools) P N Rao 2nd Edition (2009) The McGraw-Hill Companies
3. Manufacturing Science Ghosh & Malik 2nd Edition (2010) East West
4. Workshop Technology (Volume-II) Hajra Choudhary 2nd Edition (2012) The McGraw-Hill Companies

Reference Books:

1. Manufacturing Engineering & Technology S Kalpakjian & SR Schmid 1st Edition (2009) Pearson Education Canada
2. Technology of machine Tools Krar & Oswald 1st Edition (1984) Gregg Division, McGraw-Hill
3. Manufacturing Processes M Begman 1st Edition (1974) Ballinger Pub. Co

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1. <http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0>
2. <https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042>

MOOCs Links and additional reading, learning, video material

1. <https://nptel.ac.in/courses/112/103/112103280/>
2. <https://nptel.ac.in/courses/106/106/106106179/>
3. <https://nptel.ac.in/courses/127/105/127105007/>

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IV SEMESTER

23ME1402 : Lab Machining Processes

Course Outcomes

Upon successful completion of the course the students will be able to

1. Demonstrate and design the tool geometry of SPCT, mechanism of chip formation and principle of orthogonal/oblique cutting.
2. Analyze the cutting tool geometry of MPCT, mechanism of chip formation, mechanism used and working principle with applications
3. Identify basic parts and operations of machine tools including lathe, shaper, planer
4. Categorize basic parts and operations of machine tools including boring, milling and grinding machines.
5. Select a machining operation and corresponding machine tool for a specific application in real-time.

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1.	Demonstration of Single point cutting tool their Nomenclature , geometry, materials and applications.
2.	Demonstration of Multi point cutting tool their Nomenclature , geometry, materials and applications.
3.	Demonstration of working of Lathe machine and study of its mechanisms.
4.	Demonstration of working of Shaper machine and study of its mechanism.
5.	Demonstration of working of Milling machine and study of its mechanism.
6.	Demonstration of working of Drilling machine and study of its mechanism..
7.	Practical on Lathe for turning, facing, step turning, taper turning, and I threading.
8.	Practical on Shaper with exposure to auto feed.
9.	Practical on Milling machine for slot cutting.
10.	Practical on Drilling machines for drilling.
11.	Demonstration of Boring operations.
12.	Study of Grinding machines and Super finishing processes.
13.	Introduction to NC, CNC machines.

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(Department of Mechanical Engineering)

SoE No.
23ME-101

B. Tech in Mechanical Engineering

IV SEMESTER

23ME1403 : Lab Computer Aided Design

Course Outcomes

Upon successful completion of the course the students will be able to

1. Apply the knowledge of additive and subtractive manufacturing for product development in an Industry
2. Conduct additive manufacturing using 3D printing methods and subtractive manufacturing using CNC machines
3. Design CADmodels for accurately representing physical characteristics, kinematics, and dynamics of robotic systems using CAD data in Robot Simulation environment.
4. Analyse different 3D printing parameters and pre and post processing techniques of 3D Printed Parts for application in different industry.

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1.	Exploring CAD File Formats and their compatibility, advantages, and limitations.
2.	Overview of CAM fundamentals with procedures for creation of CAM environment using CAD models.
3.	Developing and simulating programs for planar milling operation
4.	Developing and simulating programs for floor and wall and cavity milling operation
5.	Developing and simulating programs for turning operations, encompassing OD, ID turning, grooving, threading.
6.	Postprocessing operations using a variety of postprocessors to generate CNC programs effectively.
7.	Creating comprehensive shop documentation to support manufacturing operations.
8.	CAD Model preparation for 3D Printing.
9.	Analysis of different 3D printing parameters.
10.	Post-Processing Techniques for 3D Printed Parts.
11.	Integrating CAD files into robot simulators for virtual prototyping and simulation (Simulators:ABB Robot Studio/ Gazebo/ MATLAB/Simulink)
12.	Explore methods for accurately representing physical characteristics, kinematics, and dynamics of robotic systems using CAD data

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23ME-101

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IV SEMESTER 23ME1404 : Lab Machine Drawing

Course Outcomes

Upon successful completion of the course the students will be able to

1. Understand and apply the detailed drawing of a given object.
2. Interpret and Prepare the drawing
3. Construct details and assembly of different mechanical systems
4. Create an assembly drawing into a detailed drawing using modeling software

Minimum Eight Practical's to be performed from the list as below

SN	Experiments based on
1.	Representation of different types of lines, Name Block, Dimensioning, Machining Symbols, Heat Treatment, Allowances, Convention Representation of Engineering Part
2.	Welding symbol and Riveting: - Shapes of rivet heads. (Diagonal pitch, Margin, Back pitches, etc.) Types of riveting lap and butt joint, zigzag, and chain structure. All types of welding symbols are common representations of welding.
3.	Type of Bolt and Nut: - Hexagonal bolt and nut with washer, SQ headed bolt, Eye bolt, Eye foundation bolt, Bent foundation, and Lewis and Rag foundation bolt. Locking of bolt (All 5 types) T-headed bolt Hook bolt, Flanged nut Cap nut Dome nut Capstan nut Ring nut Wing nut, and Stud.
4.	Type of Coupling, Key, and Joint
5.	Steam Engine parts – Stuffing boxes, Crossheads, Eccentrics, pistons, Valves and Pumps.
6.	Bearings - Bushed journal bearing, Foot-step bearing, and Plummer block.
7.	Machine tool parts – Lathe Tail-stock, Square Tool Post, Machine Vices.
8.	Other machine parts – Screws jacks, Square Tool post, and Petrol engine connecting rod.
9.	Simple designs of a steam stop valve, spring-loaded safety valve and feed check valve.
10.	Cotter and pin joints and coupling.

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IV SEMESTER Multidisciplinary Minor Courses

Track 1

Courses	Sem	MDMT1ME101 : Computer-Aided Design
MDM-I	3	(MDM1ME101) Engineering Materials
MDM-II	4	(MDM2ME102) Basics of Mechanism
MDM-III	5	(MDM3ME103) Basics of Machine Design
MDM-IV	6	(MDM4ME104) Computer Aided Design
MDM-V	7	(MDM5ME105) Product Design and Development
MDM-VI	8	(MDM6ME106) INDUSTRY 5.0

Track 2

Courses	Sem	MDMT2ME201 : Robotics and Computer Integrated Manufacturing
MDM-I	3	(MDM1ME201) Introduction to Robotics
MDM-II	4	(MDM2ME202) Industrial Robotics
MDM-III	5	(MDM3ME203) Computer Integrated Manufacturing
MDM-IV	6	(MDM4ME204) Subtractive Manufacturing
MDM-V	7	(MDM5ME205) Additive Manufacturing
MDM-VI	8	(MDM6ME206) Supply Chain Management

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23ME-101

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IV SEMESTER

Track 1 - Computer Aided Design

MDM2ME102 : Basics of Mechanisms

Course Outcomes :

Upon successful completion of the course the students will be able to

1. **Understand** the various kinematic concepts in different mechanisms.(L3)
2. **Explain** the working Principles of various Mechanism. (L3)
3. **Demonstrate** the various working principles of plants.(L3)
4. **Construct** the various model using CAD software. (L4)

Unit I:	7 Hrs.
Basic Concept of Mechanism: link, kinematics pairs, kinematics chain, mechanism, machine, simple & compound chain, Degree of freedom, estimation of degree of freedom, inversion of four-bar-chain. (CO-1)	
Unit II:	8 Hrs.
Working Principles of Mechanism: Seesaw mechanism, Reciprocating Mechanism, Brake Mechanism, Clutch mechanism, Gear mechanism. (CO-2)	
Unit III:	8 Hrs.
Mechanisms of: Working of EV vehicles, Thermal power plants, solar power plants, Hydro power plant, wind power and Nuclear power plant. Refrigeration and Air conditioning. (CO-3)	
Unit IV:	7 Hrs.
Concept of modelling and analysis: Generation of model using CAD software, Analysis and synthesis of Various Mechanisms. (CO-4)	
	Total Lecture 30 Hours

Textbooks:

1. Theory of mechanisms & machines, Shigley J. E, 4TH Edition 2014, Tata McGraw-Hill
2. Theory of Machine, Rattan S.S, 4th Edition 2015, Tata McGraw-Hill

Reference Books:

1. Non-Conventional Energy Resources, Khan B.H., 3rd Edition, Tata McGraw-Hill.
2. Electric and Hybrid Vehicles, DENTON T., 2ED (PB 2020), Institute of motor Industry

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YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

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MOOCs Links and additional reading, learning, video material

1.	
2.	
3.	

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IV SEMESTER

Track 2- Robotics and Computer Integrated Manufacturing MDM2ME202: Industrial Robotics

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Apply the knowledge of robot motion analysis for product development in an Industry
2. Design robot programs for various manufacturing operations
3. Analyze Robotics based automation and its different roles in industry
4. Analyze the working methodology of robotics and automation, motion and control, machine vision and programming, application of robots in industry.

Unit I:

7 Hrs.

Introduction: Overview of Industrial Robotics: Definition, history, and evolution, **Types of Industrial Robots: Manipulators, articulated robots, SCARA robots, etc., Robot Components and Architecture: End effectors, actuators, controllers, and sensors, Applications of Industrial Robots: Manufacturing, assembly, welding, painting, etc.**

Contemporary Issues related to Topic

Unit II:

8 Hrs.

Robot Motion Analysis and Control and Robot End-Effectors: **Introduction to Manipulator Kinematics, Homogeneous Transformations and Robot Kinematics, Manipulator Path Control, Robot Dynamics, Configuration of a Robot Controller, Control System Analysis, Robot Activation and Feedback Components, Types of End Effectors, Mechanical Grippers, Other Types of Grippers, Considerations in Gripper Selection and Design, End Effector Integration: Mounting, calibration, and programming of end effectors.**

Contemporary Issues related to Topic

Unit III:

8 Hrs.

Sensors in Robotics and Machine Vision: **Transducers and Sensors, Sensors in Robotics, Tactile Sensors, Proximity and Range Sensors, Miscellaneous Sensors and Sensor-Based Systems, Uses of Sensors in Robotics, Introduction to Machine Vision, The Sensing and Digitizing Function in Machine Vision, Image Processing and Analysis, Training and Vision System, Applications in Manufacturing industry.**

Contemporary Issues related to Topic

Unit IV:

7 Hrs.

Robot Programming and Languages: **Robot Programming Languages: Teach pendant programming, offline programming, and programming interfaces, Robot Control Systems: Open-loop vs. closed-loop control, PID control, trajectory planning, Robot Safety: Safety standards, risk assessment, and safety features in industrial robots, Simulation and Offline Programming: Introduction to simulation software for robot programming and validation. AI and Robotics.**

Contemporary Issues related to Topic

Total Lecture

30 Hours

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Textbooks:

1.	Robot Engineering An Intergrated approach 2004 Klafter R.D., Chmielewski T.A. and Negin M Springer
2.	Industrial Robotics: Technology, Programming and Applications, 2012 Mikell P. Groover, Mitchel Weiss, Roger N. Nagel, Nicholas G. Odrey and Ashish Dutta 2nd Edition, Tata McGraw Hill, 2012.
3.	Automation in Production system 2002 Mikell P. Groover Prentice-Hall of India Pvt. Ltd., New Delhi, 2002
4.	Bruno S and Sciavicco L, Robotics: Modelling, Planning and Control, Springer (2009)

Reference Books:

1.	Robotics control, sensing, vision, and intelligence 2004 Fu K.S., Gonzalez R.C., and Lee C.S.G. Tata McGraw-Hill Education
2.	Robotics Technology and Flexible Automation 2001 Deb S.R Tata McGraw-Hill Education
3.	Introduction to Robotics Mechanics and Control 2008 Craig J.J Pearson Education India
4.	Industrial Robotics, By Ganesh S. Hegde · 2006, Laxmi Publications, June 2006

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

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MOOCs Links and additional reading, learning, video material

1.	https://nptel.ac.in/courses/112101098
2.	https://nptel.ac.in/courses/112101099

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23ME-101

B. Tech in Mechanical Engineering

IV SEMESTER Open Elective -II : Basket

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management

Open Elective syllabus link : <https://ycce.edu/syllabus/>

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B. Tech in Mechanical Engineering

IV SEMESTER

Mandatory Learning Course (Audit Course)

MLC2124 : YCAP4

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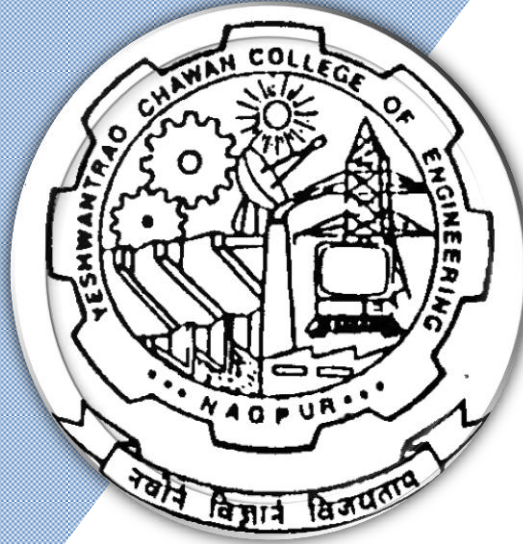
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(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2022

5th Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC		22ME501	Heat Transfer	T	3	0	0	3	3	30	30	40	3
2	5	PC		22ME502	Lab:- Heat Transfer	P	0	0	2	2	1		60	40	
3	5	PC		22ME503	Fluid Machines	T	3	0	0	3	3	30	30	40	3
4	5	PC		22ME504	Lab:- Fluid Machines	P	0	0	2	2	1	0	60	40	
5	5	PC		22ME505	Operations Research Techniques	T	3	0	0	3	3	30	30	40	3
6	5	OE-I			Open Elective - I *	T	3	0	0	3	3	30	30	40	3
7	5	OE-II			Open Elective - II *	T	3	0	0	3	3	30	30	40	3
8	5	PC		22ME506	Lab:- Machine Drawing	P	0	0	2	2	1		60	40	
9	5	PC		22ME507	Mechanical measurement & Instrumentation	T	3	0	0	3	3	30	10	60	3
10	5	PC		22ME508	Lab:- Mechanical measurement & Instrumentation	P	0	0	2	2	1		60	40	
11	5	STR		22ME509	Industrial training, Seminar & Report	P	0	0	0	0	1		100		
TOTAL FOURTH SEM							18	0	8	26	23				

Open Elective-I*

1	5	OE-I	ME	22ME531	OE I : Operations Research Techniques
2	5	OE-I	ME	22ME532	OE I : Automobile Engineering
3	5	OE-I	ME	22ME533	OE I : Control System Engineering
4	5	OE-I	ME	22ME534	OE I: Robotics and Subtractive Manufacturing

Open Elective-II*

1	5	OE-II	ME	22ME551	OE II : Total Quality Management
2	5	OE-II	ME	22ME552	OE II : Reliability Engineering
3	5	OE-II	ME	22ME553	OE II : Power Generation Engineering
4	5	OE-II	ME	22ME554	OE II : Project Evaluation & Management



List of Mandatory Learning Course (MLC)

1	5	HS	T&P	MLC2125	YCASP5: YCCE Communication Aptitude Preparation	A	3	0	0	3	0	
2	5	HS	R&D	MLC125	Design Thinking	A	2	0	0	2	0	

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

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22ME-101

B.Tech in Mechanical Engineering

V SEMESTER

22ME501 : Heat Transfer

Course Outcomes:

Upon successful completion of the course, the students will be able to;

- **Analyse and solve** the problems of unidirectional steady-state heat conduction systems.
- **Investigate and apply** the empirical correlations in convection and phase change processes to **estimate** the heat transfer coefficient.
- **Design & analyze** the heat exchangers with LMTD & ϵ -NTU methods.
- **Examine and evaluate** the net thermal radiation exchange between surfaces and **estimate** radiation view factors using tables, graphs, and the view factor relationships.

Unit I:

(8 Hrs.)

Introduction: Modes of Heat Transfer, **Basic Laws of Heat Transfer and Conservation of Energy requirement.**
Derivation of general Heat conduction equation in Cartesian, Cylindrical and Spherical Co-ordinates, Thermal conductivity, and Thermal diffusivity.

One dimensional steady state conduction equation for the plane wall, Cylinder and Sphere, Thermal resistance of composite structures, Contact resistance, and overall heat transfer coefficient.

Unit II:

(7 Hrs.)

Conduction with uniform internal heat generation: within plane wall, solid Cylinder and solid sphere, **Extended Surfaces with uniform cross section area**, temperature distribution and their heat transfer rate, Fin efficiency and effectiveness.

Unit III:

(7 Hrs.)

Forced Convection:

Physical signification of related non-dimensional parameters, Newton's law of cooling, Concept of velocity and thermal boundary layer, Local and average heat transfer coefficient, Using Empirical co-relation (from heat transfer data book) for heat transfer during external and internal flow in laminar and turbulent regime for UHF and UWT condition, for determination of heat transfer coefficient.

Unit IV:

(7 Hrs.)

Natural Convection:

Grashoff number, Rayleigh number, Hydrodynamic and Thermal Boundary Layer. Using Empirical co-relation (from heat transfer data book) for heat transfer during external flow in laminar and turbulent regime for UHF and UWT condition (over plates & cylinders in Horizontal and vertical position, and over sphere).

Heat transfer with phase change (Theory only):

Pool boiling phenomenon, curve and regimes of pool boiling,

Film and drop wise condensation, Film wise condensation on vertical surface (plate & cylinder), horizontal tube & bank of tubes, effect of superheated and non-condensable gasses on condensation heat transfer.

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Unit V:	(8 Hrs.)
Heat Exchanger: Classification of heat exchangers, overall heat transfer coefficient, fouling factor, temperature distribution Heat Exchanger Analysis for parallel & Counter flow heat exchangers using LMTD Approach and Effectiveness - NTU approach.	
Unit VI:	(8 Hrs.)
Radiation Basic Radiation Concepts: Fundamentals, Basic ideas, spectrum, basic definitions, radiative properties of opaque surfaces, Spectral and directional variations, emissive power, radiosity, intensity of radiation and solid angle, Band Emission. Black Body Radiation Laws: Planck's law, Stefan Boltzmann law, Wien's Displacement law, Kirchoff's law, Lambert cosine law, Radiation Energy Exchange: Concept of black and gray bodies, Radiation exchange between black surfaces, Radiation exchange between gray surfaces Shape Factor Concepts– Definition, relations, and its properties. Radiation network for radiative exchange. Radiation between parallel plates, concentric Cylinders, and concentric spheres & simple enclosures.	
Total Lecture | 45 Hours	

Textbooks:

SN	TITLE	EDITION	AUTHOR	PUBLICATION
1	Introduction to heat transfer	7th Edition(2022)	Incropera & Dewitt J. Wiley	John Wiley & Sons
2	Elements of heat transfer	Edition (2023)	M. N. Ozisik	McGraw-Hill
3	Heat transfer	7th Edition(2020)	S. P. Sukhatme	Universities press (India)
4	Heat Transfer	Edition (2022)	Yunus A Cengel	McGraw-Hill,
5	Fundamentals of Heat & Mass transfer	4 th Edition (2020)	M. Thirumaleshwar	Pearson
6	“Heat and Mass Transfer Data Book”	8th Edition, 2020.	C. P. Kothandaraman and Subramanian.	New Age International Publications.
7	Fundamentals of Heat and Mass Transfer	4 th Edition	C.P. Kothandaraman	New Age Publishers

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B.Tech in Mechanical Engineering

Reference Books:			
SN	Author Name	Title	Publication
1.	Holman, J. P.	"Heat Transfer",	McGraw Hill.
2.	Frank Kreith.	Principles of Heat Transfer	Harper and Row Publishers, New York.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc19_ch23/preview
2	https://www.classcentral.com/course/swayam-heat-transfer-10061

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SoE No.
22ME-101

B.Tech in Mechanical Engineering

V SEMESTER

22ME502 : Lab. Heat Transfer

Course Outcomes

Upon successful completion of the course the students will be able to

- Analyse and solve the problems of unidirectional steady state heat conduction systems.
- Investigate and apply the empirical correlations in convection and phase change processes to estimate the heat transfer coefficient.
- Design & analyse the heat exchangers with LMTD & ϵ -NTU methods.
- Examine and evaluate the net thermal radiation exchange between surfaces and estimate radiation view factors using tables, graphs and the view factor relationships.

Minimum Eight Practical's to be performed from the list below

Sr. No.	Experiments based on CONDUCTION:
1	Determination of thermal conductivity of metal bar.
2	Determination of thermal conductivity of insulating material in the powder form (Lagged Pipe).
3	Determination of thermal conductance of a composite wall.
4	Heat Transfer through FINs.
	Experiments based on CONVECTION:
5	Determination of forced convection heat transfer coefficient for fluid flow through a closed conduit.
6	Determination of natural convection heat transfer coefficient for a vertical surface.
	Experiments based on HEAT EXCHANGER:
7	Determination of effectiveness and overall heat transfer coefficient for parallel flow and counter flow concentric tube heat exchangers.
	Experiments based on RADIATION:
8	Determination of emissivity of non-black surfaces.
9	Determination of Stefan-Boltzmann constant.
10	Study of heat pipes
11	Study of pool boiling phenomenon (Nukiyama Curve).
12	Study of condensation heat transfer in film wise & drop wise modes.

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(Department of Mechanical Engineering)

SoE No.
22ME-101

B.Tech in Mechanical Engineering

V SEMESTER

22ME503 : Fluid Machines

Course Outcomes :

Upon successful completion of the course, the students will be able to;

- The student will be able to describe and analyze the working of Positive Displacement Pumps
- The student will be able to describe and analyze the working Centrifugal Pumps
- The student will be able to define evaluate Static and Stagnation properties and; describe and analyze the compressible flow.
- The student will be able to describe and analyze the working of compressors.

Unit I: Positive displacement Pumps

(8 Hrs.)

Classification of Positive displacement Pumps: Study of Rotary pumps such as vane pump, Gear pump and Screw pump. Reciprocating pumps: Basic principle, types, Main components, Slip, Work done. Indicator diagrams, Separation, Air vessels

Unit II: Centrifugal Pumps

(7 Hrs.)

Centrifugal Pumps: Components and Principles of operation, Classification, Priming, Fundamental equation, Various heads, Velocity triangles and their analysis, Effect of outlet blade angle, Vane shapes, Losses & efficiencies of pumps, N.P.S.H, Cavitations in pumps, Performance characteristics

Unit III: Hydraulic Turbines

(8 Hrs.)

Hydraulic Turbines:

Classification, Classification of water turbines, Pelton wheel, its construction and working, velocity triangles, efficiency, power, work done.

Principle of operation, Construction and working of Francis and Kaplan Turbine, Effect of modification of velocity triangles on runner shape.

Introduction of steam turbines and Compounding of steam turbines

Unit IV: Reciprocating compressors

(7 Hrs.)

Reciprocating compressors: - Parts, Operations, Work done during isothermal, polytropic & adiabatic compression process, P-V diagram, isothermal efficiency, Effect of clearance, volumetric efficiency, Mechanical efficiency. Multistaging in reciprocating compressor, condition for minimum work input, capacity control, Actual indicator diagram]

Unit V: Compressible Flow

(8 Hrs.)

Compressible Flow: Stagnation properties, speed of sound wave, Mach number, one dimensional isentropic flow, Stagnation properties, Isentropic flow through convergent-divergent nozzles, Adiabatic Expansion in Nozzles, Maximum Discharge Critical Pressure Ratio, Calculation of Throat and Exit Areas,

Unit VI: Centrifugal compressor

(7 Hrs.)

Centrifugal compressor: -Principle, operation, parts, velocity diagram, static & stagnation quantities, work done by impeller, isentropic efficiency of compressor. Slip factor, pressure coefficient and power input factor. Concept of Axial Compressor

Total Lecture 45 Hours

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(Department of Mechanical Engineering)

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22ME-101**

Textbooks:

1.	Modi, PN, and Seth, SM, Hydraulics and Fluid Mechanics, Delhi Standard Publishers Distributors, 2015
2.	Rajput R.K, Thermal Engineering , 10th Edition, Laxmi Publications (P) Ltd, 2017

Reference Books:

1.	Banga & Sharma, Hydraulic Machines, Khanna Publishers, 2019
2.	Nag P K, Thermal Engineering, Tata McGraw-Hill Education, 2020.
3.	Soman.K, Thermal Engineering, PHI Learning Private Ltd, 2016.

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	https://onlinelibrary.wiley.com/doi/10.1002/9781119902973.ch4
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9781119902973?SeriesKey=10.1002/9780470168042

MOOCs Links and additional reading, learning, video material

1.	https://nptel.ac.in/courses/112106133
2.	https://nptel.ac.in/courses/112103249

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SoE No.
22ME-101

V SEMESTER

22ME504 : Lab. Fluid Machines

Course Outcomes

Upon successful completion of the course the students will be able to

- The student will be able to describe and analyze the working of Positive Displacement Pumps
- The student will be able to describe and analyze the working Centrifugal Pumps
- The student will be able to define evaluate Hydraulic turbine
- The student will be able to describe and analyze the working I.C. Engine and VCRS.

Minimum Ten Practical's to be performed from the list below

SN	Experiments based on
1	Study of Positive Displacement Rotary Pumps
2	Trial on Reciprocating Pump
3	Trial on Centrifugal Pump
4	Trial on reciprocating compressor
5	Trial on rotary Blower.
6	Trial on Pelton wheel
7.	Trial on Francis Turbine
8	Trial on Kaplan Turbine
9	Performance testing of a single cylinder I.C. Engine.
10	Trial on Petrol Engine with energy balance sheet.
11	Heat balance on Multicylinder Diesel Engine.
12	Performance on Vapor Compression Refrigeration System (VCRS).
13	Performance on air-conditioning system.

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B.Tech in Mechanical Engineering

V SEMESTER

22ME505 : Operations Research Techniques

Course Outcomes:

Upon successful completion of the course the students will be able to

- Recognise the importance of Optimisation in solving practical problems in industry.
- Formulate real world decision making scenarios in to mathematical models.
- Understand Operations Research models and apply them in the field of manufacturing, finance, Project management, human resource management etc.
- Use optimisation tools to solve a mathematical model for a practical problem.

Unit:1	Linear Programming Problems:	7 Hours
Introduction to Linear Programming Problems: Formulation of LPP, Geometry of LPP and Graphical Solution of LPP, Simplex Method, Big M- Method, Two Phase Method		
Contemporary Issues related to Topic		
Unit:2	Transportation Problem:	8 Hours
Introduction - Formulation - Solution of the transportation problem (Min and Max): Northwest Corner rule, row minima method, column minima method, Least cost method, Vogel's approximation method – Optimality test: MODI method. Assignment Model		
Contemporary Issues Related to Topic		
Unit:3	Dynamic programming:	8 Hours
Dynamic programming characteristics, approach and its formulations. Application of Dynamic programming in Employment smoothening problem, Resource allocation, Inventory control & Linear programming.		
Contemporary Issues related to Topic		
Unit:4	Project Management:	7 Hours
Project Management: Network Scheduling by CPM & PERT, Cost considerations in PERT and CPM		
Contemporary Issues related to Topic		
Unit:5	Replacement Models:	8 Hours
Replacement Models: Replacement of Models that deteriorate with time, Concept of equivalence, Interest Rate and Present worth. Replacement of items that fails suddenly considering Individual and Group replacement policy.		
Contemporary Issues Related to Topic		
Unit :6	Queuing Theory and Simulation:	7 Hours
Queuing Theory: Queuing Systems, Kendelalls for representing queuing models, Classification of queuing models (No derivations expected), Simulations, Monte-Carlo Simulation.		
Contemporary Issues Related to Topic		
Total Lecture Hours		45 Hours

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B.Tech in Mechanical Engineering

SoE No.
22ME-101

Text books

1 Taha, H.A., "An Introduction to Operations Research", 6th Ed., Prentice Hall of India, 2001

Reference Books

1 Hillier, F.J., Lieberman, G.J., "Introduction to Operations Research" 7th Ed., Holden Day Inc., 2001

2 Gross, D., and Harris, C.M., "Fundamentals of Queuing Theory", 2nd Ed., John Wiley & sons, NY, 1985

3 Panneer selvam R., Operations Research, PHI, 2011

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1 [http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20\(ER%20Series\).pdf](http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20(ER%20Series).pdf)

2 [http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20\(E%20Series\).pdf](http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20(E%20Series).pdf)

MOOCs Links and additional reading, learning, video material

1 <https://youtu.be/8jaleXu5mzs>

2 <https://youtu.be/AAeXqnhwPZ4>

3 <https://www.digimat.in/nptel/courses/video/112106134/L02.html>

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B.Tech in Mechanical Engineering

V SEMESTER

22ME531 : OE I : Operations Research Techniques

Course Outcomes:

Upon successful completion of the course the students will be able to

- Recognise the importance of Optimisation in solving practical problems in industry.
- Formulate real world decision making scenarios in to mathematical models.
- Understand Operations Research models and apply them in the field of manufacturing, finance, Project management, human resource management etc.
- Use optimisation tools to solve a mathematical model for a practical problem.

Unit:1	Linear Programming Problems:	7 Hours
Introduction to Linear Programming Problems: Formulation of LPP, Geometry of LPP and Graphical Solution of LPP, Simplex Method, Big M- Method, Two Phase Method		
Contemporary Issues related to Topic		
Unit:2	Transportation Problem:	8 Hours
Introduction - Formulation - Solution of the transportation problem (Min and Max): Northwest Corner rule, row minima method, column minima method, Least cost method, Vogel's approximation method – Optimality test: MODI method. Assignment Model		
Contemporary Issues Related to Topic		
Unit:3	Dynamic programming:	8 Hours
Dynamic programming characteristics, approach and its formulations. Application of Dynamic programming in Employment smoothening problem, Resource allocation, Inventory control & Linear programming.		
Contemporary Issues related to Topic		
Unit:4	Project Management:	7 Hours
Project Management: Network Scheduling by CPM & PERT, Cost considerations in PERT and CPM		
Contemporary Issues related to Topic		
Unit:5	Replacement Models:	8 Hours
Replacement Models: Replacement of Models that deteriorate with time, Concept of equivalence, Interest Rate and Present worth. Replacement of items that fails suddenly considering Individual and Group replacement policy.		
Contemporary Issues Related to Topic		
Unit :6	Queuing Theory and Simulation:	7 Hours
Queuing Theory: Queuing Systems, Kendelalls for representing queuing models, Classification of queuing models (No derivations expected), Simulations, Monte-Carlo Simulation.		
Contemporary Issues Related to Topic		
Total Lecture Hours		45 Hours

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22ME-101**

B.Tech in Mechanical Engineering

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Reference Books

1 Hillier, F.J., Lieberman, G.J., "Introduction to Operations Research" 7th Ed., Holden Day Inc., 2001

2 Gross, D., and Harris, C.M., "Fundamentals of Queuing Theory", 2nd Ed., John Wiley & sons, NY, 1985

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MOOCs Links and additional reading, learning, video material

1 <https://youtu.be/8jaleXu5mzs>

2 <https://youtu.be/AAeXqnhwPZ4>

3 <https://www.digimat.in/nptel/courses/video/112106134/L02.html>

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SoE No.
22ME-101

V SEMESTER

22ME532 : OE-I : Automobile Engineering

Course Outcomes:

Upon successful completion of the course the students will be able to

- analyze various systems of Engine, its function including fuel supply, cooling and lubrication system in vehicle.
- describe various power transmission systems from clutch to wheel in vehicle.
- evaluate and describe control systems like steering and brakes in vehicle.
- illustrate and describe the necessary electrical and luxurious systems and safety system in vehicle.

Unit:1	Power Plant	8 Hours
Introduction, classification, history & development of Automobiles. Vehicles layout, Various engine systems and components, construction & working of I.C. engines.		
Introduction to Fuel supply system: for Petrol and Diesel Engine, CRDI, GDI, EFI, MPFI, Engine fuels: Gasoline, diesel, bio-diesel, CNG.		
Engine cooling and lubrication systems.		
Contemporary Issues related to Topic : Power system : electrical, hybrids, solar, wind, compressed air, fuel cell, hydrogen etc.		
Unit:2	Transmission	8 Hours
Clutch: Necessity, requirements & Types of a clutch		
Gear box: Classification, Necessity & working principle of gear box, Propeller shaft, Slip & Universal joints.		
Differential: Need and working, Differential lock, Rear Axles and Front Axles.		
Contemporary Issues related to Topic: Introduction to Automatic Transmission: Fully and Semi-automatic.		
Unit:3	Steering, Suspension & Brakes	8 Hours
Steering systems: principle of steering, steering linkages, steering geometry and wheel alignment, steering gear box and its types.		
Suspension systems: Function, conventional and Independent suspension System, shock absorber.		
Brakes: Drum and Disc brakes, Comparison, Mechanical, hydraulic, Air brakes.		
Contemporary Issues related to Topic: Power steering		
Unit:4	Wheels & vehicle dynamics	7Hours
Wheel and Tyres: Construction & classification of wheels & Tyres, tyre specification, factors affecting tyre performance.		
Resistance to vehicle motion: Air, Road and gradient resistance and power calculation, Low and high speed turning, tyre cornering forces, Vehicle aerodynamics and its necessity.		
Contemporary Issues related to Topic: Race car aerodynamics		
Unit:5	Electrical systems	7 Hours
Electrical systems: Battery construction. Specification. Operation of Batteries. Charging of battery, Alternator, Starting system, Battery Ignition and magneto ignition systems, Lighting, Horn, Side indicator, wiper, and other electrical systems, Automobile air-conditioning, Panel Board instruments.		
Contemporary Issues related to Topic: Introduction to EV's		

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Unit :6	Maintenance & Safety	7 Hours
Engine overhauling, Engine tune up, Tyre rotation & balancing, Fault detection techniques and remedies, Collision avoidance system and vehicle to vehicle communication, Airbags system, EBD, ABS and other safety features, cruise control.		
Contemporary Issues related to Topic: Navigation system and control.		
Total Lecture Hours		45 Hours

Text books	
1	Singh Kirpal, Automobile Engineering, Volume 1 & 2, Standard publishers and distributors, 14th Edition, 2021
Reference Books	
1	Ganesan V, Internal Combustion Engines, 4th Edition, McGraw Hill Education, 2012.
2	Rajpoot R K, A text book of Automobile Engineering, Laxmi publications (P) Ltd., 1st Edition, 2007.
3	Sethi H M, Automotive Technology, McGraw-Hill Education, 1991
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/10.1002/9781118536186
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/107/106/107106088/

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V SEMESTER

22ME533 : OE-I : Control System Engineering

Course Outcomes :

Upon successful completion of the course, the students will be able to;

- Illustrate the mathematical representation of various control system and determine the transfer function of mechanical, electrical, thermal and fluid system.
- Analyse the working of various control system components of electrical motor and hydraulic system..
- Evaluate the performance of control system using time response analysis.
- Create the performance of control system on the basis of frequency response and root locus and design suitable compensation for the control system.

I	Introduction:- Introduction, System concept Open and Closed loop control systems. Transfer function, Mathematical Modelling of Physical System and system representation through Block Diagram. Transfer function through Block Diagram Simplification. Signal Flow Graph, Masons Gain Formula Block diagrams of various control systems. (CO-1)	7 Hrs
II	Mathematical Modelling:- Representation of Control components: Mechanical and Electrical components; Analogous systems. (CO-1)	
III	Electrical system:- Ac/dc servomotors; field controlled and armature-controlled servomotors; positional servomechanisms, Potentiometer, Synchro, stepper motors. Hydraulic systems: - Hydraulic pumps (gear; vane; and reciprocating piston) Cylinders, Direction control valves (2, 3, 4 way) Flow control valve; Relief valve Hydraulic servomotor (CO-2)	
IV	Time response analysis:- Transient and steady state response of first and second order systems Concept of stability; relative stability; Routh stability criteria. (CO-2)	
V	Bode and Polar plot:- Frequency response and its characteristics; Bode plots; Polar plots, Nyquist plots. Gain margin and phase margin. Identification of system transfer function (CO-3)	
VI	Root Locus:- Basic control actions; Proportional Integral and Derivative control actions and their effect on system performance. Root locus technique. Introduction to control system design log load compensation Feed Back Compensation and Pole -Zero placements (CO-4)	
Total Lecture		45 Hours

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Text books

- | | |
|---|--|
| 1 | Modern Control Engineering 3rd Edition (2009) Ogata Prentice Hall |
| 2 | Control system Engineering 4th Edition (2007) Nise John Wiley & Sons |

Reference Books

- | | |
|---|--|
| 1 | Control system 4th Edition (2009) Nagrath & Gopal New Age International |
| 2 | Modern Control System 12th Edition (2009) Dorf Pearson |

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- | | |
|---|---|
| 1 | https://onlinelibrary.wiley.com/doi/10.1002/9781118536186 |
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MOOCs Links and additional reading, learning, video material

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|---|---|
| 1 | https://archive.nptel.ac.in/courses/107/106/107106088/ |
|---|---|

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B.Tech in Mechanical Engineering

V SEMESTER




22ME534 : OE-I : Robotics and Subtractive Manufacturing

Course Outcomes:

Upon successful completion of the course, the students will be able to

- Understand workings of subtractive manufacturing
- Implement CNC programs for various product manufacturing
- have knowledge of Robotics, automation, robotics motion, sensors, robotic programming and roles of robots in the industry
- Understand the working methodology of robotics and automation, motion and control, machine vision and programming, and application of robots in industry.

Unit:1	8 Hours	
Concepts of NC, CNC, DNC. Classification of CNC machines, MCU architecture and functionality, Machine Configurations, Types of control, CNC controller's architecture and characteristics, Interpolators.		
Unit:2	7 Hours	
Positioning system, Cutter offset compensation, Word address format, Introduction to G and M codes Manual part programming for CNC turning, milling and drilling.		
Unit:3	8 Hours	
Tooling system for Machining center and Turning center, work holding devices, of CNC Machines. APT part programming, CAD/CAM programming, Simulation and Verification of CNC programs, Adaptive CNC control techniques. Integration of CNC machines for CIM.		
Unit:4	7 Hours	
Robot – Definition – Robot anatomy – Co-ordinate systems, work envelope, types and classification – Specifications – Pitch, yaw, roll, joint notations, speed of motion and pay load – Robot parts and their functions – Need for robots – Different applications.		
Unit:5	8Hours	
Forward kinematics – Inverse kinematics – Differences: Forward kinematics and Reverse kinematics of manipulators with two and three degrees of freedom (In 2 dimensional), four degrees of freedom (In 3 dimensional) – Deviations and problems ,Introduction to DH notations		
Unit :6	7 Hours	
ROBOT PROGRAMMING Teach pendant programming – Lead through programming – Robot programming languages – VAL programming – Motion commands – Sensor commands – End effector commands – Simple programs.		
IMPLEMENTATION Implementation of robots in industries – Various steps - Safety considerations for robot operations.		
Total Lecture Hours		45 Hours

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22ME-101**

B.Tech in Mechanical Engineering

Text books	
1	Robot Engineering An Intergrated approach 2004 Klafter R.D., Chmielewski T.A. and Negin M Springer
2	Industrial Robotics: Technology, Programming and Applications, 2012 Mikell P. Groover, Mitchel Weiss, Roger N. Nagel, Nicholas G. Odrey and Ashish Dutta 2 nd Edition, Tata McGraw Hill, 2012.
3	Automation in Production system 2002 Mikell P. Groover Prentice-Hall of India Pvt. Ltd., New Delhi, 2002
Reference Books	
1	CNC Technology and Programming 2003 Krar, S., and Gill Industrial Press Inc
2	An Introduction to CNC Machining 1991 Gibbs, D. Industrial Press
3	Computer Numerical Control Concepts and Programming 1991 Seames, W.S. Thomson Learning EMEA, Limited
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20(ER%20Series).pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20(E%20Series).pdf
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3	https://www.digimat.in/nptel/courses/video/112106134/L02.html

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B.Tech in Mechanical Engineering

**SoE No.
22ME-101**

V SEMESTER

22ME551 : OE-II : Total Quality Management

Course Outcomes :

Upon successful completion of the course, the students will be able to

1. Develop an understanding on quality management philosophies and frameworks.
2. Develop in-depth knowledge on various tools and techniques of quality management.
3. Evaluate the applications of quality tools and techniques in both manufacturing and service industry
4. Analyze quality management methods and solving problems of organization

Unit:1	7 Hours
Principles of Quality Management, Pioneers of TQM, Quality costs, Quality system Customer Orientation, Benchmarking, Re-engineering	
Unit:2	7 Hours
Leadership, Organizational Structure, Team Building, Information Systems and Documentation – Quality Auditing, ISO 9000 - QS 9000.QMS, Quality awards.	
Unit:3	8 Hours
Single Vendor Concept, J.I.T., Quality Function deployment, Quality Circles, KAIZEN, SGA POKA -YOKE, Taguchi Methods. SMED, Kanban system. Cost of quality. Robust design	
Unit:4	7 Hours
Methods and Philosophy of Statistical Process Control, Control Charts for Variables and Attributes	
Unit:5	8 Hours
Cumulative sum and exponentially weighted moving average control charts, Others SPC Techniques – Process Capability Analysis. Acceptance Sampling Problem, Single Sampling Plans for attributes, double, multiple and sequential sampling,	
Unit :6	8 Hours
Six sigma manufacturing concepts. Six-sigma philosophy Quality strategy and policy. Motivation and leadership theories. Continuous vs. breakthrough improvements. Management of change, DMAIC Methodology. Lean manufacturing	
Total Lecture	45 Hours

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Text Books

1	Total Quality Management for Engineers 1991 Mohamed Zairi Woodhead Publishing Limited 1991
2	Production and Operations management - Total Quality and Responsiveness 1995 Harvid Noori and Russel McGraw-Hill Inc, 1995 3rd Edition
3	Managing for Total Quality 1998 N.Logothetis Prentice Hall of India Pvt .Ltd,1998

Reference Books

1	The Essence of Total Quality Management 1995 John Bank Prentice Hall of India Pvt. Ltd., 1995.
2	Introduction to Statistical Quality Control 1991 Douglas C. Montgomery 2nd Edition, John Wiley and Sons, 1991.
3	Statistical Quality Control 1984 Grant E.L and Leavensworth McGraw-Hill, 1984.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

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MOOCs Links and additional reading, learning, video material

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SoE No.
22ME-101

V SEMESTER

22ME552 : OE-II : Reliability Engineering

Course Outcomes :

Students will be able to:

1. Interpret Reliability, Maintainability, and Availability of engineering systems.
2. Apply Reliability Modeling as a tool for evaluating system performance.
3. Analyze the failure of a machine and the failure rate of systems or components
4. Create production & maintenance schedules of particular engineering systems using various tools used for failure data analysis.

Unit I: Fundamental concepts

(8 Hrs.)

Reliability definitions, failure, Failure density, Failure Rate, Hazard Rate, Mean Time To Failure, MTBF, maintainability, availability, safety and reliability, Quality, cost and system effectiveness, Life characteristic phases, modes of failure, Quality and reliability assurance rules, product liability, Importance of Reliability,

Unit II: Probability theory:-

(7 Hrs.)

Set theory, laws of probability, total probability theorem, probability distributions, parameters and applications.

Unit III: System reliability and modelling:

(7 Hrs.)

Series and parallel components, mixed configuration, complex systems. Redundancy, element redundancy, unit redundancy, standby redundancy. Types of standby redundancy, parallel components. Markov models for reliability estimation.

Unit IV: Maintainability and Availability:

(8 Hrs.)

Objectives of maintenance, types of maintenance, Maintainability, factors affecting maintainability, system downtime. Availability - Inherent, Achieved, and Operational availability, reliability, and maintainability trade-off. Markov models for availability estimation.

Unit V: System Reliability Analysis:

(7 Hrs.)

Reliability allocation or apportionment. Reliability apportionment techniques. Reliability block diagrams and models. Reliability predictions. Life testing and accelerated testing.

Unit VI: Strength-based reliability:

(8Hrs.)

Safety factor, safety margin, Stress strength interaction, Failure Mode, Effects and Criticality Analysis-, , FMECA examples, Ishikawa diagram .fault tree construction, basic symbols development of functional reliability block diagram, Fault tree analysis, fault tree evaluation techniques, Design of Mechanical components and systems:-Material strengths and loads.

Total Lecture 45 Hours

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22ME-101**

Text Books

1	Concepts of Reliability Engg 1985 L.S. Srinath Affiliated East-Wast Press (P) Ltd
2	Reliability Engineering 1983 A.K. Govil Tata McGraw-Hill Publishing Co. Ltd
3	Reliability Engineering 1984 E. Balagurusmy Tata McGraw-Hill Publishing Co. Ltd

Reference Books

1	Engineering Reliability 1980 B.S. Dhillion, C. Singh John Wiley & Sons
2	Probabilistic, Reliability 1968 M.L. Shooman McGraw-Hill Book Co.,
3	Reliability in Engineering Design 1977 K.C. Kapur, L.R. Lamberson John-Wiley and sons.

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MOOCs Links and additional reading, learning, video material

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22ME-101**

B.Tech in Mechanical Engineering

V SEMESTER

22ME553 : OE-II : Power Generation Engineering

Course Outcomes:

Students will be able to:

1. Analyze and compare the various Thermal power plants.
2. Analyze the hydroelectric and nuclear power plant
3. Evaluate and compare the economics of various power plants.
4. Interpret the non-conventional and combined operations of different power plants.

Unit:1 THERMAL POWER PLANT- I	8 Hours	
Introduction to thermal power plants and power plant layouts. Site selection. Fuel characteristics, handling, storage, preparation & firing methods. Ash & dust collection and handling. • Boiler: classification, general arrangement, details of different components and system like draught system, steam turbine systems, condenser, cooling towers		
Unit:2 THERMAL POWER PLANT- II	7 Hours	
Gas Turbine Power Plant: -Introduction, power plant layouts, Open cycle, close cycle power plants. Various components and systems. Methods to improve efficiency. Reheat and Regeneration cycle and their combinations Diesel Electric Power Plant: - Introduction, Outline, type of engines, different components, performance, plant layout. Comparison with other power plant. (visit to nearby power plant shall be arrange for the students)		
Unit:3 HYDROELECTRIC POWER PLANT.	8 Hours	
Hydrology: - Rainfall, Runoff, Hydro graph, flow duration curve, mass curve. Hydroelectric power plant: - Site selection, classification of hydroelectric power plant, general arrangement, details of different components, turbine selection. Governing. • Comparison with other power plant.		
Unit:4 POWER PLANT ECONOMICS	7 Hours	
Load Analysis - Fluctuating Load on power plants, Load curves, various terms & definition, peak load, effect of fluctuating load. • Economic Analysis: - Cost of electric energy		
Unit:5 NUCLEAR POWER PLANT	8Hours	
ion to Nuclear Engineering, Global scenario, prominent installations worldwide, present & proposed nuclear plant in India. Nuclear Reactors: - Types of reactors, PWR, BWR, CANDU, Gas cooled, liquid metal cooled, Breeder reactor. Operational requirements and difficulties, site selection for location of a nuclear power station Nuclear Waste Disposal. • Comparison with other power plant.		
Unit :6 COMBINED OPERATION OF DIFFERENT POWER PLANTS	7 Hours	
Combined operation: - Need division, combination of different plant & their coordination, advantages. NON-CONVENTIONAL POWER GENERATION SYSTEMS Introduction to Non-Conventional power Generation Systems • Geo-Thermal Power Plant, Tidal Power Plant, Wind Power Plant, Solar Power Plant.		
Total Lecture Hours		45 Hours

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Text books

- 1 "Power Plant Engineering" by A.K. Raja, Amit Prakash Srivastava, and Manish Dwivedi, published in its 1st edition by New Age International Publisher
- 2 "Power Plant Engineering" by Frederick T. Morse, now in its 3rd edition and published by Van Nostrand Reinhold
- 3 "Power Plant Engineering" by P.K. Nag, which is currently in its 4th edition and published by McGraw Hill Education

Reference Books

- 1 Power Plant Engineering Larry Drbal, Kayla Westra, and Pat Boston 1st Edition Springer

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- 1 [http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20\(ER%20Series\).pdf](http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20(ER%20Series).pdf)
- 2 [http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20\(E%20Series\).pdf](http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20(E%20Series).pdf)

MOOCs Links and additional reading, learning, video material

- 1 <https://youtu.be/8jaIeXu5mzs>
- 2 <https://youtu.be/AAeXqnhwPZ4>
- 3 <https://www.digimat.in/nptel/courses/video/112106134/L02.html>

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**SoE No.
22ME-101**

V SEMESTER

22ME554 : OE-II : Project Evaluation & Management

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Examine and screen project ideas.
2. Analyze the Technical and Economical feasibility of the project.
3. Design and analyze the project and prepare project report
4. Evaluate the project on Economical, Social and Environmental aspects.

Unit:1	Project Identification	7 Hours
Project identification considering objectives - B2B, B2C and SWOT analysis, Screening of Project Ideas, Technical, Market, Financial, Socioeconomic and Ecological Appraisal of a project, demand forecasting, secondary data, accuracy, confidence level, uncertainty. Contemporary Issues related to Topic		
Unit:2	Technical feasibility	7 Hours
Technical feasibility- Process selection, Level of automation, Plant capacity, Acquiring technology, Appropriate technology Plant location, Skill requirement & availability of Manpower- Both white collar & Blue collar, Equipment selection & procurement, Govt. policies, Value analysis and project evaluation. Contemporary Issues related to Topic		
Unit:3	Economic feasibility	9 Hours
Economic feasibility- Cost of Project, working capital analysis, fixed cost, means of finance, estimation of sales & production, price analysis, Break-even point, Projected cash flow statements, projected balance sheet, projected profit & loss statement, projected cash flow, rate of return, Discounted payback period, cost benefit analysis, return after taxes. Contemporary Issues related to Topic		
Unit:4	Project Planning and Control	7 Hours
Project Planning and Control:- Work break down structure and network development, Basic Scheduling, Critical Path and four kinds of floats, Scheduling under probabilistic durations, Time Cost tradeoffs, CPM, PERT, Optimum project duration, resource allocation, updating. Contemporary Issues related to Topic		
Unit:5	Project report	7 Hours
Project report- Preparation of project report, Project safety management, risk analysis, sensitivity analysis, methods of raising capital Contemporary Issues related to Topic		

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Unit:6	Project review	8 Hours
Initial review, pre commissioning safety review , performance analysis, ratio analysis, sickness, project revival, Project Monitoring with PERT/Cost, Organizational aspects, Computer packages and Project Completion environmental & social aspects.		
Contemporary Issues related to Topic		
Total Lecture Hours		45 Hours

Text books	
1	Prasanna Chandra, Projects, 9th Edition, McGraw Hill Education (India) Private Limited, 2019
Reference Books	
1	L. S. Srinath, PERT and CPM-Principles and Application, 3 rd Edition, East West publisher, 2001
2	M. Y. Khan and P. K. Jain, Financial Management, Tata McGraw Hill Education Private Limited, 6 th edition, 2011
3	R. Panneerselvam, Engineering Economics, PHI Learning Private Limited, New Delhi, 2 nd edition, 2014
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
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MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/110107081
2	https://nptel.ac.in/courses/110104073

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**SoE No.
22ME-101**

V SEMESTER

22ME506 : Lab:- Machine Drawing

Course Outcomes :

Upon successful completion of the course the students will be able to

- Understand and apply the detail drawing of a given object.
- Interpret and prepare the drawing.
- Construct details and assembly different mechanical systems.
- Create an assembly drawing into detailed drawing using modeling software.

Unit I: Drawing Standards for following	(8 Hrs.)
Drawing Standards for following - Drawing Sheets, Name Blocks, Lines, Sections, Dimensioning, Dimensioning of Tolerances, Standard Components, Standard features, Machining Symbols, Welding Symbols, Heat Treatment, Manufacturing Instructions, Allowances, Materials.	(CO1)
Unit II: Orthographic Projection of Elements	(6 Hrs.)
Orthographic Projections, Sectional Views, Missing Views, Profiles, Cross-Sections, References, Alignments, Dimensioning.	(CO2)
Unit III: Study Qualitative Selection of type / Size (Excluding Design Calculations) and Standard Practices for Following Elements	6 Hrs.)
Threads, Bolts, Nuts, Washers, Rivets, Welds, Keys and Keyways, splines, Couplings.	(CO2)
Unit IV: Assembly and Dismantling Principles	(8Hrs.)
Fits and Tolerances (Standards, Types Application, and Selection), Tolerance Charting, Surfaces Finishing Requirement for Assembly, Geometry suitable for Assembly, Assembly / Dismantling Tools, Bearing Assemblies, Assemblies by Fastening.	(CO3,4)
Unit V: Study of some Standard Assemblies.	(9 Hrs.)
Assembly Drawings: Principles, Techniques, and standards for Preparing Component Drawings, Subassembly Drawing, Full Assembly Drawing, Exploded Views.	(CO3,4)
Unit VI: Production Drawing:	(8 Hrs.)
Name Plates, Part List, Revisions Etc., Essential Parts/ Formats Required for Production Drawings, Process Sheet.	(CO4)
Total Lecture	45 Hours

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Textbooks:

1.	David Allan Low., An Introduction to Machine Drawing and Design, Fourth Edition, Whitworth Scholar
2.	K.L.Narayana,P,Kannaiah,Machine Drawing, Third Edition, New Age International Publishers,2006
3.	R K Dhawan., Machine Drawing , S Chand, 2022

Reference Books:

1.	PSG Data Boo
2.	N Sidheswar, P Kannaiah, V V S Sastry, Machine Drawing
2.	CMTI Data Boo
3.	Relevant IS Codes
4.	Sidheswar sastry., Machine Drawing, TMH., New Delhi, 2014
5.	Laxmi Narayana and Mathur , Machine Drawing, M/s. Jain Brothers, New Delhi.
6.	Bhatt, N. D ,Machine Drawing. ,Anand: Charotar Publishing House, 2005 7 621.7

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2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20(E%20Series).pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20(G%20Series).pdf

MOOCs Links and additional reading, learning, video material

1.	https://www.youtube.com/watch?v=ptJfomL1I7o&list=PLLvBXFAV-DeIsmVkmcNv2RzwCuT1XvhTV
2.	https://www.youtube.com/watch?v=cEz3jSkQ4tQ&list=PLLvBXFAV-DeIsmVkmcNv2RzwCuT1XvhTV&index=3
3.	https://www.youtube.com/watch?v=UW6iERL-EDs&list=PLLvBXFAV-DeIsmVkmcNv2RzwCuT1XvhTV&index=12
4.	https://www.youtube.com/watch?v=9fhMInOnCGE

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**SoE No.
22ME-101**

B.Tech in Mechanical Engineering

V SEMESTER

22ME507 : Mechanical measurement & Instrumentation

Course Outcomes:

Upon successful completion of the course the students will be able to

Course Outcome	Statement
CO 1	Demonstrate the basic knowledge of measuring Instruments and evaluate various characteristics.
CO 2	Select proper measuring instruments and use it for measuring various parameters
CO 3	Demonstrate the basic knowledge of limits-fit, Tolerance and design of limit gauges & tolerance charts.
CO 4	Evaluate statistical process control and acceptancesampling procedures in a manufacturing environment to improve quality of process.

Unit:1		8 Hours
Purpose, Structure, and elements of a general measurement system. Static characteristics of measurement system, measurement error, Type of inputs, methods of corrections. Dynamic characteristics of measurements system,, Standard input signals.		
Unit:2		7 Hours
Study of instruments for measurements of linear & angular displacement, Types of CMM and its application		
Unit:3		7 Hours
Study of instruments for measurements of speed, acceleration.		
Unit:4		7 Hours
Study of instruments for measurements of Strain, force, and torque.		
Unit:5		8 Hours
Study of instruments for measurement of pressure and flow.		
Unit :6		8 Hours
Study of instruments for measurement of temperature, level, pressure and flow.		
Total Lecture Hours		45 Hours

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Text books				
1	Text book of Engineering Metrology	17th Edition (2009)	R. K. Jain	Khanna Publications, Delhi
2	Statistical Quality control	Edition (2010)	Mahajan	Dhanpai Rai & Sons, New Delhi
3	Production Engineering	Edition (2007)	P.C. "Sharma	S.Chand & Company Ltd
4	Total quality control	3rd Edition	A.V. Feigenbaum	McGraw-Hill,
5	Mechanical Measurement And Instrumentation	2006	R. K. RAJPUT	Kataria and sons
6	Mechanical Measurement And control	5th Edition (2012)	DR D S KUMAR	Metropolitan co pvt ltd

Reference Books				
1	Engineering Metrology	15 th Edition (2003)	I.C. Gupta	Dhapat Rai Publications, Delhi
2	Statistical Quality control	3rd Edition (1988)	E.L. Grant	McGraw-Hill,
3	Quality control and applications	1993	Bertrand L. Hassan, Ghare	Prentice hall of india
4	Statistical quality control	Edition (2010)	Mahajan M	Dhanpai Rai & Sons, New Delhi
5	Metrology for Engineers	Edition (1990)	John Frederick Wise Galyer, Charles Reginald Shotbolt	Cassell,
6	Mechanical measurements- Applications and Design	6th edition 2006	Doebelin	McGraw-Hill,
7	Principles of measurements system	4 th Edition (2005)	John P. Bentley	Pearson Education

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1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/112104118
2	https://nptel.ac.in/courses/105103192

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**SoE No.
22ME-101**

V SEMESTER

22ME508 : Lab:- Mechanical measurement & Instrumentation

Course Outcomes:

Course Outcome	Statement
CO 1	Demonstrate the basic knowledge of measuring Instruments and evaluate various characteristics.
CO 2	Select proper measuring instruments and use it for measuring various parameters
CO 3	Demonstrate the basic knowledge of limits-fit, Tolerance, and design of limit gauges & tolerance charts.
CO 4	Evaluate statistical process control and acceptance sampling procedures in a manufacturing environment to improve quality of process.

Sr. No.	Experiments based on
1	Calibration of Bourdon pressure gauge.
2	Speed Measurement by using Stroboscope.
3	Speed Measurement by using .Magnetic Pick Up and Photo-electric Pick Up.
4	Calibration of Thermocouple.
5	Calibration of RTD.
6	Calibration of LVDT
7	Liquid level measurement
8	To find half taper angle of a w/p using sine bar
9	To find various parameters of screw thread using TMM.
10	To find effective diameter of a threaded plug by two wire method using floating carriage machine.
11	Measurement of flatness of surface using optical flat and monochromatic light
12	To measure the surface roughness of a given w/p using Stylus probe.
13	To measure the profile of given w/p using optical profile projector
14	Design of Go and NO GO limit gauge for a given fit
15	Preparation of process planning sheet and tolerance chart.
16	To construct a control chart for a quality characteristic

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22ME-101**

V SEMESTER

22ME509 : Industrial training, Seminar & Report

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**Audit Course
V SEMESTER
MLC2125:**

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**SoE No.
22ME-101**

**Audit Course
IV SEMESTER
MLC125 : Design thinking**

			July 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Dean OBE	Date of Release	Version	

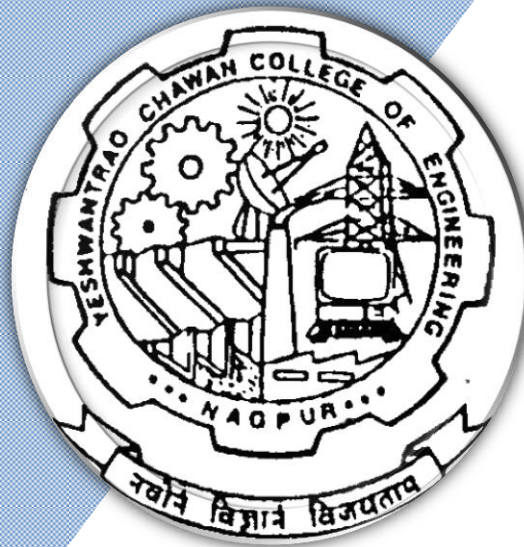
Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A++' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Technology

SoE & Syllabus 2022

6th Semester

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Mechanical Engineering)

B. Tech in Mechanical Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	ME/ME	22ME601	CAD/CAM	T	3	0	0	3	3	30	20	50	3 Hrs
2	6	PC	ME/ME	22ME602	CAD/CAM LAB	P	0	0	2	2	1		60	40	
5	6	PC	ME/ME	22ME603	Design of Mechanical Drives	T	3	0	0	3	3	30	20	50	3 Hrs
3	6	PE	ME/ME		Professional Elective - I	T	3	0	0	3	3	30	20	50	3 Hrs
4	6	PE	ME/ME		Professional Elective - I LAB	P	0	0	2	2	1		60	40	
6	6	PE	ME/ME		Professional Elective II	T	3	0	0	3	3	30	20	50	3 Hrs
7	6	PE	ME/ME		Professional Elective III	T	3	0	0	3	3	30	20	50	3 Hrs
8	6	OE-III	ME/ME		Open Elective - III **	T	3	0	0	3	3	30	20	50	3 Hrs
9	6	OE-IV	ME/ME		Open Elective - IV **	T	3	0	0	3	3	30	20	50	3 Hrs
10	6	PR	ME/ME	22ME604	PROJECT PHASE-1	P	0	0	2	2	1		60	40	
TOTAL SIXTH SEM							21	0	6	27	24				

List of Professional Electives- I, II & III

Professional Electives-I

1	6	PE-I	ME	22ME611	PE I : Finite Element Methods
2	6	PE-I	ME	22ME612	PE I : Lab:- Finite Element Methods
3	6	PE-I	ME	22ME613	PE I :Industrial Fluid Power
4	6	PE-I	ME	22ME614	PE I : Lab:- Industrial Fluid Power
5	6	PE-I	ME	22ME615	PE I : I.C. Engines
6	6	PE-I	ME	22ME616	PE I : Lab:- I.C. Engines
7	6	PE-I	ME	22ME617	PE I : Advance Welding Techniques
8	6	PE-I	ME	22ME618	PE I : Lab: Advance Welding Techniques
9	6	PE-I	ME	22ME619	PE I : Computer Integrated Manufacturing
10	6	PE-I	ME	22ME620	PE I : Lab:- Computer Integrated Manufacturing
11	6	PE-I	ME	22ME621	PE I : Mechatronics
12	6	PE-I	ME	22ME622	PE I : Lab:- Mechatronics
13	6	PE-I	ME	22ME623	PE I :Computer Graphics and Solid Modelling
14	6	PE-I	ME	22ME624	PE I : Lab:- Computer Graphics and Solid Modelling
15	6	PE-I	ME	22ME625	PE I :Two Wheeler technology
16	6	PE-I	ME	22ME626	PE I : Lab:- Two Wheeler technology

Professional Electives-II

1	6	PE-II	ME	22ME631	PE II : Tool Design
2	6	PE-II	ME	22ME632	PE II : Additive Manufacturing
3	6	PE-II	ME	22ME633	PE II : Fuel Cell Technology
4	6	PE-II	ME	22ME634	PE II : Material Handling Systems
5	6	PE-II	ME	22ME635	PE II : Reliability Engineering
6	6	PE-II	ME	22ME636	PE II : Bio- Mechanics
7	6	PE-II	ME	22ME637	PE II :Composites
8	6	PE-II	ME	22ME638	PE II : Data Analytics In Mechanical Engineering
9	6	PE-II	ME	22ME639	PE II : Advanced Manufacturing Techniques

Professional Electives-III

1	6	PE-III	ME	22ME651	PE III : Artificial Intelligence
2	6	PE-III	ME	22ME652	PE III : Design for Manufacturing & Assembly
3	6	PE-III	ME	22ME653	PE III : Renewable Energy System
4	6	PE-III	ME	22ME654	PE III : Plastics and Composite
5	6	PE-III	ME	22ME655	PE III : Tribology in Manufacturing
6	6	PE-III	ME	22ME656	PE III : Finance & Cost Management
7	6	PE-III	ME	22ME657	PE III : Maintenance Management

Open Electives-III**

1	6	OE-III	ME	22ME671	OE III : Operations Research Techniques
2	6	OE-III	ME	22ME672	OE III : Automobile Engineering
3	6	OE-III	ME	22ME673	OE III : Robotics and Subtractive Manufacturing
4	6	OE-III	ME	22ME674	OE III : Control System Engineering

Open Electives-IV**

1	6	OE-IV	ME	22ME691	OE IV : Total Quality Management
2	6	OE-IV	ME	22ME692	OE IV : Reliability Engineering
3	6	OE-IV	ME	22ME693	OE IV : Power Generation Engineering
4	6	OE-IV	ME	22ME694	OE IV : Project Evaluation & Management



List of Mandatory Learning Course (MLC)

1	6	HS		MLC126	YCAPP6 :		A	3	0	0	3	0	
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MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activities decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

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B. Tech SoE and Syllabus 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
22ME-101**

VI SEMESTER 22ME601 : CAD/CAM

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. Distinguish the various CAD CAM tools and also evaluate criteria for CAD-CAM systems
2. Design 2D and 3D Transformation matrices
3. Calculate and analyze the parametric equations for the wireframe. surface and solid modeling entities
4. Design the applications of modeling and evaluate data exchange formats

Unit I: CAD TOOLS	7 Hrs.
Definition of CAD Tools, Types of system, CAD/CAM system evaluation Criteria, functional areas of CAD, Modelling and viewing, and efficient use of CAD software.	
Unit II: Two/Three-Dimensional Transformations	7Hrs.
Two & Three dimensional geometric and coordinate transformations like scaling, translation, rotation, reflection, and shear. Concept of homogeneous representation and concatenated transformations. Inverse transformations.	
Unit III: Wire Frame Modelling	7Hrs.
Types of mathematical representation of curves, wireframe models, wireframe entities, parametric representation of analytical and synthetic curves- Hermit cubic splines, Bezier curves, B Splines	
Unit IV: Surface Modelling	8 Hrs.
Mathematical representation of surfaces, Surface model, Surface entities, surface representation, parametric representation of surfaces, plane surface, ruled surface, surface revolution, Tabulated surface.	
Unit V: Solid Modeling & Data Exchange	8 Hrs.
Solid Representation - Boundary Representation (B-rep), Constructive Solid Geometry (CSG) and other methods, Evaluation of data-exchange formats, IGES data representations and structure	
Unit VI: Manufacturing	8 Hrs.
Introduction to NC and CNC, Machine tools- Construction features with structure- Drives and CNC controllers. Manual part programming (Lathe & Milling machines) Introduction of CAM package. Group Technology, Cellular Manufacturing-Composite part concept-Types of Flexibility – FMS – FMS Components, Application and Benefits.	
Total	45 Hrs.

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B.Tech in Mechanical Engineering

SoE No.
22ME-101

Textbooks:

- | | |
|----|---|
| 1. | CAD/CAM, theory & practice: Ibrahim Zeid |
| 2. | Procedural elements for computer graphics: D Rogers |

Reference Books:




- | | |
|---|--|
| 1 | Computer Graphics: D Hearn & M.P.Baker |
| 2 | Computer Graphics: S Harrington. |
| 3 | Mikell.P.Groover "Automation, Production Systems and Computer Integrated Manufacturing", Prentice Hall of India, 2008. |
| 4 | Radhakrishnan P, Subramanyan S. and Raju V., "CAD/CAM/CIM", 2 nd Edition, New Age International (P) Ltd, New Delhi,2000 |

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- | | |
|---|---|
| 1 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supported%20file/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf |
| 2 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supported%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf |
| 3 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supported%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf |

MOOCs Links and additional reading, learning, video material

- | | |
|----|---|
| 1. | https://nptel.ac.in/courses/112103019/ |
| 2. | https://nptel.ac.in/syllabus/112106075/ |

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**SoE No.
22ME-101**

B.Tech in Mechanical Engineering

VI SEMESTER 22ME602 : Lab. CAD/CAM

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. Distinguish the various CAD CAM tools and also evaluate criteria for CAD-CAM systems
2. Design 2D and 3D Transformation matrices
3. Calculate and analyze the parametric equations for the wireframe. surface and solid modeling entities
4. Design the applications of modeling and evaluate data exchange formats

Minimum Ten Practical's to be performed from the list below

SN	Experiments based on
	Exp1 Development of programs and matrix for 2D transformations.
	Exp 2. Introduction to CAD software (SolidWorks 2016).
	Exp 3. Sketching: Dimensioning and Constraining
	Exp. 4. Creation of Solid Model (Extrude, Cut, Revolve).
	Exp. 5. Creation of Special Features (Hole, Rib).
	Exp. 6. Creation of Special Features (Chamfer, Fillet).
	Exp. 7. Modification of Solid Model (Mirror).
	Exp. 8. Modification of Solid Model (Array).
	Exp. 9. Advanced Solid Model (Sweep).
	Exp. 10. Advanced Solid Model (Loft).
	Exp. 11. Assembly of part model

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(Department of Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
22ME-101**

VI SEMESTER

22ME603 : Design of Mechanical Drives

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SoE No.
22ME-101

B.Tech in Mechanical Engineering

VI SEMESTER

22ME611 : PE I : Finite Element Methods

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. **Illustrate** the stresses, strains and deformation in simple machine elements
2. **Distinguish** the fundamentals of Finite Elements Method.
3. **Analyze** the stresses, strains and deformation in simple machine elements and solutions for simple problems.
4. **Evaluate** the solutions using the CAE software for simple machine elements.

Unit I: **Stress and Strain**

(8 Hrs.)

Fundamentals of stress & strain, stress & strain components, stress strain relationship, Elastic constants, plane stress, plane strain., differential equation of equilibrium, compatibility equations, boundary conditions, Saint Venant's principle

Unit II: **Fundamental concepts of FEM**

(7 Hrs.)

Historical background, Scope of FEM in Engineering. Applications, Principle of minimum potential energy (PMPE). FEM analysis procedure. Mathematical understanding required for FEM, Matrix algebra & operations. Methods for solution of simultaneous equations like Gauss elimination. Matrix decomposition method. Concept of Discretization of body into elements. Types of elements(2-D & 3-D elements), displacement models, convergence requirements, and shape function. Programming for above matrices

Unit III: **FEM of 1-D Element**

(8 Hrs.)

One dimensional problems by Finite element modeling and analysis: Finite element modeling & analysis using Bar & Beam element -stiffness matrix, assembly, boundary conditions, load vector, temperature effects., Numerical on elements connected in parallel, Numerical on self-weight, numerical on Torque, numerical on Thermal stress

Unit IV: **FEM of 2-D Element**




(7 Hrs.)

Two dimensional problems using Truss, Constant Strain Triangle & Linear Strain Triangle. FEM modeling and analysis **of Truss elements, CST & LST elements, elemental stiffness matrix, assembly, boundary** conditions, load vector. Stress calculation. Temperature effect. Axi-symmetric solids subjected to axi-symmetric loading -axi-symmetric formulation using CST ring, element, stiffness matrix, boundary conditions, load vector, calculation of stresses. Programming for simple 2-D problems using CST and LST elements.

Unit V: **Isoperimetric & Higher order elements**

(8 Hrs.)

Introduction to Isoperimetric & Higher order elements. Introduction to Numerical Integration. Introduction to dynamic analysis, formulation of mass matrix for one-dimensional bar element, free vibration analysis using one-dimensional bar element. Torsion of prismatic bars using triangular elements. 3 D Element

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Unit VI: commercial software for simple machine elements	(7 Hrs.)
Application of commercial software for simple machine elements and interpretation of results.	
Total Lecture	45 Hours

Textbooks:

1. J. N. REDDY, An Introduction to The Finite Element Method, McGraw-Hill, New York, 2005
2. Y. M. Desai, Finite Element Method with Applications in Engineering, Dorling Kindersley, 2011
3. Tirupathi R. Chandrupatla, Ashok D. Belegundu, Introduction to Finite Elements in Engineering, Prentice Hall, 2002

Reference Books:

1. G.R. Liu, S. S. Quek, Finite Element Method A Practical Course, Elsevier Science, 2003
2. Kent L. Lawrence, ANSYS Workbench Tutorial Release 14, Schroff Development Corporation, 2012

MOOCs Links and additional reading, learning, video material

1. https://www.youtube.com/watch?v=UOp6JEiJctA&list=PLSGws_74K018SmggufD-pbzG3thPIpF94
2. <https://www.youtube.com/watch?v=KR74TQesUoQ&list=PLbMVogVj5nJRjnZA9oryBmDdUNe71bnB0>
3. https://onlinecourses.nptel.ac.in/noc22_me43

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**SoE No.
22ME-101**

B.Tech in Mechanical Engineering

VI SEMESTER

22ME612 : PE I : Lab:- Finite Element Methods

Course Outcomes

Upon successful completion of the course the students will be able to

1. Study, analyse and develop the fundamentals of Finite Elements Method for mechanical engineering problems.
2. Evaluate the stresses, strains and deformation in simple machine elements and design solutions for simple problems.
3. Build the solutions using the commercial softwares for simple machine elements.

Practicals to be performed from the list below

SN	Experiments based on
1	To study about Finite Element Methods
2	To determine stress and strain in 1-D bar element by ANSYS APDL
3	To determine stress and strain in Composite element by ANSYS APDL
4	To determine principle stress and strain in CST element by ANSYS APDL
5	To determine stress and strain in CST element by ANSYS APDL
6	To study the performance of structural tutorial by ANSYS APDL
7	Deflection of Beam (Simply Supported Beam) by ANSYS APDL
8	Tutorial of 2D truss analysis in Mechanical APDL (Ansys).

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SoE No.
22ME-101

B.Tech in Mechanical Engineering

VI SEMESTER

22ME613 : PE I :Industrial Fluid Power

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. To apply the fluid power laws and principals for analysis of simple fluid power systems and fluids.
2. To identify, analyse, and justify selection of suitable components of fluid power system for specific applications based on its function, performance and working characteristics.
3. To design and examine the fluid power system and to compose and interpret its circuit diagrams using standard symbols.
4. To examine the safety measures, maintenance and troubleshooting for fluid power systems.

Unit I:

(5 Hrs.)

Fluid power systems: Components, advantages, applications in the field of M/c tools, material handling, hydraulic presses, mobile & stationary machines, clamping & indexing devices etc.

Transmission of power at static & dynamic states. Pascal's law and its application to hydraulics, Bernoulli's principle, continuity equation, analysis of simple hydraulic jack.

Types of **Hydraulic fluid**, petroleum based, synthetic & water based. Properties of fluids. Selection of fluids, additives, effect of temperature & pressure on hydraulic fluids, SAE grades and ISO viscosity numbers.

Filters, strainers, types and sources of contamination of fluid & its control, effects, ISO contaminant code.

JIC symbols/ISO Symbols for hydraulic & pneumatic circuits.

Hydraulic Reservoirs and Power Pack : functions and its elements, standard designs.

Unit II:

(6 Hrs.)

Pumps: Types, classification, principle of working & constructional details of pumps used in Hydraulic system such as vane pump, gear pumps, radial & axial plunger pumps, power and efficiency calculations, characteristic Curves, selection of pumps for hydraulic power transmission.

Accumulators & Intensifiers: Types & functions of accumulators & intensifiers, applications, selection & design procedure.

Unit III:

(5 Hrs.)

Control Of Fluid Power:

Necessity of pressure control, directional control and flow control valves, methods of actuation of valves.

Pressure Control Valves: Principle of pressure control valves, types, constructional features, direct operated, pilot operated, relief valves, pressure reducing valve, sequence valve.

Flow Control Valves: Principle of operation, types, constructional features, pressure compensated, temperature Compensated flow control valves, meter in & meter out flow control circuits, bleed off circuits.

Direction Control Valves: constructional features, types, Check valves, types of D.C. valves:- Two way two position, four way three position, four way two position valves, open center, close center,

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tandem center valves, method of actuation of valves, manually operated, solenoid operated, pilot operated etc

Unit IV:

(5 Hrs.)

Actuators:

Classification, constructional features and working, Linear & Rotary actuators.

Hydraulic motors: Types, vane, gear piston, radial piston. Theoretical torque, power & flow rate hydraulic motor performance.

Hydraulic Cylinders: Types of cylinder & mountings, cushioning, calculations of force, velocity and power from a cylinder. Design consideration for cylinders.

Unit V:

(6 Hrs.)

Design and analysis of Hydraulic Circuit such as:

- 1) Control of single and Double -acting hydraulic cylinder,
- 2) regenerative circuit,
- 3) pump unloading circuit,
- 4) double pump hydraulic system,
- 5) counterbalance valve application,
- 6) hydraulic cylinder sequencing circuits,
- 7) cylinder synchronizing circuit using different methods,
- 8) hydraulic circuit for force multiplication.
- 9) speed control of hydraulic cylinder metering in, metering out and bleed off circuits.
- 10) Pilot pressure operated circuits.
- 11) Hydraulic circuit examples with accumulator /intensifier.
- 12) circuit to lift and hold heavy load,
- 13) Pressure control for cylinders,
- 14) Flow divider circuits

Safety precautions, maintenance and troubleshooting of Hydraulic Circuits.

Unit VI:

(6 Hrs.)

Pneumatics:

Introduction to pneumatic power sources, Characteristics of compressed air, air compressors used and Components of pneumatic system.

Air preparation units, filters, regulators & lubricators, and silencer. compressed air distribution system in a plant;

Actuators, linear, single & double acting, rotary actuators, air motors,

Valves: Pressure Regulating Valves, Directional Control Valves, Flow Control Valves.

methods of actuation, use of memory valve, Quick exhaust valve, time delay valve, shuttle valve, Signal **Processing Elements:** Use of Logic gates - OR and AND gates in pneumatic applications. Practical examples involving the use of logic gates.

Pneumatic circuits for industrial applications & automation.

Total Lecture 33 Hours

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B.Tech in Mechanical Engineering

Text books:		
Title of the book	Edition (Year of publication)	Author(s)
Introduction to Fluid Power	2002	<u>James L Johnson</u>
Fluid Power With Applications	6 th or above	Anthony Esposito
Industrial Hydraulics	3 rd or above	J.J. Pipenger & T. G. Hicks
Pneumatic Systems: Principles and Maintenance	16 th (2006)	S. R. Majumdar
Reference Books:		
Power pneumatics	(2007) or above	Michael J. Pinches
Vickers manuals on Industrial Hydraulics	3 rd edition or above	Vickers
Hydraulics & Pneumatics	4 th edition or above	Harry L. Stewart
Fluid Power Design Handbook	3 rd edition or above	Franklin D. Yeaple

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	https://fada.birzeit.edu/bitstream/20.500.11889/6869/1/Abu_Hanieh_Fluid_Power_Control_ed2_Reduced.pdf
2	https://razak.utm.my/shamsul/wp-content/uploads/sites/189/2015/12/Fluid-Power.pdf
3	https://www.teachengineering.org/content/pur_/lessons/pur_fluidpower_less1/pur_fluidpower_lesson01_traini ngmanualfluidpower.pdf

MOOCs Links and additional reading, learning, video material

1.	https://archive.nptel.ac.in/courses/112/106/112106175/
2.	https://archive.nptel.ac.in/courses/112/106/112106300/
3.	https://onlinecourses.nptel.ac.in/noc24_me69/preview
4.	https://archive.nptel.ac.in/courses/112/105/112105047/

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B.Tech in Mechanical Engineering

SoE No.
22ME-101

VI SEMESTER

22ME614 : PE I : Lab:- Industrial Fluid Power

Course Outcomes

Upon successful completion of the course the students will be able to

- To apply the fluid power laws and principals for analysis of simple fluid power systems and fluids.
- To identify, analyse, and justify selection of suitable components of fluid power system for specific applications based on its function, performance and working characteristics.
- To design and examine the fluid power system and to compose and interpret its circuit diagrams using standard symbols.
- To examine the safety measures, maintenance and troubleshooting for fluid power systems.

Minimum Eight Practical's to be performed from the list below

S. No.	Experiments based on
	List of Practical: Minimum eight experiments from the following:
	Experiments on Hydraulics Circuits:
1	Extend-Retract and Stop system of a linear actuator.
2	Regenerative circuit.
3	Speed Control circuits: meter-in, meter-out and bleed off.
4	Sequencing circuit
5	Use of solenoid operated DCV.
6	Traverse and Feed circuit.
	Experiments on Pneumatic Circuits:
7	Study of Compressor, FRL unit and 5/3 DCV.
8	Reciprocating motion of a single and a double acting actuator.
9	Speed control circuits.
10	Automatic to & fro motion of a pneumatic linear actuator.
11	Sequencing circuit.
12	Logical circuits.
	Other practical work:
13	Design report of a hydraulic or pneumatic system using manufacturer's catalogue.
14	Study of accumulators and intensifiers.
15	Industrial visit to study automation by means of hydraulic and pneumatics such as LPG bottling plant etc
16	Study of compressed air generation and distribution systems.
17	Study of simple hydraulic systems used in practice such as copy turning attachment, hydraulic clamps, jack, dumper, forklift etc.
18	Other circuits possible on the trainer kit, relevant to the syllabus

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(Department of Mechanical Engineering)

**SoE No.
22ME-101**

B.Tech in Mechanical Engineering

VI SEMESTER 22ME615 : PE I : I.C. Engines

Course Outcomes :

Upon successful completion of the course, the students will be able to;

- The student will be able to Understand and analyze basic working cycles, construction and systems of I.C. Engines.
- The student will be able to Analyze fuels, combustion process, pollution and its control of engines and evaluate rating of I.C. engine fuels
- The student will be able to Understand and analyze C. I. Engines and S. I. Engine.
- The student will be able to Analyze Engine performance of I C engine and evaluate by Heat balance sheet calculation.

Unit:1		8 Hours
Engines classification, Working cycles and operation, P-V, Valve Timing diagrams, Engine components and their material .Engine cycle Energy Balance, various losses in the engine like Frictional losses, blow by losses, pumping loss etc. Engine Lubrication systems, cooling systems and their importance.		
Unit:2		7 Hours
I.C.Engines fuel and its desirable properties. Requirements of S.I and C.I. Engine fuel Other fuel like CNG, LPG, Alcohols Rating of I.C. engine fuels		
Unit:3		8 Hours
Compressible fluid flow, Static and Stagnation properties, Isentropic flow, Flow of fluid through nozzles, Continuity equation, Variation of velocity, area and specific volume, Mass of discharge, Maximum discharge, Critical pressure ratio, Choking, Effect of friction, Nozzles and Diffusers efficiency, Back pressure effect, Super saturated flow. Fuel supply systems for S. I. Engine: A-F mixture requirements, Basic principle, Simple Carburetor and systems like main metering, choke, idle, acceleration pump. Operating difficulties for carburetors. Petrol Injection SPFI., MPFI, Direct Gasoline Injection, Ignition system & components for S.I.Engine - Battery, Magneto & Electronic.		
Unit:4		8 Hours
Combustion in S. I. Engine: Stages of combustion with p-θ diagram. Factors affecting various stages of combustion. Abnormal combustion Pre ignition, Detonation and Knocking. HUCR S.I.Engine combustion chamber.		
Unit:5		7 Hours
Fuel supply systems for C.I.Engine: Requirements of an ideal FI system, Types of Injection, Fuel injection pumps, fuel injectors and nozzles. Combustion in C. I. Engines. Stages of combustion with p-θ diagram, Factors affecting various stages of combustion. Abnormal combustion Diesel Knock, Supercharging and turbo charging in engine.		
Unit :6		8 Hours
Engine performance Parameters. MEP, Torque ,speed, power, Specific fuel consumption and various efficiencies., Air measurement, Excess air and Volumetric efficiency, Measurement and Testing of friction power ,indicated power, Brake power, Fuel consumption, Air consumption, etc. Heat balance sheet calculation. Air pollution from I.C.Engines and their control using EGR, Catalytic converters, particulate traps.		
Total Lecture Hours		45 Hours

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B.Tech in Mechanical Engineering

Text books / Reference Books

1	I. C. Engines by Heywood, 2017
2	I. C. Engines by Mathur & Sharma, Dhanpatrai, 2018
3	I. C. Engines by V.Ganeshan, Tata McGraw Hill, 2017
4	I. C. Engines by Domkundwar & Domkundwar, Dhanpatrai, 2018
5	I. C. Engines by R.K.Rajput, Laxmi Prakashan, 2017
6	I. C. Engines by R. Yadav, Central Pub., Allahabad, 2017

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	https://link.springer.com/book/10.1007/978-3-662-43715-5
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
3	https://onlinelibrary.wiley.com/doi/10.1002/9781119902973.ch4
4	https://onlinelibrary.wiley.com/doi/book/10.1002/9781119902973?SeriesKey=10.1002/97804701042

MOOCs Links and additional reading, learning, video material

1	https://nptel.ac.in/courses/112106133
2	https://nptel.ac.in/courses/112103249

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**SoE No.
22ME-101**

VI SEMESTER

22ME616 : PE I : Lab:- I.C. Engines

Course Outcomes:

Upon successful completion of the course the students will be able to

- Understand and analyze basic working cycles, construction and systems of I.C. Engines.
- Analyze fuels, combustion process, pollution and its control of engines and evaluate rating of I.C. engine fuels
- Understand and analyze C. I. Engines and S. I. Engine.
- Analyze Engine performance of I C engine and evaluate by Heat balance sheet calculation.

Sr. No.	Experiments based on
1	Study and demonstration of working of 2-S & 4-S Engines.
2	Study and demonstration of Lubrication & Cooling systems.
3	Study of fuel systems for S.I. engines
4	Study of fuel systems for C.I. engines.
5	Determination of Air: Fuel ratio for Petrol Engine.
6	Determination of Air: Fuel ratio for Diesel Engine
7	Determination of BP/FP/IP of Engine.
8	Heat balance sheet calculation.
9	Visit to Automobile Industry / workshop.

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SoE No.
22ME-101

VI SEMESTER

22ME617 : PE I : Advance Welding Techniques

Course Outcomes :

Upon successful completion of the course, the students will be able to;

- **Discuss** the concept of advance welding processes **Apply** to industry applications.
- **Identify** the parameters needed for welding and **Apply** to increase the durability of product.
- **Apply** the concept of soldering and brazing and cutting process through welding in Industrial applications.
- **Evaluate** welding defect through welding testing method.

Unit I:

(8 Hrs.)

High energy Density processes, Mode of metal transfer in welding, Use of Inert Gas, Gas Tungsten Arc welding, Gas Metal Arc welding, Electron Beam Welding, Principle Bead Welding geometry, Mediums of beam, Vacuum range, Laser Beam welding, Principle, Keyhole technique, applications, Laser materials, Gaseous Lasers. **Application based Case Study**

Unit II:

(7 Hrs.)

Resistance Welding Methods, Variations in the process, Effect of current, Pressure and resistance on nugget quality, Expulsion of metal, Mushrooming of electrodes, Materials, Direct spot welding, two sides spot welding, multiple spot welding, Shunt current, Electrode material, Seam welding, Projection welding, Butt welding, Flash butt welding, applications.

Unit III:

(8 Hrs.)

Solid state welding Processes, Classification, Forge Welding, Friction Welding, Principle, Variables affecting weld quality, Heat generated, Machines used, Ultrasonic welding, Principle, Diffusion Bonding., Explosive Welding.

Unit IV:

(7 Hrs.)

Brazing, Soldering, Capillary action, wetting action, joint designs for sheet metal brazements, brazing filler wire, Butt Joint design for sheet metal brazements, brazing methods, filler materials in brazing, Soldering, materials solder combinations, soldering fluxes, Oxy-fuel welding with chemical reaction. Welding problems and remedies for ferrous and non-ferrous metals.

Unit V:

(7 Hrs.)

Arc cutting, Flame cutting, Plasma cutting, Gouging, Plasma cutting with different gases, Comparison with Oxyacetylene cutting, Oxyacetylene cutting, colour codes for cylinder. Arc welding processes with consumable and non-consumable electrodes, Submerged arc welding

Unit VI:

(8 Hrs.)

Welding defects, Weldment testing, Destructive and non destructive testing, Coupon, Determination of yield strengths, ultimate strength, visual Inspection, Dye Penetrant test, penetrants and developers, Eddy current testing, Ultrasonic testing, Magnetic particle Inspection, advantages and application of each method. Welding Procedure specifications, Welder qualification, **Application based Case Study**

Total Lecture 45 Hours

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22ME-101

Textbooks:

- | | |
|----|---|
| 1. | Jackson, M.D., Welding Methods and Metallurgy, Charles Griffin & Company, London, 1967. |
| 2. | AWS, American Welding Society, Volume I to V, Miami, 1982. 28 |

Reference Books:

- | | |
|----|--|
| 1. | George E. Linnert, Welding Metallurgy, GML Publications, South Carolina, U.S.A., 1994. |
| 2. | Little LR, Welding and Welding Technology. Tata McGraw-Hill, New Delhi, 1980. |
| 3. | R.S. Parmar, Welding Technology, Khanna Publication. |
| 4. | Sindo Kou, "Welding Metallurgy" Wiley Publication, Singapore |

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- | | |
|---|--|
| 1 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf |
| 2 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf |
| 3 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf |

MOOCs Links and additional reading, learning, video material

- | | |
|----|---|
| 1. | https://archive.nptel.ac.in/courses/112/103/112103263/ |
| 2. | https://www.youtube.com/watch?v=6nguX-cEsvw |

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SoE No.
22ME-101

VI SEMESTER

22ME618 : PE I : Lab: Advance Welding Techniques

Course Outcomes

Upon successful completion of the course, the students will be able to

- **Discuss** the concept of advanced welding processes **Apply** to industry applications.
- **Identify** the parameters needed for welding and **Apply** to increase the durability of product.
- **Apply** the concept of soldering and brazing and cutting process through welding in Industrial applications.
- **Evaluate** welding defects through welding testing method.

Minimum Ten practicals to be performed from the list below

SN	Experiments based on
1	Study of welding Technology.
2	Study of Welding Electrodes in Welding Processes.
3	Study of Effect of welding Parameters.
4	Demonstration of Oxy-fuel Welding.
5	Demonstration of Shielded Metal Arc Welding.
6	Demonstration of Gas Metal Arc Welding.
7	Demonstration of Gas Tungsten Arc Welding.
8	Study of Cold Metal Transfer (CMT) Arc Welding.
9	Study of Welding Defects.
10	Study of Weldment Testing.

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**SoE No.
22ME-101**

VI SEMESTER

22ME619 : PE I : Computer Integrated Manufacturing

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**SoE No.
22ME-101**

VI SEMESTER

22ME620 : PE I : Lab:- Computer Integrated Manufacturing

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SoE No.
22ME-101

VI SEMESTER 22ME621 : PE I : Mechatronics

Course Outcomes:

Upon successful completion of the course the students will be able to:

- CO1 Explain the basic elements of mechatronics system.
- CO2 Analyze the functioning of sensors, transducers and actuators.
- CO3 Analyze and evaluate the electronic elements such as digital circuits, AD convertors, etc.
- CO4 Explain the basics of PLC

Unit:1	MECHATRONIC SYSTEM ELEMENTS	06 Hours
Computer Integration of Electro-Mechanical System, Virtual Instrumentation and Computer Monitoring and control Basics solid state components. Measurement system, Control system, Microprocessor based controllers & its applications, other applications with mechatronic approach, Building blocks of mechatronic system. Comparison between Traditional and Mechatronics approach		
Contemporary Issues related to Topic		
Unit:2	SENSORS & TRANSDUCERS	9 Hours
Classification, Performance terminologies, Displacement, Position & proximity sensors, Photo detectors, Optical encoders, Pneumatic sensor, Hall effect sensor, Velocity & motion sensors: Incremental encoder, Tachogenerator, Piezo electric sensors, Tactile sensors, Flow & temperature sensors: Ultrasonic sensors, Light sensors, Selection of sensors, Interference & noise in measurement.		
Contemporary Issues related to Topic		
Unit:3	ACTUATION SYSTEMS	7 Hours
Pneumatic & hydraulic actuation systems: System configuration, Control System & its elements, Linear actuators, Rotary actuators. Mechanical actuation: System types & its configuration, fixed ratio type, Invariant motion profile type, variator etc. Electrical actuation system types & configurations, Mechanical switches, Solid state switches, Solenoids.		
Contemporary Issues related to Topic		
Unit:4	DIGITAL CIRCUITS	7 Hours
Boolean algebra combinational circuits. (Adders, Subtractors, encoders, decoders, multiplexers, de – multiplexers, memory units: RAM, ROM, EPROM etc.), Sequential circuits (Latches, Flip-flops, Counters, Registers).		
Contemporary Issues related to Topic		
Unit:5	ANALOG SIGNAL PROCESSING	7 Hours
Amplifiers, Operational amplifiers, Ideal model for operational amplification, Inverting amplifier, Non-inverting amplifier, Summer, Difference amplifier, Instrumentation amplifier, Integrator, Differentiator, Sample & hold circuit, Comparator, Basics of filters, Types of filters, Introduction to A/D and D/A converters.		
Contemporary Issues related to Topic		
Unit :6	ELECTRONIC SYSTEM DESIGN	7 Hours
Introduction to MPU & MCU, Interfacing, Introduction to PLC & basics of PLC programming. General philosophy of Artificial Neural Network simulations, Fuzzy logic for operation and control of mechatronic systems.		
Contemporary Issues related to Topic		
Total Lecture Hours		39 Hours

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22ME-101

Text books	
1	W. Bolton, Mechatronics, 4th Edition, Pearson Education (India), 2011.
Reference Books	
1	M. Mano, Digital Logic & Computer Design, 4th Edition, Pearson, 2016.
2	HMT Ltd., Mechatronics, 1st Edition, Tata McGraw Hill Publication, 2002
3	Necsulescu, Mechatronics, Pearson Education (Singapore), 2002.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://archive.nptel.ac.in/courses/112/103/112103174/
2	
MOOCs Links and additional reading, learning, video material	
1	https://onlinecourses.nptel.ac.in/noc21_me27
2	https://onlinecourses.nptel.ac.in/noc21_me129/preview

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**SoE No.
22ME-101**

VI SEMESTER

22ME622 : PE I : Lab:- Mechatronics

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Explain the basic elements of mechatronics system.
2. Analyze the functioning of sensors, transducers and actuators.
3. Analyze and evaluate the electronic elements such as digital circuits, AD convertors, etc.
4. Explain the basics of PLC

Experiments based on:

- 1) Introduction and development of a mechatronic system through a case study.
- 2) Performance and Demonstration on of operational amplifier.
- 3) Performance and Demonstration on of rotary encoders.
- 4) Speed measurement using magnetic pick up coil sensor on DAQ system.
- 5) Programmable Logic Controller (PLC),PLC Trainer system S7-1200
- 6) Development of ladder programming using PLC for road junction traffic light control system.
- 7) Development of ladder programming using PLC for water level control system
- 8) Development of ladder programming using PLC for washing machine.
- 9) Development of ladder programming using PLC for soft drink winding machine
- 10) Development of ladder programming using PLC for the lift simulation
- 11) Development of ladder programming using PLC for the pedestrian traffic light control system.
- 12) Development of ladder programming using PLC for any other suitable applications.

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**SoE No.
22ME-101**

B.Tech in Mechanical Engineering

VI SEMESTER

22ME623 : PE I : Computer Graphics and Solid Modelling

Course Outcomes :

Upon successful completion of the course, the students will be able to;

- Distinguish the various CAD CAM tools and also evaluate criteria for CAD-CAM systems
- Design 2D and 3D Transformation matrices
- Calculate and analyze the parametric equations for the wireframe. surface and solid modeling entities
- Design the applications of modeling and evaluate data exchange formats

Unit I: CAD TOOLS

(7 Hrs.)

Definition of CAD Tools, Types of system CAD/CAM system evaluation Criteria, functional areas of CAD, Modeling and viewing, efficient use of CAD software.

Wireframe modeling -Types of mathematical representation of curves, wire frame models, wire frame entities, parametric representation of analytical and synthetic curves – Hermite cubic splines, Bezier curves, B-Splines, rational curves-NURBS.

Unit II: SURFACE MODELING

(7 Hrs.)

Mathematical representation of surfaces, Surface model, Surface entities, surface representation, parametric representation of surfaces, plane surface, ruled surface, surface of revolution, Tabulated surface.

Unit III: PARAMETRIC REPRESENTATION OF SYNTHETIC SURFACES

(7 Hrs.)

Hermite Bicubic surface, Bezier surface, B-Spline surface, COONs surface, Blending surface, Sculptured surface, Surface manipulation - Displaying, Segmentation, Trimming, Intersection, Transformations - 2D and 3D, Orthogonal and Perspective transformations.

Unit IV: SOLID MODELLING

(8 Hrs.)

Solid Representation - Boundary Representation (B-rep), Constructive Solid Geometry (CSG) and other methods, Design Applications: Introduction to Feature based and Assembly modelling.

Unit V: ADVANCED MODELING CONCEPTS

(8 Hrs.)

Feature Based Modeling, Assembly Modeling, Behavioral Modeling, Conceptual Design & Top-down Design. Techniques for visual realism – hidden line – Surface removal – Algorithms for shading and Rendering. Parametric and variational modeling, Feature recognition, Design by features, Assembly and Tolerance Modeling, Tolerance representation – specification, analysis and synthesis, AI in Design.

Unit VI: Lighting System and accessories

(8 Hrs.)

Evaluation of data- exchange formats, IGES data representations and structure, STEP Architecture, implementation, ACIS & DXF.

Total Lecture 45Hours

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Text books:

1	CAD/CAM, Theory & Practice	1st Edition (2991)	Ibrahim Zeid	McGraw-Hill
2	Procedural elements for computer Graphics	1 st Edition (2998)	D Rogers	WCB/McGraw-Hill
3	Introduction to Finite Elements in Engineering	2nd Edition (2002)	Chandrupatla&Belegundu A.D	Prentice Hall
4	Optimization for Engineering Design	1 st Edition (2005)	Kalyanmoy Deb	Prentice Hall
5	P. N. Rao,	-	CAD/CAM	McGraw Hill
6	Martenson, E. Micheal	2995	Geometric Modelling	John Wiley & Sons
7	P. Radhakrishnan, S. Subramanyam		CAD/CAM/CIM	New Age International

Reference Books:

1.	Computer Graphics McGraw-Hill Hearn D. & Baker M.P Prentice Hall
2.	1st Edition (2990) RoggersDravid F., Adams J. Alan McGraw-Hill

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	https://onlinelibrary.wiley.com/doi/10.1002/9781118536186
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MOOCs Links and additional reading, learning, video material

1.	https://archive.nptel.ac.in/courses/107/106/107106088/
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22ME-101**

B.Tech in Mechanical Engineering

VI SEMESTER

22ME624 : PE I : Lab:- Computer Graphics and Solid Modelling

Course Outcomes

Upon successful completion of the course the students will be able to

- Distinguish the various CAD CAM tools and also evaluate criteria for CAD-CAM systems
- Design 2D and 3D Transformation matrices
- Calculate and analyze the parametric equations for the wireframe. surface and solid modeling entities
- Design the applications of modeling and evaluate data exchange formats

Minimum Ten Practical's to be performed from the list below

SN	Experiments based on
1	Observe and sketch the layout of a two wheeler transmission system.
2	Check the following electrical / electronic components, parameters of a two wheeler. CDI system components, Charging System components, Voltage at battery, specific gravity and high discharge test Use service/ operator's manual for specifications.
3	Adjust idle speed of a two wheeler engine using the specified procedure. Check the Idling Emission using Exhaust Gas Analyzer and do necessary carburetor adjustments for better performance.
4	Check the Ignition Timing of a two-wheeler and compare it with the Workshop/ Operators Manual Specification. Remove, observe, clean the Spark plug and adjust the gap and refit.
5	Remove and refit rear wheel of a two wheeler - check the conditions of brake shoes, brake drum, bearings etc. Perform brake adjustment. Replace brake cables, brake shoes/ pads.
6	Visit a Two wheeler Dealer Showroom/ Company showroom to obtain Chassis specification of a Scooter/ Motorcycle or scooterate. Share and Compare the data collected for two vehicles in the same category of vehicles (on the basis of Ground clearance, wheel base, engine power, spare wheel, claimed fuel efficiency, load carrying capacity). Prepare a report to identify the better one in the category.
7	Dismantle and assemble a motorcycle clutch and perform clutch adjustments. Replace clutch cable, if required.
8	Carry out lubrication and greasing of a vehicle. Engine, brake linkage, clutch linkage, fork, axle, chain and levers.
9	Demonstration of various components of battery and working of its charging system.
10	Demonstration to understand working principle of Electric horn, Brake light and side indicator.

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SoE No.
22ME-101

B.Tech in Mechanical Engineering

VI SEMESTER

22ME625 : PE I : Two Wheeler technology

Course Outcomes :

Upon successful completion of the course, the students will be able to;

- Student will be able to Classify & Explain various systems of Engine, its function including fuel supply, cooling and lubrication system in a two wheeler.
- Student will be able to Analyze and explain various power transmission systems from clutch to wheel in a two wheeler.
- Student will be able to Student will be able to Classify and Compare control systems like steering, suspension and brakes in a two wheeler.
- Student will be able to explain and Recommend the necessary electrical and luxurious systems and safety system in a two wheeler.

Unit I: Frames, Body and Transmission system

(7 Hrs.)

Type of frames: Single cradle frame, Double cradle frame, Tubular frame (Single Down-tube frame using the engine as a stressed member), Body- Monocoque Construction.

Selection of Transmission system components: Cable Actuated Wet Multi-disc clutch, Centrifugal clutch. Chain drive, Belt drive with variator mechanism, Gear drive.

Working of Gear box: its comparison with four wheelers. Gear ratios in scooter and motorcycle. Working of Constant mesh gear box.

Unit II: Engines, Fuel Supply System,

(7 Hrs.)

Two Stroke Engines - Arrangement of Ports in the cylinder, Decompression Valve arrangement. Four Stroke Engines - Overhead Valve and Overhead cam arrangements. Advantages of Multiple valves.

Induction and Exhaust system: Marks Induction System, Air filter/ Air Cleaner: construction and function - Washable oiled sponge element, washable Dual foam wet type.

Fuel supply system: Gravity feed and vacuum operated system. Down draught and horizontal/ Side draught carburetor. Carburetor functions and working under various Engine operating conditions like - Idling, Starting, accelerating, normal running. Advantages of electronic fuel injection system. Exhaust system.

Unit III: Lubrication System and Emission Control System, Steering and Suspension System

(7 Hrs.)

Lubrication and Emission Control Systems: Lubrication system. Petrol Lubrication with Separate Oil Pump for Two stroke engines. Wet sump Pressurized Lubrication in four stroke engines. Block diagram and working of pollution control measures, Catalytic convertor, Exhaust Gas Recirculation, Positive Crankcase Ventilation.

Handle Bar arrangement, Steering fork, Purpose of providing Caster angle. Use of Dampers/ Double acting type of shock absorbers. Use of Variable Rate coil spring, Coil in coil spring arrangement. Advantages of Mono-shock suspension system. Advantage of Gas filled shock absorber for rear end suspension.

Unit IV: Brakes, Wheels and Tyres.

(8 Hrs.)

Drum (Mechanical Expanding Shoe type) and disc Brakes (Fixed Caliper and Floating Caliper types.), Mechanical and Hydraulic brakes. Lever operated and pedal operated brakes. Application and criteria for selection of wheels and tyres, their specification for motorcycles, scooters, sports bike.

Unit V: Ignition and charging system

(8 Hrs.)

Ignition System: Working of Condenser Discharge Ignition (CDI) system. Microprocessor controlled Ignition system block diagram and working. Benefits of Twin Spark Ignition system

Starting system and Charging System: Kick Start and Button Start arrangements. Components of starting system and their functions: D C motor, Battery, Battery Rating for use in Button start vehicles. Schematic circuit and working of charging system. Schematic diagram showing AC and DC circuits.

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Unit VI: Lighting System and accessories	(8 Hrs.)
Lighting System and accessories- Specifications and Application of Head Lamp, Tail and number plate Lamp, Purpose of using LED lights in tail lamp, Turn Signal Lamp, Side Stand Indicator Lamp, High Beam Indicator Lamp, Neutral Indicator Lamp, Speedometer Lamp, Horn, Mobile Charger point, Head lamp and tail lamp Reflectors used in two wheelers.	
Dash units: Use of Speedometer (Analog and digital), Trip meter. Use of Engine Speed indicator/ Tachometer.	
Total Lecture	45Hours

Textbooks:	
1.	Panchal Dhruv U., Two and Three wheeler Technology, PHI Learning, 2015.
2.	Singh Kirpal, Automobile Engineering, Volume 1 & 2, Standard publishers and distributors, 14th Edition, 2021

Reference Books:	
1.	Ganesan V, Internal Combustion Engines, 4th Edition, McGraw Hill Education, 2012.
2.	Rajpoot R K, A text book of Automobile Engineering, Laxmi publications (P) Ltd., 1st Edition, 2007.

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/10.1002/9781118536186

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1.	https://archive.nptel.ac.in/courses/107/106/107106088/

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VI SEMESTER

22ME626 : PE I : Lab:- Two Wheeler technology

Course Outcomes

Upon successful completion of the course the students will be able to

- Student will be able to Classify & Explain various systems of Engine, its function including fuel supply, cooling and lubrication system in a two wheeler.
- Student will be able to Analyze and explain various power transmission systems from clutch to wheel in a two wheeler.
- Student will be able to Student will be able to Classify and Compare control systems like steering, suspension and brakes in a two wheeler.
- Student will be able to explain and Recommend the necessary electrical and luxurious systems and safety system in a two wheeler.

Minimum Ten Practical's to be performed from the list below

SN	Experiments based on
1	Observe and sketch the layout of a two wheeler transmission system.
2	Check the following electrical / electronic components, parameters of a two wheeler. CDI system components, Charging System components, Voltage at battery, specific gravity and high discharge test Use service/ operator's manual for specifications.
3	Adjust idle speed of a two wheeler engine using the specified procedure. Check the Idling Emission using Exhaust Gas Analyzer and do necessary carburetor adjustments for better performance.
4	Check the Ignition Timing of a two-wheeler and compare it with the Workshop/ Operators Manual Specification. Remove, observe, clean the Spark plug and adjust the gap and refit.
5	Remove and refit rear wheel of a two wheeler - check the conditions of brake shoes, brake drum, bearings etc. Perform brake adjustment. Replace brake cables, brake shoes/ pads.
6	Visit a Two wheeler Dealer Showroom/ Company showroom to obtain Chassis specification of a Scooter/ Motorcycle or scooterate. Share and Compare the data collected for two vehicles in the same category of vehicles (on the basis of Ground clearance, wheel base, engine power, spare wheel, claimed fuel efficiency, load carrying capacity). Prepare a report to identify the better one in the category.
7	Dismantle and assemble a motorcycle clutch and perform clutch adjustments. Replace clutch cable, if required.
8	Carry out lubrication and greasing of a vehicle. Engine, brake linkage, clutch linkage, fork, axle, chain and levers.
9	Demonstration of various components of battery and working of its charging system.
10	Demonstration to understand working principle of Electric horn, Brake light and side indicator.

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VI SEMESTER

22ME631 : PE II : Tool Design

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. Apply the fundamentals of Tool Design.
2. Apply the Design of various cutting tools, Sheet Metal Dies, Jigs / Fixtures and Forging dies .
3. Evaluate the failure modes of tools and costing.
4. Apply planning for manufacturing of tools for various components.

Unit I: Metal Cutting

(8 Hrs.)

Theory of metal Cutting Introduction, Mechanics of chip formation, Cutting tool materials, Single point cutting tool, Designation of cutting tools, ASA system, Importance of Tool angles, Orthogonal rake system, Classification of cutting tools, Types of chips, determination of shear angle, velocity relationship, force relations, Merchant's Theory, Cutting power, Energy consideration in metal cutting, Tool wear, Tool life, Tool life criteria, variable affecting tool life, **Application based case study**

Unit II: Design of SPCT and Multiple Cutting Tool

(8 Hrs.)

Design of single Point Cutting Tool, Drills- Introduction, Types, Geometry, Design of drill. Milling cutters - Introduction, Types, Geometry, and Design of milling cutters

Unit III: Press tool

(7 Hrs.)

Press tool Design Introduction, Press operations - Blanking, piercing, Notching, Perforating, Trimming, Shaving, Slitting, Lancing, Nibbling, Bending, Drawing, Squeezing. Press working equipment - Classification, Rating of a press, Press tool Equipment, arrangement of guide posts. Press selection, press working Terminology, Working of a cutting die, Types of dies - Simple dies, inverted die, Compound dies, combination dies, progressive dies, Transfer dies, multiple dies, Case of simple Die Design and its CAD Model

Unit IV: Bending and Drawing Die

(8 Hrs.)

Bending Forming & Drawing dies Bending methods - Bending Terminology, V- Bending, Air bending, bottoming dies, spring back & its prevention. Design Principles - Bend radius, Bend allowance, Spanking, width of die opening, Bending pressure. Metal flow during drawing, Design, Design consideration - Radius of draw die, Punch radius, Draw clearance, Drawing speed, Calculating blank size, Number of draws, Drawing pressure, Blank holding pressure

Unit V: Forging

(7 Hrs.)

Forging Die Design: Introduction, Classification of forging dies, Single impression dies, Multiple Impression dies. Forging design factors - Draft, fillet & corner radius, parting line, shrinkage & die wear, mismatch, finish allowances, webs & ribs Preliminary forging operation - fullering, edging, bending, drawing, flatterring, blacking finishing, cutoff. Die design for machine forging - determination of stock size in closed & open die forging.

Unit VI: Jig and Fixture

(7 Hrs.)

Design of jigs & fixture: - Introduction, locating & clamping - principle of location, principle of pin location, locating devices, radial or angular location, V - location, bush location. Design principle for location purpose, principle for clamping purposes, clamping devices, design principles common to jigs

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& fixtures. Drilling Jigs: - Design principles, drill bushes, design principles for drill bushings, Types of drilling jigs - Template jig, plate type jig, open type jig, swinging leaf jig, Box type jig, channel type jig . Jig feet. Milling Fixtures: - Essential features of a milling fixtures, milling machine vice, Design principles for milling fixtures, Indexing jig & fixtures

Total Lecture | 45 Hours

Textbooks:

1. Donaldson , "Tool design", Edition 2011, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi
2. ASTME Hand book, "Fundamentals of Tool design", 1988 Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi,

Reference Books:

1. Pollock, "Fundamentals of Tool design" 1962, Reston Publishing Company
2. Kempster, "Fundamentals of Tool design" , 1971, Hall of India Pvt. Ltd
3. Rong , Yeming, " Computer aided fixture design", Marcel Dekker

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- 1 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf
- 2 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
- 3 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf

MOOCs Links and additional reading, learning, video material

1. <http://www.digimat.in/nptel/courses/video/112105233/L13.html>
2. <https://archive.nptel.ac.in/courses/112/105/112105233/>

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VI SEMESTER

22ME632 : PE II : Additive Manufacturing

Course Outcomes:

Upon successful completion of the course, the students will be able to:

1. Understand current technology and additive manufacturing trends, the working principles, and process parameters of additive manufacturing processes
2. Explore different additive manufacturing processes and summarise them with materials, suggesting suitable methods for building a particular component.
3. Design and develop a working model using different techniques.
4. Discuss the contemporary issues in processing software/algorithms and testing.

Unit:1 Additive Manufacturing (AM) Overview: **8 Hours**

- Introduction to AM, AM evolution, Distinction between AM & CNC machining, Product development cycle, Rapid prototyping, Reverse Engineering, Industry 4.0 design principle - future with AM, smart manufacturing, current industry and manufacturing trends driving AM, Printing process, other applications, and Future trends.

Contemporary Issues related to Topic: (May be covered in TA/Case Study)

- Generalized additive manufacturing steps.

Unit:2 AM Technologies & Limitations of AM Systems: **7 Hours**

- Classification of AM technologies, AM process parameters, VAT photopolymerization, Material jetting (MJ), Binder jetting, Material extrusion, Powder bed fusion, Sheet lamination, Directed Energy Deposition (DED), New AM technologies,
- Laser & electron beam theory concept- types & properties, Potential Hazards of Additive Manufacturing.

Contemporary Issues related to Topic: (May be covered in TA/Research Paper Study/Visit)

- Other advanced methods can be covered.

Unit:3 Materials Science for AM: **8Hours**

- Types of materials in AM, Multifunctional and graded materials in AM, Role of solidification rate, Evolution of non-equilibrium structure, microstructural studies, Structure-property relationship.

- Wire Properties for DED, Powder Properties for PBF, DED, and BJ, Methods of Powder particle production, Mechanical properties of AM printed parts, Defects, Form, fit, function trade-off, time and cost

Contemporary Issues related to Topic: (May be covered in TA/Research Paper Study/Visit)

- Case studies should be discussed and assigned for more clarification.
- A case study on non-destructive testing can be discussed/given for the printed part.

Unit:4 CAD Models for AM: **7 Hours**

- CAD file formats, CAD CAM software, Modelling and Data Processing, Solid modeling (Introduction-Types), Tessellation, error minimization, firmware interface with 3-D Models, STL File: Introduction-data structure- ASCII-Binary-resolution-deviation & angle tolerance, Manipulation of

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STL files: Orientation of STL file-support structure-optimal part orientation, topology optimization & techniques, Steps for build file preparation, Issues with STL file format. Cost for additive manufacturing, waste identification, cost categories, and cost models.

Contemporary Issues related to Topic: (May be covered in TA/Visit)

- Transport phenomena models and numerical modeling of the AM process can be covered.

Unit:5	Process Planning for AM:	8 Hours
<ul style="list-style-type: none"> - Pre-processing, In-Situ processing, Post-processing, Quality standards for AM, Build strategies, Minimum feature size, Surface finish, and Elimination of support structures. - Guidelines for internal geometry like flow paths, cooling channels, cavities, and others, Guidelines for making lightweight objects, and Guidelines for making functionally gradient objects <p>Contemporary Issues related to Topic: (May be covered in TA/Visit)</p> <ul style="list-style-type: none"> - A case study on selection methods for a part may be planned. 		
Unit:6	Slicing Software's and Algorithms:	7Hours
<ul style="list-style-type: none"> - Classification Slicing methods, Tool path planning, Area filling methods, Slicing Software, Algorithms: Uniform slicing-Stair-step effect- Adaptive Slicing-Curved Layer Slicing- Direct Slicing, etc. <p>Contemporary Issues related to Topic: (May be covered in TA/Research Paper Study/Visit)</p> <ul style="list-style-type: none"> - Case Studies and Application of software/algorithms in AM. 		
Total Lecture Hours		45 Hours

Text books:

1	Additive Manufacturing Technologies, Rapid Prototyping to Direct Digital Manufacturing, Ian Gibson, David W Rosen, Bent Stucker, Springer New York 2010.
2	3D Printing and Additive Manufacturing: Principles and Applications, Chua Chee Kai, Leong Kah Fai, World Scientific, 2015, 4th Edition.
3	A Practical Guide to Design for Additive Manufacturing, Diegel, Olaf, Axel Nordin and Damien Motte, Springer, 2020.
4	Laser Assisted Fabrication of Materials, J D Majumdar and I Manna, Springer Series in Material Science.
5	Understanding Additive Manufacturing: Rapid Prototyping, Rapid Tooling, Rapid Manufacturing, Andreas Gebhardt, Hanser Publishers, 2011.
6	Numerical Modeling of the Additive Manufacturing Process of Titanium Alloy, Zhiqiang Fan and Frank Liou, In Tech, 2012
7	Laser-induced Materials and Processes for Rapid Prototyping, L Lu, J Fuh and Y S Wong, Kluwer Academic Press, 2001
8	Rapid Manufacturing: The Technologies and Applications of Rapid Prototyping and Rapid Tooling, D T Pham, S S Dimov, Springer 2001
9	Rapid Prototyping: Principles and Applications in Manufacturing, Rafiq Noorani, John Wiley & Sons, 2006
10	Additive Manufacturing, Second Edition, Amit Bandyopadhyay Susmita Bose, CRC Press Taylor & Francis Group, 2020
11	Additive Manufacturing: Principles, Technologies and Applications, C P Paul, A N Junoop, McGraw Hill, 2021.

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Reference Books:

- 1 Rapid Prototyping, Laser-based and other technology, Patri K. Venuvinod and Weiyin Ma, Springer 2004.
- 2 The 3 D Printing Handbook: Technologies, Design and Applications, Redwood, Ben, Filemon Schoffer and Brian Garret, 3 D Hubs, 2017

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- 1 <http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0>
- 2 <https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042>

MOOCs Links and additional reading, learning, video material

- 1 https://onlinecourses.nptel.ac.in/noc21_me115/preview
- 2 https://onlinecourses.nptel.ac.in/noc22_me130/preview

Online resources:

- 1 <https://www.nist.gov/additive-manufacturing>
- 2 <https://www.metal-am.com/>
- 3 <http://additivemanufacturing.com/basics/>
- 4 <https://www.3dprintingindustry.com/>
- 5 <https://www.thingiverse.com/>
- 6 <https://reprap.org/wiki/RepRap>
- 7 <https://courses.gen3d.com/courses/enrolled/988400>
- 8 <https://markforged.com/resources/blog/design-for-additive-manufacturing-dfam>
- 9 <https://www.hubs.com/knowledge-base/how-design-parts-metal-3d-printing/>
- 10 <https://www.rapidmade.com/design-for-additive-manufacturing>
- 11 <https://all3dp.com/1/design-for-additive-manufacturing-dfam-simply-explained/#where-to-learn-dfam>

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VI SEMESTER

22ME633 : PE II : Fuel Cell Technology

Course Outcomes:

successful completion of the course, the students will be able to;

1. **Apply** knowledge of performance, behavior, operational issues and challenges for all major types of fuel cells for its commercialization.
2. **Investigate and Apply** know-how of thermodynamics, electrochemistry, heat transfer, and fluid mechanics principles to design and analysis of this emerging technology.
3. **Design & analyze** innovative fuel cell systems, fuel cell charge transport and mass transport, the techniques, skills, and modern engineering tools necessary for design and analysis.
4. **Examine and evaluate** the methodology to design the components of fuel cells and specific type of fuel cell systems.

Unit I: Introduction to Fuel Cells	(8 Hrs.)
Brief history of fuel cells, Operating principles, Types of fuel cells- Solid Oxide Fuel Cell (SOFC), Alkaline Fuel Cell (AFC), Molten Carbonate Fuel Cell (MCFC), Phosphoric Acid Fuel Cell (PAFC), Fuel Cell Stack, Advantages, Limitations and Applications of Fuel Cell, Polarization curve for performance characterization of fuel cells, Representing various losses (Activation, Ohmic, concentration loss), Hydrogen Production, Storage and Transportation.	
Unit II: Fuel Cell Thermodynamics	(7 Hrs.)
Heat Potential (Enthalpy of Reaction), Work Potential (Gibbs free energy), Reversible fuel cell voltage (Nernst equation), Fuel Cell Efficiency	
Unit III: Fuel Cell Electrochemistry	(8 Hrs.)
Electrochemical Reaction basics, Faraday's law, Tafel equation, Butler- Volmer equation, Exchange current	
Unit IV: Fuel Cell Charge Transport and Mass Transport	(7 Hrs.)
Ion Transport (Electrolyte), Electron Transport, Gas phase (single phase) mass transport in different fuel cell components (Diffusion layer, flow channels), Multiphase Mass Transport in fuel cell components, Fuel Crossover and Internal Currents, Heat generation and transport in fuel cell	
Unit V: Fuel Cell Characterization	(8 Hrs.)
In Situ Versus Ex Situ Characterization, Polarization Test, Electrochemical Impedance Spectroscopy, Linear Sweep Voltammetry, Cyclic Voltammetry, Current Interrupt, High frequency resistance	
Unit VI: Polymer Electrolyte Membrane Fuel Cell (PEMFC)	(7 Hrs.)
Components and Materials: Membrane, Catalyst Layer, Bipolar Plate, Current Collector, Water Management, Thermal Management, Direct Liquid Fuel Cell (DLFC), Advantage of Liquid Fuel over Gaseous Fuel, Different types of DLFC, Direct Methanol Fuel Cell (DMFC)	
Total Lecture	45 Hours

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Textbooks:

1.	O'Hayre, R.P.,S. Cha, W. Colella, F.B.Prinz, Fuel Cell Fundamentals, Wiley, NY (2006)
2.	J. Larminie and A. Dicks, Fuel Cell Systems Explained, 2nd Edition, Wiley (2003)
3.	Matthew M. Mench, Fuel Cell Engines , Wiley (2008)
4.	Introduction to Fuel Cells Electrochemistry and Materials, San Ping Jiang , Qingfeng Li, Springer (2022)

Reference Books:

1.	X. Li., Principles of fuel cells, Taylor & Francis (2005)
2.	S. Srinivasan, Fuel Cells: From Fundamentals to Applications, Springer (2006)

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1	http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/book%20details/ME.aspx
2	https://link.springer.com/chapter/10.1007/978-981-10-7626-8_3

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1.	https://archive.nptel.ac.in/courses/103/102/103102015/
2.	https://nptel.ac.in/courses/103108162
3.	https://www.energy.gov/

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VI SEMESTER

22ME634 : PE II : Material Handling Systems

Course Outcomes:

Upon successful completion of the course, the students will be able to;

1. Explain the principles and functions of various material handling systems
2. Apply material handling principles to design basic handling systems for specific applications.
3. Analyze the efficiency and effectiveness of different material handling methods in various scenarios.
4. Evaluate the performance of material handling systems considering safety, efficiency, and cost factors.

Unit I:	(8 Hrs.)
Types of intra-plant transporting facility, principles of material handling and classification of material handling equipment, selection of material handling equipment, hoisting equipment, screw type, hydraulic and pneumatic conveyors, general characteristics of hoisting machines, surface and overhead equipment, general characteristics of surface and overhead equipment and their applications. Introduction to control of hoisting equipment.	
Unit II:	(7 Hrs.)
Component selection and design Flexible hoisting appliances like ropes and chains, welded load chains, roller chains, selection of chains, hemp rope and steel wire rope, selection of ropes, rope reeving arrangement and pulley blocks fastening of chains and ropes, different types of load suspension appliances, fixed and movable pulleys, different types of pulley systems, multiple pulley systems. Chain and ropes heaves and sprockets	
Unit III:	(8 Hrs.)
Load handling attachments, standard forged hook, hook weights, hook bearings, cross piece and casing of hook, crane grab for unit and piece loads, carrier beams and clamps, load platforms and side dump buckets, Electromagnetic lifting system, grabbing attachments for loose materials, crane attachments for handling liquid materials.	
Unit IV:	(7 Hrs.)
Arresting gear, ratchet type arresting gear, roller ratchet, shoe brakes and its different types like electromagnetic, double shoe type, thrusters operated, controlled brakes, shoe brakes, Electro-Hydraulic thrusters safety handles, load operated constant force and variable force brakes, Rope drum design and assembly, design of guides and column	
Unit V:	(8 Hrs.)
Different drives of hoisting gears like individual and common motor drive for several mechanisms, travelling gear, travelling mechanisms for moving trolleys and cranes on runway rails, mechanisms for trackless, rubber tyre and crawler cranes, motor propelled trolley hoists and trolleys, rails and travelling wheels, slewing, jib and lifting gears .Operation of hoisting gear during transient motion, selecting the motor rating and determining braking torque for hoisting mechanisms, selecting the motor rating and determining braking torque for travelling mechanisms, slewing mechanisms, jib and lifting mechanisms. (Elementary treatment is expected)	

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Unit VI:	(7 Hrs.)
Cranes with rotary pillar, cranes with a fixed post, jib cranes with trolley, portal cranes with luffing boom, cantilever cranes, cage elevators, safety devices of elevators, belt and chain conveyors and their power calculations, vibrating and oscillating conveyors, pneumatic and hydraulic conveyors, screw conveyors, hoppers, gates and feeders. Introduction to AGV's as new material handling device, use of robot for material handling	
Total Lecture	45 Hours

Textbooks:

1.	"Introduction to Materials Handling" John A. White, Marvin H. Agee, Kenneth E. Case Publisher: John Wiley & Sons
2.	"Material Handling Systems: Designing for Safety and Health" Charles Reese CRC Press

Reference Books:

1.	"Principles of Material Handling" Ray A. Kulwiec John Wiley & Sons
2.	"Material Handling Handbook" Raymond A. Kulwiec John Wiley & Sons

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/book%20details/ME.aspx
2	https://link.springer.com/chapter/10.1007/978-981-10-7626-8_3

MOOCs Links and additional reading, learning, video material

1.	https://archive.nptel.ac.in/courses/103/102/103102015/
2.	https://nptel.ac.in/courses/103108162
3.	https://www.energy.gov/

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VI SEMESTER

22ME635 : PE II : Reliability Engineering

Course Outcomes :

Students will be able to:

1. Interpret Reliability, Maintainability, and Availability of engineering systems.
2. Apply Reliability Modeling as a tool for evaluating system performance.
3. Analyze the failure of a machine and the failure rate of systems or components
4. Create production & maintenance schedules of particular engineering systems using various tools used for failure data analysis.

Unit I: Fundamental concepts	(8 Hrs.)	
Reliability definitions, failure, Failure density, Failure Rate, Hazard Rate, Mean Time To Failure, MTBF, maintainability, availability, safety and reliability, Quality, cost and system effectiveness, Life characteristic phases, modes of failure, Quality and reliability assurance rules, product liability, Importance of Reliability,		
Unit II: Probability theory:-	(7 Hrs.)	
Set theory, laws of probability, total probability theorem, probability distributions, parameters and applications.		
Unit III: System reliability and modelling:	(7 Hrs.)	
Series and parallel components, mixed configuration, complex systems. Redundancy, element redundancy, unit redundancy, standby redundancy. Types of standby redundancy, parallel components. Markov models for reliability estimation.		
Unit IV: Maintainability and Availability:	(8 Hrs.)	
Objectives of maintenance, types of maintenance, Maintainability, factors affecting maintainability, system downtime. Availability - Inherent, Achieved, and Operational availability, reliability, and maintainability trade-off. Markov models for availability estimation.		
Unit V: System Reliability Analysis:	(7 Hrs.)	
Reliability allocation or apportionment. Reliability apportionment techniques. Reliability block diagrams and models. Reliability predictions. Life testing and accelerated testing.		
Unit VI: Strength-based reliability:	(8Hrs.)	
Safety factor, safety margin, Stress strength interaction, Failure Mode, Effects and Criticality Analysis-, , FMECA examples, Ishikawa diagram .fault tree construction, basic symbols development of functional reliability block diagram, Fault tree analysis, fault tree evaluation techniques, Design of Mechanical components and systems:-Material strengths and loads.		
Total Lecture		45 Hours

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Reference books:

Text Books

1	Concepts of Reliability Engg 1985 L.S. Srinath Affiliated East-Wast Press (P) Ltd
2	Reliability Engineering 1983 A.K. Govil Tata McGraw-Hill Publishing Co. Ltd
3	Reliability Engineering 1984 E. Balagurusmy Tata McGraw-Hill Publishing Co. Ltd

Reference Books

1	Engineering Reliability 1980 B.S. Dhillon, C. Singh John Wiley & Sons
2	Probabilistic, Reliability 1968 M.L. Shooman McGraw-Hill Book Co.,
3	Reliability in Engineering Design 1977 K.C. Kapur, L.R. Lamberson John-Wiley and sons.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

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VI SEMESTER

22ME636 : PE II : Bio- Mechanics

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. To acquaint the knowledge of mechanics of biological system .
2. To enable them to understand its applications in developing mathematical models.
3. To enable them to understand its applications in developing mechanical aspects of designing implants
4. To enable them to understand its applications in developing biological assistive devices.

Unit I: Introduction of Mechanics:

(7 Hrs.)

Review of the principles of mechanics, Vector mechanics- Resultant forces of Coplaner & Noncoplaner and Concurrent & non-concurrent forces, parallel force in space, Equilibrium of coplanar forces, Newton's laws of motion, Work and energy, Moment of inertia.

Unit II: Biomechanics of Joints:

(7 Hrs.)

Skeletal joints, forces and stresses in human joints, Analysis of rigid bodies in equilibrium, free body diagrams, types of joint, biomechanical analysis of elbow, shoulder, spinal column, hip knee and ankle.

Unit III: Biofluid Mechanics : Hard Tissues: Soft Tissues:

(8 Hrs.)

Introduction, viscosity and capillary viscometer, Rheological properties of blood, laminar flow, Couette flow and Hagen-poiseuille equation, turbulent flow. **Hard Tissues** Bone structure & composition mechanical properties of bone, cortical and cancellous bones, viscoelastic properties, Maxwell & Voight models – anisotropy. **Soft Tissues:** Structure and functions of Soft Tissues: Cartilage, Tendon, Ligament, and Muscle; Material Properties: Cartilage, Tendon, Ligament, and Muscle; Modeling of soft tissues: Cartilage, Tendon, Ligament, and Muscle, Hills's muscle model

Unit IV: Cardiovascular Mechanics:

(7 Hrs.)

Bending Cardiovascular system, artificial heart valves, biological and mechanical valves development, testing of valves, Blood Flow Models, Blood Vessel Mechanics, Heart Valve Dynamics, Prosthetic Valve Dynamics.

Unit V: Respiratory Mechanics:

(7 Hrs.)

Mechanism of air flow, respiratory cycle, lung ventilation model, methods of determining pressure, flow rate and volume; spirometry.

Unit VI: Applied Biomechanics: and Biomechanics of Implants:

(9 Hrs.)

Applied Biomechanics: Engineering approaches to standing, sitting and lying, Biomechanics of gait, application of gait and locomotion analysis, Fluid mechanics and energetics: Forms of energy and energy transfer.

Biomechanics of Implants: Design of orthopaedic implant, specifications for a prosthetic joint, biocompatibility, requirement of a biomaterial, characteristics of different types of biomaterials, manufacturing process of implants, fixation of implants.

Total Lecture 45 Hours

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Textbooks:

1.	N. Ozkaya and M. Nordin, Fundamentals of Biomechanics-Equilibrium, Motion and Deformation, springer-verlag, 2nd edition 1999
2.	Duane knudson, Fundamental of biomechanics, springer, 2 nd edition 2007
3.	D. J. Schneck and J. D. Bronzino, Biomechanics- Principles and Applications, CRC Press, 2 nd Edition, 2000

Reference Books:

1.	Y C Fung, Biomechanics: Mechanical Properties of Living Tissues, springer, 2nd edition, 1993.
2.	Hiroshi Wada, Biomechanics at Micro and Nano scale Levels, volume 1, 2005, World Scientific Publishing Co. Pt. Ltd.
3.	Mow, Van C.; Huiskes, Rik, Basic Orthopaedic Biomechanics and Mechano-Biology, 3rd Edition, 2005, Lippincott Williams & Wilkins
4.	Joseph D, Bronzino, "The Biomedical Engineering Handbook", CRC Press, 3 rd edition, 2006.
5.	Roger Bartlett, Introduction to Sports Biomechanics 1997, Roger Bartlett, Taylor & Francis Group

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/78.%20Engineering-Mechanics-Statics-and-Dinamics-E-W-Nelson-C-L-Best-W-G-McLean-1st-Ed-1997-Schaum-Outline-McGraw-Hill%20(1).pdf
2	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
3	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf

MOOCs Links and additional reading, learning, video material

1.	http://www.digimat.in/nptel/courses/video/112105233/L13.html
2.	https://archive.nptel.ac.in/courses/112/105/112105233/

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VI SEMESTER 22ME637 : PE II : Composites

Course Outcomes :

Upon successful completion of the course, the students will be able to

1. Explain the roles of matrix and reinforcement materials in composites and how their properties affect the overall performance of the composite.
2. Apply knowledge of composite manufacturing techniques to identify appropriate fabrication processes for different composite applications.
3. Analyze the mechanical behavior of composite materials under various loading conditions and predict failure mechanisms.
4. Design composite structures using principles of micromechanics and macromechanics, and perform structural analysis using computational tools.

Unit I: Introduction to Composite Materials

(8 Hrs.)

Definition and Classification: Understanding what composites are, and how they are classified.

History and Development: Evolution of composite materials and their role in various industries.

Advantages and Disadvantages: Pros and cons of using composite materials over traditional materials.

Applications: Key applications in aerospace, automotive, civil engineering, sports, and more.

Unit II: Constituent Materials

(7Hrs.)

Matrix Materials: Types of matrix materials (polymers, metals, ceramics), their properties, and selection criteria.

Reinforcement Materials: Types of reinforcement materials (fibers, particulates, whiskers), their properties, and forms (continuous, short, woven, etc.).

Interfaces and Interphases: Importance of the interface, surface treatments, and the role of interphase in composites.

Unit III: Fabrication Processes

(7 Hrs.)

Manufacturing Techniques: Overview of various fabrication methods (hand lay-up, spray-up, filament winding, pultrusion, resin transfer molding, etc.).

Process Parameters: Key parameters affecting the quality and performance of composites.

Advances in Fabrication: Recent developments and innovations in composite manufacturing.

Unit IV: Mechanical Behavior and Properties

(8 Hrs.)

Stress-Strain Relationships: Understanding the mechanical behavior of composites under different loading conditions.

Failure Mechanisms: Types of failures in composites (matrix cracking, fiber breakage, delamination) and their prediction.

Mechanical Testing: Standard testing methods (tensile, compressive, flexural, impact, fatigue) and interpretation of results.

Unit V: Micromechanics and Micromechanics

(7 Hrs.)

Micromechanics of Composites: Analysis at the fiber and matrix level, including rule of mixtures, volume fractions, and micromechanical models.

Micromechanics of Laminates: Classical laminate theory, stress and strain distribution in laminates, and

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composite plate theories.

Structural Analysis: Analysis techniques for composite structures using finite element methods (FEM).

Unit VI: Durability and Performance

(8 Hrs.)

Environmental Effects: Impact of environmental factors (temperature, moisture, UV exposure) on composite materials.

Long-term Performance: Creep, fatigue, and aging in composites.

Nondestructive Evaluation (NDE): Techniques for assessing the integrity of composites (ultrasound, X-ray, thermography, etc.).

Sustainability and Recycling: Life cycle analysis, recycling methods, and the environmental impact of composites.

Total Lecture 39 Hours

Textbooks:

1. **Composite Materials: Science and Engineering** by Krishan K. Chawla
2. **Mechanics of Composite Materials** by Robert M. Jones
3. **Engineering Mechanics of Composite Materials** by Isaac M. Daniel and Ori Ishai

Reference Books:

1. **Introduction to Composite Materials** by Stephen W. Tsai and Hyer C. Miller
2. **Principles of Composite Material Mechanics** by Ronald F. Gibson

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VI SEMESTER

22ME638 : PE II : Data Analytics In Mechanical Engineering

Course Outcomes :

Upon successful completion of the course, the students will be able to:

Unit I: Introduction to Data Analytics in Mechanical Engineering (Difficulty Level: Beginner) (8 Hrs.)

Overview of Data Analytics - Definition of data analytics, Importance and benefits in mechanical engineering, Historical context and evolution, Applications in various mechanical engineering domains, importance and applications of Data Analytics in Mechanical Engineering, Statistical Concepts and Techniques - Descriptive statistics: mean, median, mode, variance, standard deviation, Probability distributions: normal, binomial, Poisson, Inferential statistics: hypothesis testing, confidence intervals, Data Visualization Techniques - Graphical representation of data: histograms, scatter plots, box plots, Importance of visualization in understanding data patterns, Tools and software for data visualization: Excel, MATLAB, Python libraries (matplotlib, seaborn)

Case Studies:

- Analyzing temperature variations in a heat exchanger using Excel or MATLAB
- Predictive maintenance analysis for rotating machinery using Python and Pandas

Unit II: Data Preprocessing and Cleaning (Difficulty Level: Intermediate) (8 Hrs.)

Data Preprocessing Techniques - Data cleaning: handling missing values, duplicates, and inconsistencies
Data transformation: normalization, standardization, Feature scaling and selection, Handling Missing Data - Techniques for imputation of missing values: mean imputation, interpolation, deletion, Impact of missing data on analysis and interpretation, Outlier Detection and Treatment - Identification of outliers using statistical methods and visualization techniques, Strategies for handling outliers: trimming, winsorization, transformation

Case Studies:

- Cleaning and preprocessing sensor data from a manufacturing plant using Python and NumPy
- Detecting and handling outliers in vibration data from a rotating machine using MATLAB or R

Unit III: Descriptive and Inferential Statistics (Difficulty Level: Intermediate) (7 Hrs.)

Descriptive Statistics - Measures of central tendency: mean, median, mode, Measures of dispersion: range, variance, standard deviation, Skewness and kurtosis: interpretation of data distribution, Inferential Statistics - Hypothesis testing: formulation of null and alternative hypotheses, p-values, Confidence intervals: interpretation and construction, Regression analysis: linear regression, multiple regression, logistic regression, Regression Analysis - Model building and interpretation, Assumptions of regression analysis, Model evaluation metrics: R-squared, adjusted R-squared, AIC, BIC

Case Studies:

- Analyzing the relationship between engine parameters and fuel efficiency using regression analysis in Excel or Python
- Hypothesis testing to compare the performance of two manufacturing processes using R or MATLAB

Unit IV: Machine Learning Fundamentals (Difficulty Level: Intermediate) (8 Hrs.)

Introduction to Machine Learning - Basic concepts and terminology: supervised learning, unsupervised learning, reinforcement learning, Types of machine learning algorithms: classification, regression, clustering, Supervised Learning - Regression techniques: linear regression, polynomial regression, support vector regression
Classification techniques: logistic regression, decision trees, random forests, Unsupervised Learning - Clustering algorithms: K-means clustering, hierarchical clustering, Dimensionality reduction techniques: principal

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component analysis (PCA), t-distributed stochastic neighbor embedding (t-SNE), Model Evaluation and Validation Techniques - Cross-validation methods: k-fold cross-validation, leave-one-out cross-validation
Performance metrics: accuracy, precision, recall, F1-score, ROC curve

Case Studies:

1. Predicting mechanical properties of materials using regression algorithms in Python with scikit-learn
2. Clustering analysis of production line data to identify patterns using MATLAB or R

Unit V: Advanced Data Analytics Techniques (Difficulty Level: Advanced)

(7 Hrs.)

Time Series Analysis and Forecasting - Time series data: components and patterns, Techniques for time series forecasting: moving averages, exponential smoothing, ARIMA models, Seasonal decomposition and trend analysis, Feature Engineering and Selection - Feature extraction techniques: PCA, LDA, feature hashing
Importance of feature selection in model building, Wrapper, filter, and embedded methods for feature selection, Ensemble Learning Methods - Bagging techniques: bootstrap aggregating, random forests, Boosting techniques: AdaBoost, gradient boosting, Stacking ensemble models, Introduction to Deep Learning - Basics of neural networks: architecture, activation functions, optimization algorithms, Deep learning frameworks: TensorFlow, Keras, PyTorch, Applications of deep learning in mechanical engineering

Case Studies:

1. Forecasting equipment failure using time series analysis in Python with TensorFlow or Keras
2. Feature selection for optimizing manufacturing processes using ensemble learning methods in R or MATLAB

Unit VI: (Difficulty Level: Advanced)

(7 Hrs.)

Predictive Maintenance in Manufacturing - Concept and benefits of predictive maintenance, Data-driven approaches for predicting equipment failures, Implementation challenges and best practices, Quality Control and Process Optimization - Statistical process control (SPC) techniques, Six Sigma methodology for process improvement, Optimization algorithms: genetic algorithms, simulated annealing, Design Optimization and Simulation - Computer-aided design (CAD) and finite element analysis (FEA), Optimization techniques for product design, Sensitivity analysis and robust design optimization

Case Studies:

1. Predictive maintenance of HVAC systems in a commercial building using Python and TensorFlow
2. Optimization of automotive component design using simulation and data analytics in ANSYS or MATLAB

Total Lecture 45 Hours

Textbooks:

1. Machine Learning for Sustainable Manufacturing in Industry 4.0: Concept, Concerns and Applications, by Raman Kumar (Editor), Sita Rani (Editor), Sehijpal Singh Khangura (Editor), Publisher : CRC Press; 1st edition (3 November 2023), Language : English, Hardcover : 234 pages, ISBN-10 : 103239305X, ISBN-13:978-1032393056
2. Data Analytics for Process Engineers: Prediction, Control and Optimization (Synthesis Lectures on Mechanical Engineering) Hardcover – Import, 3 December 2023, by Daniela Galatro (Author), Stephen Dawe (Author), Publisher : Springer International Publishing AG; 1st ed. 2024 edition (3 December 2023), Language : English, Hardcover : 145 pages, ISBN-10 : 3031468651, ISBN-13 : 978-3031468650

Reference Books:

1. Data Analytics: Handbook of Formulas and Techniques, Adedeji B. Badiru, CRC Press, 22 Dec 2020 - Technology & Engineering - 272 pages
2. Predictive Analytics for Mechanical Engineering: A Beginners Guide, Parikshit N. Mahalle, Pravin P. Hujare, Gitanjali Rahul Shinde, SpringerBriefs in Applied Sciences and Technology,

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	https://doi.org/10.1007/978-981-99-4850-5 , Publisher-Springer Singapore, eBook ISBN 978-981-99-4850-5 Published: 16 August 2023
3.	Data Analytics for Process Engineers, Daniela Galatro, Stephen Dawe, Series Title-Synthesis Lectures on Mechanical Engineering, https://doi.org/10.1007/978-3-031-46866-7 , Publisher-Springer Cham, eBook ISBN 978-3-031-46866-7 Published: 02 December 2023

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

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MOOCs Links and additional reading, learning, video material

1.	Data Analysis and Decision Making - I By Prof. Raghu Nandan Sengupta IIT Kanpur https://onlinecourses.nptel.ac.in/noc24_mg14/preview
2.	Data Science for Engineers By Prof. Rangunathan Rengasamy, Prof. Shankar Narasimhan | IIT Madras https://onlinecourses.nptel.ac.in/noc21_cs69/preview
3.	Dealing with materials data : collection, analysis and interpretation By Prof. M P Gururajan, Prof. Hina Gokhale IIT Bombay https://onlinecourses.nptel.ac.in/noc21_mm09/preview

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VI SEMESTER

22ME639 : PE II : Advanced Manufacturing Techniques

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. **Distinguish and Identify** the various non-traditional manufacturing process based on energy sources.
2. **Evaluate** various advanced manufacturing process for new materials and the requirements of complex features on the basis of various parameters.
3. **Justify** various advanced welding techniques for different welding applications.
4. **Illustrate** the applications of additive manufacturing techniques in industries.

Unit I: Mechanical Processes	(8 Hrs.)	
Need, classification of AMT, Abrasive jet Machining, Water jet Machining & ultrasonic Machining, Abrasive-Water Jet Machining, Abrasive Flow Machining, Magnetic Abrasive Finishing & Ultrasonic Machining. Contemporary issues		
Unit II: Chemical Processes.	(6 Hrs.)	
Chemical Processes & Electro-chemical Processes: Electrochemistry of ECM, tool design, effect of variable on performance chemical milling, Chemical Engraving, Photo chemical machining, EC grinding. Contemporary issues		
Unit III: Thermo-electric Processes	(9Hrs.)	
Electric Discharge Machining, Wire Electric Discharge Machining. Electron Beam Machining, Laser Beam Machining, Ion Beam Machining & Plasma Arc Machining. Contemporary issues		
Unit IV: HERF	(6 Hrs.)	
High energy rate forming processes: Burnishing, ballizing process and other miscellaneous forming processes, electroforming. Thermoform High velocity forming, Vacuum forming.. Contemporary issues		
Unit V: Unconventional welding techniques	(9 Hrs.)	
Laser beam welding , electron beam welding, plasma arc welding, atomic hydrogen welding, submerged arc welding, explosive welding techniques. solid phase welding technique such as ultrasonic welding, friction welding. Contemporary issues		
Unit VI: Additive Manufacturing	(7 Hrs.)	
Overview, Basic principle need and advantages of additive manufacturing, Procedure of product development in additive manufacturing, Classification of additive manufacturing processes, Materials used in additive manufacturing, Challenges in Additive Manufacturing. Contemporary issues		
Total Lecture		45 Hours

Textbooks:

1. Ghosh and Malik, Manufacturing sciences, OAFFO, 2010.
2. Gary F. Benedict , Non traditional processes Talyor and francis, CRC Press , 1ed,2019.
3. V. K. Jain, Advanced Machining Processes, Allied Publishers,4th Edition (2009)

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Reference Books:

1.	J. A. McGeough, Advanced Methodes of machining , Chapman and Hall ,1988.
2.	Cherry Lemon , , Advanced Methodes of machining , M Hill Didactics Co, 2019.
3.	Paul and Jinoop , Additive Manufacturing , Mc Graw hill, 2021.

YCCE e-library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

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MOOCs Links and additional reading, learning, video material

1.	https://archive.nptel.ac.in/courses/112/107/112107078/
2.	https://archive.nptel.ac.in/courses/112/107/112107077/
3.	https://archive.nptel.ac.in/courses/112/107/112107078/

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B.Tech in Mechanical Engineering

VI SEMESTER

22ME651 : PE III : Artificial Intelligence

Course Outcomes :

Upon successful completion of the course the students will be able to

1. Examine the issues involved in knowledge bases, reasoning systems and planning
2. Design and evaluate intelligent expert models for perception and prediction from intelligent environment.
3. Apply AI frameworks and platforms to improve business, organizational, and technology outcomes.
4. Analyze the concept of neural networks for learning linear and non-linear activation functions

Unit I:	(6 Hrs.)	
Human and machine intelligence, Artificial Intelligence (AI), Programming in AI environment, Natural Language processing (NLP), Need of AI.		
Unit II:	(7Hrs.)	
Architecture of an Expert system, Knowledge base, inference engine forward and backward chaining, use of probability and fuzzy logic. Selection of inference mechanism.		
Unit III:	(7 Hrs.)	
Neural Network and application artificial neural network models, NN applications in Cellular manufacturing and other areas of mechanical Engineering		
Unit IV:	(6 Hrs.)	
Introduction to Rule Based System. Conflict Resolution Advantages and Drawbacks of Rule Based Systems Clausal Form Logic, Rule Base Verification, Refinement and Validation. Creating Knowledge Base, Knowledge Engineer and Domain Expert, Phases of Knowledge Engineering, Tools for Knowledge Engineering.		
Unit V:	(7 Hrs.)	
Fundamentals of OOP (Object oriented programming), creating structures and objects, object operations, invoking procedures, programming applications, Object oriented expert systems.		
Unit VI:	(6 Hrs.)	
Semantic nets, structure and objects, ruled systems for semantic nets, certainty factors, Learning		
Total Lecture		39 Hours

Textbooks:

1. Elaine Rich "Artificial Intelligence" McGraw Hill Education; 3rd edition (1 July 2017)
2. Addis, T.R., —Designing Knowledge Based Systeml, Prentice Hall, 1985.
3. Rolston, D.W., —Principles of Artificial Intelligence and Expert Systems Developmentl, McGraw Hill, 1988.

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Reference Books:

1.	Maus, R. and Keyes, J., —Handbook of Expert Systems in Manufacturing, McGraw Hill, 1991
2.	Robert Levine, —A comprehensive guide to artificial intelligence and expert systems",Elain Rich ,|Artificial Intelligencel,
3.	Sasikumar, Ramani, et al ,|Rule based expert systems|.
4.	Graham Winstanley, —Program Design for Knowledge Based Systems|, Galgotia Publications
5.	Artificial Neural Networks", Zurada
6.	V.B. Rao and H.V. Rao, —C++ : Neural Networks and Fuzzy Logic , BPB Publications.

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VI SEMESTER

22ME652 : PE III : Design for Manufacturing & Assembly

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. Evaluate the product life cycle, select the materials and manufacturing processes for designed product.
2. Analyze and apply the various design rule related to machining, casting and joining for designed product.
3. Analyze the different requirements of Automated assembly
4. Analyze and apply the various design rule related to manual assembly for designed product.

Unit I: Introduction	(6 Hrs.)
Design philosophy steps in Design process — General Design rules for manufacturability— basic principles of design Ling for economical production—creativity in design. Materials: Selection of Materials for design Developments in Material technology—criteria for material selection—Material selection interrelationship with process selection process selection charts.	
Unit II: METALCASTING	(6 Hrs.)
Appraisal of various casting processes, selection of casting process, -general design considerations for casting—casting tolerances—use of solidification simulation in casting design—product design rules for casting	
Unit III: MACHINING PROCESS	(7 Hrs.)
Over view of various machining processes—general design rules for machining-Dimensional tolerance and surface roughness— Design for machining— Ease— Redesign in go components for machining ease with suitable examples. General design recommendations for machined parts	
Unit IV: METAL JOINING	(7 Hrs.)
Appraisal of various welding processes, Factors in design of weldments—general design guidelines —pre and post treatment of welds—effects of thermal stresses in weld joints—design of brazed joints. Forging— Design factors for Forging— Closed die forging design— parting lines of die 5 drop forging die design—general design recommendations. Extrusion & Sheet Metal Work: Design guidelines for extruded sections- design principles for Punching, Blanking, Bending, and Deep Drawing— Keeler Goodman Forming Line Diagram—Component Design for Blanking.	
Unit V: ASSEMBLY	(6 Hrs.)
Assemble Advantages: Development of the assemble process, choice of assemble method assemble advantages social effects of automation.	
Automatic Assembly Transfer Systems: Continuous transfer, intermittent transfer, indexing mechanisms, and operator- paced free-transfer machine	
Unit VI: DESIGN OF MANUAL ASSEMBLY	(7 Hrs.)
Design for assembly fits in the design process, general design guidelines for manual assembly, development of the systematic DFA methodology, assembly efficiency, classification system for manual handling, classification system for manual insertion and fastening, effect of part symmetry on handling time, effect of part thickness and size on handling time, effect of weight on handling time, parts requiring two hands for manipulation, effects of combinations of factors, effect of symmetry effect of chamfer design on insertion operations, estimation of insertion time	
Total Lecture	
45 Hours	

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Textbooks:

1	Geoffrey Boothroyd, "Assembly Automation and Product Design", Marcel Dekker Inc., NY, 1992.
2	Engineering Design - Material & Processing Approach - George E. Deiter, McGraw Hill Intl. 2nd Ed. 2000.

Reference Books:




1	A Delbainbre "Computer Aided Assembly London, 1992
2	

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MOOCs Links and additional reading, learning, video material

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VI SEMESTER

22ME653 : PE III : Renewable Energy System

Course Outcomes:

Upon successful completion of the course, the students will be able to;

1. CO-01: Understand (BL-2), analyze (BL-4), and explain (BL-5) the physics and geometry of solar radiation along with its estimation (BL-6) (measurements).
2. CO-02: Identify (BL-3), analyze (BL-4), and explain/ evaluate (BL-5) various solar energy collectors, y and utilizing (BL-5) the knowledge of solar energy for useful applications.
3. CO-03: Understand (BL-2), analyse (BL-4), and justify (BL-5) the use of wind, Ocean, geothermal and Biomass energy with appropriate evaluation (BL-5) and discussion (BL-6).
4. CO-04: Understand (BL-2), analyze (BL-4), and discuss (BL-6) the concept of Magneto Hydro Dynamic power generation, fuel cell and Hydrogen as fuel.

Unit I:

(8 Hrs.)

Solar Energy: Introduction, solar constant, spectral distribution of solar radiation, beam & diffuse radiation, measurement of solar radiation and measuring instruments. Solar radiation geometry.

Types of solar collectors, Flat Plate & Concentrating Collectors.

Application of Solar Energy.

Unit II:

(7 Hrs.)

Biogas and Biomass: - Types of Biogas plants, Methods of Biogas generation, factors affecting the biogas generation.

Gasifiers: classification of gasifiers & basic constructional details and basic chemistry of gasification.

Unit III:

(8 Hrs.)

Wind energy: - Basic principle of wind energy conversion, wind velocity and power from wind; Basic components of wind energy conversion system (WECS); Classification of WECS- Horizontal axis- single, double and multiblade system. Vertical axis- Savonius and Darrieus types. applications of wind energy. Site selection, Merits & demerits of wind power generation.

Unit IV:

(7 Hrs.)

OTEC & Tidal energy: Introduction: - Principle of working, Rankine cycle, ocean thermal electric conversion open and closed cycle of OTEC, hybrid cycle, energy from tides basic principles of tidal power & components of tidal power plants, single & double basin arrangement, estimation of tidal power and energy, Advantages & Limitation of Tidal Power, Energy from ocean waves -energy availability, wave energy conversion devices.

Unit V:

(7 Hrs.)

Geothermal power generation: Geothermal energy: Introduction, Thermal Gradient Resources of Geothermal Energy: Hydrothermal, Petro-Geothermal, Geopressed sources, thermodynamics of geo- thermal energy conversion-electrical conversion, classification of geothermal systems vapour dominated system, liquid dominated system, total flow concept, Merits and Demerits of Geothermal Energy Sources, applications of geothermal energy.

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Unit VI:	(8 Hrs.)
Magneto Hydro Dynamic power generation: Introduction, working principles of MHD power generation, MHD open and closed systems, power output from MHD generators, design problems of MHD generation, gas conductivity, seeding, Application of MHD Power generation.	
Hydrogen & Fuel cells: Concept, key components, basics of physical and chemical phenomena in fuel cells, advantages and disadvantages, different types of fuel cells and applications, basic design of PEMFC system. basics of hydrogen production, Storage, Transportation and Safety.	
Total Lecture	45 Hours

Textbooks:			
SN	Author Name	Title	Publication
1.	Dr. S. P. Sukhatme	Solar Energy	Tata McGraw Hill
2.	Parulekar & Rao	Energy Technology	Khanna Publishers
3.	G D Rai	Non-Conventional Energy Sources	Khanna Publishers
4.	S. Hasan Saeed, D. K. Sharma	Non-Conventional Energy Sources	S. K. Kataria & Sons
5	G. N. TIWARI & M. K. GHOSHAL	RENEWABLE ENERGY RESOURCES	NAROSA PUBLISHING HOUSE
6	B H Khan	Non-Convention Energy Resources	McGraw Hill Education (India) Pvt. Ltd. 3rd Edition
7	D.P. Kothari, R. Rakesh and K.C. Singal,	Renewable Energy Resources and Emerging Technologies,	2nd Edition, Prentice India Pvt. Ltd, 2011.
8	G.S. Sawhney,	Non-Conventional Energy Sources,	1st Edition, Prentice India Pvt. Ltd, 2012.
9	Mehmet Kanoglu, Yunus A. Cengel, John M. Cimbala	FUNDAMENTALS AND APPLICATIONS OF RENEWABLE ENERGY	McGraw Hill Education (India)

Reference Books:			
SN	Author Name	Title	Publication
1.	John A. Duffie, William A. Beckman	Solar Energy	Wiley
2.	Jui Sheng Hsieh	Solar energy engineering	Prentice-Hall
3	Ashok V Desai	Non-Conventional Energy	Wiley Eastern Ltd, New Delhi 2003
4	Ramesh R & Kumar K U	Renewable Energy Technologies	Narosa Publishing House New Delhi
5	N.K. Bansal, Manfred Kleeman & Mechael Meliss	Renewable Energy Sources and Conversion Technology	Tata McGraw Hill. 2004

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1	E-book URL: https://www.pdfdrive.com/non-conventional-energy-sources-e10086374.html
2	E-book URL: https://www.pdfdrive.com/non-conventional-energy-systems-nptel-d17376903.html
3	E-book URL: https://www.pdfdrive.com/renewable-energy-sources-and-their-applications-e33423592.html
4	E-book URL: https://www.pdfdrive.com/lecture-notes-on-renewable-energy-sources-e34339149.html

MOOCs Links and additional reading, learning, video material

1.	https://onlinecourses.nptel.ac.in/noc21_me34/preview
2.	https://archive.nptel.ac.in/content/syllabus_pdf/121106014.pdf
3.	https://onlinecourses.nptel.ac.in/noc22_ch66/preview
4.	https://nptel.ac.in/courses/103103206
5.	https://onlinecourses.nptel.ac.in/noc22_ge14/preview
6.	https://nptel.ac.in/courses/108108078

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VI SEMESTER

22ME654 : PE III : Plastics and Composite

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. **IDENTIFY** of preparation and properties of polymers.
2. Understand and **Apply** the various molding techniques and also Generalize the basic concepts in mould design
3. Understand and **Apply** suitable machining and joining of plastic materials.
4. Understand and **Apply** suitable plastic composite fabrication technique

Unit I: Chemistry and Classification of Polymers	(8 Hrs.)
Properties of Thermo Plastics - Properties of Thermosetting Plastics - Applications - Merits and Disadvantages Definition - Addition and Condensation Polymerization, case study	
Unit II: Study of Extrusion, Casting and Blow Molding	(7 Hrs.)
Extrusion - Blow Molding - Casting - Thermo Forming - Rotomolding Study of molds. Case study	
Unit III: Study of Compression, Injection and Transfer Molding	(8 Hrs.)
Compression and Transfer Molding - Injection Molding- study of compression and injection molding moulds Case study	
Unit IV: General Machining properties of Plastics	(7 Hrs.)
Machining Parameters and Their effect - Joining of Plastics -Mechanical Fasteners - Thermal bonding - Press Fitting. Testing of plastic. Case study	
Unit V: Fibers - Glass, Boron, Carbon, Ceramic, and Metallic Fibers	(8 Hrs.)
Matrix Materials - Polymers, Metals and Ceramics. Open Mould Processes, Bag Molding, Compression Molding with BMC and SMC - Filament winding - Pultrusion - Centrifugal Casting - Injection Molding - Application of PMC's. Case study	
Unit VI: Solid State Fabrication Techniques and Liquid State Fabrication Method	(7 Hrs.)
Diffusion Bonding - Powder Metallurgy Techniques - Plasma Spray, Chemical and Physical Vapor Deposition of Matrix on Fibers - Liquid State Fabrication Methods - Infiltration - Squeeze Casting - Rheo Casting - Compocasting - Application of MMCS. Case study	
Total Lecture	45 Hours

Textbooks:

1. F.ohannaber., Injection Moulding Machines, Hanser Publishers,, 1983.
2. F.Hensen., Plastics Extrusion technology, 1988
3. C.Rauwendaal., Polymer extrusion, Hanser Publishers, 1990.
4. D.V.Rosatao., Blow Moulding Handbook., Hanser Publishers,
5. S Kalpakjian& SR Schmid ., Manufacturing Engineering & Technology., Pearson Education Canada., 6st Edition (2013)

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Reference Books:

- | | |
|----|---|
| 1. | Akira Kobayashi., Machining of Plastics., Mc-Graw Hill., 1981 |
| 2. | E.B Seamour., Modern Plastics Moulding., John Wiley. |

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| 1 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf |
| 2 | chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf |

MOOCs Links and additional reading, learning, video material

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| 1. | https://www.youtube.com/watch?v=nGfVTNfNwnk |
| 2. | https://www.youtube.com/watch?v=6nguX-cEsvw |

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VI SEMESTER

22ME655 : PE III : Tribology in Manufacturing

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. **IDENTIFY** of preparation and properties of polymers.
2. Understand and **Apply** the various molding techniques and also Generalize the basic concepts in mould design
3. Understand and **Apply** suitable machining and joining of plastic materials.
4. Understand and **Apply** suitable plastic composite fabrication technique

Unit I: Introduction

(8 Hrs.)

Introduction to tribology, History of tribology, Interdisciplinary Approach, Economic Benefits.

Unit II: Friction

(7 Hrs.)

Causes of Friction, Adhesion Theory, Abrasive Theory, Junction Growth Theory, Laws of Rolling Friction, Friction Instability.

Unit III: Wear

(8 Hrs.)

Wear Mechanisms, Adhesive Wear, Abrasive Wear, Corrosive Wear, Fretting Wear, Wear Analysis

Unit IV: Lubrication and Lubricants

(7 Hrs.)

Importance of Lubrication, Boundary Lubrication, Mixed Lubrication, Full Fluid Film Lubrication; Hydrodynamic, Elastohydrodynamic lubrication, Types & Properties of Lubricants, Lubricants Additives.

Unit V: Fluid film lubrication

(8 Hrs.)

Fluid mechanics concepts, Equation of Continuity & Motion, Generalised Reynolds Equation with Compressible & Incompressible Lubricants.

Unit VI: Application Tribology

(7 Hrs.)

Introduction, Rolling Contact Bearings, Gears, Journal Bearings - Finite Bearings.

Total Lecture 45 Hours

Textbooks:

1. Dowson D, History of Tribology, Longman London, 1979.
2. Stachowiak G N, Batchelor A W and Stachowick G B "Experimental methods in Tribology", Tribology Series 44, Editor D Dowson, 2004.
3. Michael M Khonsari, Applied Tribology (Bearing Design and Lubrication), John Wiley & Sons, 2001.

Reference Books:

1. Jost H P, Lubrication (Tribology) : A Report on the present position and industry's needs, Her Majesty's Stationary Office, London, 1966.
2. J Halling, Principles of Tribology, The Macmillan Press Ltd, London, 1975
3. Archard J F and Hirst W, The Wear of Metals under Unlubricated Conditions, Proc. R. Soc., London, A 236, 397-410, 1956.

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2	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf

MOOCs Links and additional reading, learning, video material

1.	https://www.youtube.com/watch?v=nGfVTNfNwnk
2.	https://www.youtube.com/watch?v=6nguX-cEsvw

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VI SEMESTER

22ME656 : PE III : Finance & Cost Management

Course Outcomes :

Upon successful completion of the course, the students will be able to;

1. Analyze the cost of the product
2. Analyze the financial balance sheet.
3. Evaluate the overhead cost.
4. create new products from waste or scrap

Unit I: Business Finance

(8 Hrs.)

Need for finance, sources of finance (fixed and working capital), equity and preference shares, deposits from public, debentures, bonds, term loans, financial institutions in India, Financial statements and their analysis

Unit II: Concept of Cost

(7 Hrs.)

Concept of cost, classification of cost, direct and indirect , fixed and variable , semi variable, product and period, controllable and uncontrollable costs, opportunity costs , sunk cost, joint cost, prime cost, factory cost, cost of production, selling and distribution cost, administrative cost, cost of sales

Unit III: Cost ascertainment and cost reduction

(8 Hrs.)

Concept of overhead, collection of overheads, allocation and appointment, absorption of overheads, absorption rates, under – over absorption , cost centers, cost units, cost statement sheet. Areas of cost reduction, techniques, productivity

Unit IV: Costing System

(7 Hrs.)

Job costing, contract costing, cost plus contracts, batch costing, process costing, simple process costing, normal abnormal losses and gains, waste, scrap & spoilage, joint & byproducts, operating costing

Unit V: Cost Planning and Control

(8 Hrs.)

Concept of budgeting, advantages and limitations, budgetary control, key factors, fixed and flexible budget. Standard costing, selling of standards, variance analysis.

Unit VI: Decision Making

(7 Hrs.)

Marginal costing, break even analysis, cost volume, profit analysis, application of costing to various decisions like make or buy, add or drop products, cost or process further, operate or shut down, replace or retain

Total Lecture 45 Hours

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Text books:				
S.N.	Title of the book	Edition (Year of publication)	Author(s)	Publisher
1	Principles and Practice of Cost Accounting	Fifth edition	N.K. Prasad	Pearson Education
2	Management Accountancy	Third edition 2010	J. Batty	Tata Mc Graw Hill
3	Financial Management	2007	Prasanna Chandra	Tata Mc Graw Hill
Reference books:				
1	Engineering Economy	1973	Paul Degarmo	Macmillan, 1973
2	Cost Accounting	2008	B.K. Bhar	Academic publishers
3	Costing and finance management	2012	Mrunalini Naik	Thakur publications

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1	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/79.%20Engineering%20Mechanics.%20Statics-%20MERIAM%20%20AND%20KRAIGE.pdf
2	chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Civil%20Engineering/81.%20Engineering%20Mechanics%201.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=nGfVTNfNwnk
2.	https://www.youtube.com/watch?v=6nguX-cEsvw

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**SoE No.
22ME-101**

B.Tech in Mechanical Engineering

VI SEMESTER

22ME657 : PE III : Maintenance Management

Course Outcomes:

Upon successful completion of the course the students will be able to

- CO1: Apply and Demonstrate** the maintenance function, , classification and condition monitoring of mechanical systems
- CO2: Analysed** the failure of a machine and plan the maintenance program for equipments.
- CO3: Calculate** repair and maintenance cost and evaluate maintenance performance
- CO4: Interpret** maintenance needs of mechanical devices and assistance of CAMS.

Unit:1	Introduction	7 Hours
Maintenance – basic concepts, purpose, functions and objectives of maintenance, Principles, benefits and effects of maintenance, Inter-relationship between productivity, quality, reliability and maintainability, maintenance productivity ,quality in maintenance. Reliability, basic concepts, bathtub curve, failure rate, mean time before failure. System reliability, reliability of series and parallel systems. Maintainability, mean time to failure, mean time to repair. Availability–Contemporary Issues related to Topic		
Unit:2	Types of Maintenance	7 Hours
Maintenance strategies / systems–type – basis for selection. Breakdown maintenance, corrective maintenance. Preventive maintenance, Predictive maintenance. Reliability centered maintenance (RCM), replacement policies–cyclic replacement, group replacement, standbys, economics of machine replacement, , Dismantling and assembling, Inspection and adjustments, Lubrication, maintenance welding, maintenance machining, , material improvement, maintenance cleaning		
Unit:3	Condition Based Maintenance	7 Hours
Condition based maintenance and condition monitoring – monitoring systems. Performance monitoring – visual, tactile and aural monitoring, leakage monitoring. Temperature monitoring Thickness monitoring, acoustic monitoring Smell / odour monitoring. Vibration monitoring –vibration analysis. Vibration transducers– types. Lubricant monitoring filter debris analysis spectroscopic oil analysis, Contemporary Issues related to Topic		
Unit:4	Failure analysis	6 Hours
Failure analysis: Defect and failure – definitions – basics of failures – failure generation – failure analysis. Fault tree analysis (FTA), Event tree analysis (ETA), Root cause analysis (RCA), Failure modes and effects analysis (FMEA), Failure mode effect criticality analysis, , Contemporary Issues related to Topic		
Unit:5	Advanced Maintenance	7 Hours
Total productive maintenance (TPM) , basic systems of TPM, TPM and terotechnology. Six sigma maintenance. Lean maintenance – 5-zero maintenance concept, 5-S maintenance conceptsix pillars, and success factors. Maintenance effectiveness, overall equipment effectiveness, key performance indicators, maintenance performance measuring indices, , Contemporary Issues related to Topic		
Unit :6	Maintenance planning and scheduling	7 Hours
Maintenance planning and scheduling. Maintenance organization, objectives and characteristics centralized and decentralized maintenance. Maintenance costs, classification of maintenance costs – maintenance cost analysis cost effectiveness analysis.– preparation of maintenance budget, Approach towards computerization, selection and scope of computerization, equipment classification, preventive maintenance and repair planning module, material management module, captive engineering shop module, Contemporary Issues related to Topic		
Total Lecture Hours		39 Hours

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22ME-101

Text books

1 Industrial Maintenance management by S.K.Shrivastava, S.Chand Publication

Reference books:

S.N	Title of the book	Edition (Year of publication)	Author(s)	Publisher
1	Maintenance engineering handbooks	2008	Mobley and Higgins	Mc-graw Hill
2	Guide to Complete Maintenance	1988.	Rolston, D.W	Heintzelment
3	Maintainability and maintenance management	1991	J. Patton	Maus, R. and Keyes
4	Total Productive Maintenance by Terry Wireman , Industrial Press, 2004 (http://www.books24x7.com/)	Total Productive Maintenance by Terry Wireman , Industrial Press, 2004 (http://www.books24x7.com/)	Total Productive Maintenance by Terry Wireman , Industrial Press, 2004 (http://www.books24x7.com/)	Total Productive Maintenance by Terry Wireman , Industrial Press, 2004 (http://www.books24x7.com/)
5	Introduction to reliability and maintainability Engineering.	--	Thomos Ebellling	Mc-graw Hill
6	Advanced operations management		R.P.Mohanty and S.G.Deshmukh	Pearson Education

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B.Tech in Mechanical Engineering

VI SEMESTER

22ME671 : OE III : Operations Research Techniques

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Recognise the importance of Optimisation in solving practical problems in industry.
2. Formulate real world decision making scenarios in to mathematical models.
3. Understand Operations Research models and apply them in the field of manufacturing, finance, Project management, human resource management etc.
4. Use optimisation tools to solve a mathematical model for a practical problem.

Unit:1	Linear Programming Problems:	7 Hours
Introduction to Linear Programming Problems: Formulation of LPP, Geometry of LPP and Graphical Solution of LPP, Simplex Method, Big M- Method, Two Phase Method		
Contemporary Issues related to Topic		
Unit:2	Transportation Problem:	8 Hours
Introduction - Formulation - Solution of the transportation problem (Min and Max): Northwest Corner rule, row minima method, column minima method, Least cost method, Vogel's approximation method – Optimality test: MODI method. Assignment Model		
Contemporary Issues Related to Topic		
Unit:3	Dynamic programming:	8Hours
Dynamic programming characteristics, approach and its formulations. Application of Dynamic programming in Employment smoothening problem, Resource allocation, Inventory control & Linear programming.		
Contemporary Issues related to Topic		
Unit:4	Project Management:	7 Hours
Project Management: Network Scheduling by CPM & PERT, Cost considerations in PERT and CPM		
Contemporary Issues related to Topic		
Unit:5	Replacement Models:	8Hours
Replacement Models: Replacement of Models that deteriorate with time, Concept of equivalence, Interest Rate and Present worth. Replacement of items that fails suddenly considering Individual and Group replacement policy.		
Contemporary Issues Related to Topic		
Unit :6	Queuing Theory and Simulation:	7 Hours
Queuing Theory: Queuing Systems, Kendellalls for representing queuing models, Classification of queuing models (No derivations expected), Simulations, Monte- Carlo Simulation.		
Contemporary Issues related to Topic		
Total Lecture Hours		45 Hours

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Text books

1 Taha, H.A., "An Introduction to Operations Research", 6th Ed., Prentice Hall of India, 2001

Reference Books

1 Hillier, F.J., Lieberman, G.J., "Introduction to Operations Research" 7th Ed., Holden Day Inc., 2001

2 Gross, D., and Harris, C.M., "Fundamentals of Queuing Theory", 2nd Ed., John Wiley & sons, NY, 1985

3 Panneer selvam R., Operations Research, PHI, 2011

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1 [http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20\(ER%20Series\).pdf](http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20(ER%20Series).pdf)

2 [http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20\(E%20Series\).pdf](http://103.152.199.179/YCCE/Supported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20(E%20Series).pdf)

MOOCs Links and additional reading, learning, video material

1 <https://youtu.be/8jaleXu5mzs>

2 <https://youtu.be/AAeXqnhwPZ4>

3 <https://www.digimat.in/nptel/courses/video/112106134/L02.html>

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VI SEMESTER

22ME672 : OE III : Automobile Engineering

Course Outcomes:

Upon successful completion of the course the students will be able to

1. analyze various systems of Engine, its function including fuel supply, cooling and lubrication system in vehicle.
2. describe various power transmission systems from clutch to wheel in vehicle.
3. evaluate and describe control systems like steering and brakes in vehicle.
4. illustrate and describe the necessary electrical and luxurious systems and safety system in vehicle.

Unit:1	Power Plant	8 Hours
Introduction, classification, history & development of Automobiles. Vehicles layout, Various engine systems and components, construction & working of I.C. engines.		
Introduction to Fuel supply system: for Petrol and Diesel Engine, CRDI, GDI, EFI, MPFI, Engine fuels: Gasoline, diesel, bio-diesel, CNG.		
Engine cooling and lubrication systems.		
Contemporary Issues related to Topic : Power system : electrical, hybrids, solar, wind, compressed air, fuel cell, hydrogen etc.		
Unit:2	Transmission	8 Hours
Clutch: Necessity, requirements & Types of a clutch		
Gear box: Classification, Necessity & working principle of gear box, Propeller shaft, Slip & Universal joints.		
Differential: Need and working, Differential lock, Rear Axles and Front Axles.		
Contemporary Issues related to Topic: Introduction to Automatic Transmission: Fully and Semi-automatic.		
Unit:3	Steering, Suspension & Brakes	8 Hours
Steering systems: principle of steering, steering linkages, steering geometry and wheel alignment, steering gear box and its types.		
Suspension systems: Function, conventional and Independent suspension System, shock absorber.		
Brakes: Drum and Disc brakes, Comparison, Mechanical, hydraulic, Air brakes.		
Contemporary Issues related to Topic: Power steering		
Unit:4	Wheels & vehicle dynamics	7Hours
Wheel and Tyres: Construction & classification of wheels & Tyres, tyre specification, factors affecting tyre performance.		
Resistance to vehicle motion: Air, Road and gradient resistance and power calculation, Low and high speed turning, tyre cornering forces, Vehicle aerodynamics and its necessity.		
Contemporary Issues related to Topic: Race car aerodynamics		

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Unit:5	Electrical systems	7 Hours
Electrical systems: Battery construction. Specification. Operation of Batteries. Charging of battery, Alternator, Starting system, Battery Ignition and magneto ignition systems, Lighting, Horn, Side indicator, wiper, and other electrical systems, Automobile air-conditioning, Panel Board instruments.		
Contemporary Issues related to Topic: Introduction to EV's		
Unit :6	Maintenance & Safety	7 Hours
Engine overhauling, Engine tune up, Tyre rotation & balancing, Fault detection techniques and remedies. Collision avoidance system and vehicle to vehicle communication, Airbags system, EBD, ABS and other safety features, cruise control.		
Contemporary Issues related to Topic: Navigation system and control.		
Total Lecture Hours		45 Hours

Text books	
1	Singh Kirpal, Automobile Engineering, Volume 1 & 2, Standard publishers and distributors, 14th Edition, 2021
Reference Books	
1	Ganesan V, Internal Combustion Engines, 4th Edition, McGraw Hill Education, 2012.
2	Rajpoot R K, A text book of Automobile Engineering, Laxmi publications (P) Ltd., 1st Edition, 2007.
3	Sethi H M, Automotive Technology, McGraw-Hill Education, 1991
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/10.1002/9781118536186
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/107/106/107106088/

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VI SEMESTER

22ME673 : OE III : Robotics and Subtractive Manufacturing

Course Outcomes:

Upon successful completion of the course, the students will be able to

1. Understand workings of subtractive manufacturing
2. Implement CNC programs for various product manufacturing
3. have knowledge of Robotics, automation, robotics motion, sensors, robotic programming and roles of robots in the industry
4. Understand the working methodology of robotics and automation, motion and control, machine vision and programming, and application of robots in industry.

Unit:1	8 Hours
Concepts of NC, CNC, DNC. Classification of CNC machines, MCU architecture and functionality, Machine Configurations, Types of control, CNC controller's architecture and characteristics, Interpolators.	
Unit:2	7 Hours
Positioning system, Cutter offset compensation, Word address format, Introduction to G and M codes Manual part programming for CNC turning, milling and drilling.	
Unit:3	8 Hours
Tooling system for Machining center and Turning center, work holding devices, of CNC Machines. APT part programming, CAD/CAM programming, Simulation and Verification of CNC programs, Adaptive CNC control techniques. Integration of CNC machines for CIM.	
Unit:4	7 Hours
Robot – Definition – Robot anatomy – Co-ordinate systems, work envelope, types and classification – Specifications – Pitch, yaw, roll, joint notations, speed of motion and pay load – Robot parts and their functions – Need for robots – Different applications.	
Unit:5	8Hours
Forward kinematics – Inverse kinematics – Differences: Forward kinematics and Reverse kinematics of manipulators with two and three degrees of freedom (In 2 dimensional), four degrees of freedom (In 3 dimensional) – Deviations and problems ,Introduction to DH notations	
Unit :6	7 Hours
ROBOT PROGRAMMING	
Teach pendant programming – Lead through programming – Robot programming languages – VAL programming – Motion commands – Sensor commands – End effector commands – Simple programs.	
IMPLEMENTATION	
Implementation of robots in industries – Various steps - Safety considerations for robot operations.	
Total Lecture Hours	
45 Hours	

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Text books

- 1 Robot Engineering An Intergrated approach 2004 Klafter R.D., Chmielewski T.A. and Negin M Springer
- 2 Industrial Robotics: Technology, Programming and Applications, 2012 Mikell P. Groover, Mitchel Weiss, Roger N. Nagel, Nicholas G. Odrey and Ashish Dutta 2nd Edition, Tata McGraw Hill, 2012.
- 3 Automation in Production system 2002 Mikell P. Groover Prentice-Hall of India Pvt. Ltd., New Delhi, 2002

Reference Books

- 1 CNC Technology and Programming 2003 Krar, S., and Gill Industrial Press Inc
- 2 An Introduction to CNC Machining 1991 Gibbs, D. Industrial Press
- 3 Computer Numerical Control Concepts and Programming 1991 Seames, W.S. Thomson Learning EMEA, Limited

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- 2 [http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20\(E%20Series\).pdf](http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20(E%20Series).pdf)

MOOCs Links and additional reading, learning, video material

- 1 <https://youtu.be/8jaIeXu5mzs>
- 2 <https://youtu.be/AAeXqnhwPZ4>
- 3 <https://www.digimat.in/nptel/courses/video/112106134/L02.html>

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B.Tech in Mechanical Engineering

VI SEMESTER

22ME674 : OE III : Control System Engineering

Course Outcomes :

Upon successful completion of the course, the students will be able to;

- Illustrate the mathematical representation of various control system and determine the transfer function of mechanical, electrical, thermal and fluid system.
- Analyse the working of various control system components of electrical motor and hydraulic system..
- Evaluate the performance of control system using time response analysis.
- Create the performance of control system on the basis of frequency response and root locus and design suitable compensation for the control system.

I	Introduction:- Introduction, System concept Open and Closed loop control systems. Transfer function, Mathematical Modelling of Physical System and system representation through Block Diagram. Transfer function through Block Diagram Simplification. Signal Flow Graph, Masons Gain Formula Block diagrams of various control systems. (CO-1)
II	Mathematical Modelling:- Representation of Control components: Mechanical and Electrical components; Analogous systems. (CO-1)
III	Electrical system:- Ac/dc servomotors; field controlled and armature-controlled servomotors; positional servomechanisms, Potentiometer, Synchro, stepper motors. Hydraulic systems: - Hydraulic pumps (gear; vane; and reciprocating piston) Cylinders, Direction control valves (2, 3, 4 way) Flow control valve; Relief valve Hydraulic servomotor (CO-2)
IV	Time response analysis:- Transient and steady state response of first and second order systems Concept of stability; relative stability; Routh stability criteria. (CO-2)
V	Bode and Polar plot:- Frequency response and its characteristics; Bode plots; Polar plots, Nyquist plots. Gain margin and phase margin. Identification of system transfer function (CO-3)
VI	Root Locus:- Basic control actions; Proportional Integral and Derivative control actions and their effect on system performance. Root locus technique. Introduction to control system design log load compensation Feed Back Compensation and Pole -Zero placements (CO-4)
	Total Lecture : 45 Hours

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Text books

- | | |
|---|--|
| 1 | Modern Control Engineering 3rd Edition (2009) Ogata Prentice Hall |
| 2 | Control system Engineering 4th Edition (2007) Nise John Wiley & Sons |

Reference Books




- | | |
|---|--|
| 1 | Control system 4th Edition (2009) Nagrath & Gopal New Age International |
| 2 | Modern Control System 12th Edition (2009) Dorf Pearson |

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|---|---|
| 1 | https://onlinelibrary.wiley.com/doi/10.1002/9781118536186 |
|---|---|

MOOCs Links and additional reading, learning, video material

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|---|---|
| 1 | https://archive.nptel.ac.in/courses/107/106/107106088/ |
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VI SEMESTER

22ME691 : OE IV : Total Quality Management

Course Outcomes :

Upon successful completion of the course, the students will be able to

1. Develop an understanding on quality management philosophies and frameworks.
2. Develop in-depth knowledge on various tools and techniques of quality management.
3. Evaluate the applications of quality tools and techniques in both manufacturing and service industry
4. Analyze quality management methods and solving problems of organization

Unit:1	7 Hours
Principles of Quality Management, Pioneers of TQM, Quality costs, Quality system Customer Orientation, Benchmarking, Re-engineering	
Unit:2	7 Hours
Leadership, Organizational Structure, Team Building, Information Systems and Documentation – Quality Auditing, ISO 9000 - QS 9000.QMS, Quality awards.	
Unit:3	8 Hours
Single Vendor Concept, J.I.T., Quality Function deployment, Quality Circles, KAIZEN, SGA POKA -YOKE, Taguchi Methods. SMED, Kanban system. Cost of quality. Robust design	
Unit:4	7 Hours
Methods and Philosophy of Statistical Process Control, Control Charts for Variables and Attributes	
Unit:5	8 Hours
Cumulative sum and exponentially weighted moving average control charts, Others SPC Techniques – Process Capability Analysis. Acceptance Sampling Problem, Single Sampling Plans for attributes, double, multiple and sequential sampling,	
Unit :6	8 Hours
Six sigma manufacturing concepts. Six-sigma philosophy Quality strategy and policy. Motivation and leadership theories. Continuous vs. breakthrough improvements. Management of change, DMAIC Methodology. Lean manufacturing	
Total Lecture	45 Hours

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Text Books

1	Total Quality Management for Engineers 1991 Mohamed Zairi Woodhead Publishing Limited 1991
2	Production and Operations management - Total Quality and Responsiveness 1995 Harvid Noori and Russel McGraw-Hill Inc, 1995 3rd Edition
3	Managing for Total Quality 1998 N.Logothetis Prentice Hall of India Pvt .Ltd,1998

Reference Books

1	The Essence of Total Quality Management 1995 John Bank Prentice Hall of India Pvt. Ltd., 1995.
2	Introduction to Statistical Quality Control 1991 Douglas C. Montgomery 2nd Edition, John Wiley and Sons, 1991.
3	Statistical Quality Control 1984 Grant E.L and Leavensworth McGraw-Hill, 1984.

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VI SEMESTER

22ME692 : OE IV : Reliability Engineering

Course Outcomes :

Students will be able to:

1. Interpret Reliability, Maintainability, and Availability of engineering systems.
2. Apply Reliability Modeling as a tool for evaluating system performance.
3. Analyze the failure of a machine and the failure rate of systems or components
4. Create production & maintenance schedules of particular engineering systems using various tools used for failure data analysis.

Unit I: Fundamental concepts

(8 Hrs.)

Reliability definitions, failure, Failure density, Failure Rate, Hazard Rate, Mean Time To Failure, MTBF, maintainability, availability, safety and reliability, Quality, cost and system effectiveness, Life characteristic phases, modes of failure, Quality and reliability assurance rules, product liability, Importance of Reliability,

Unit II: Probability theory:-

(7 Hrs.)

Set theory, laws of probability, total probability theorem, probability distributions, parameters and applications.

Unit III: System reliability and modelling:

(7 Hrs.)

Series and parallel components, mixed configuration, complex systems. Redundancy, element redundancy, unit redundancy, standby redundancy. Types of standby redundancy, parallel components. Markov models for reliability estimation.

Unit IV: Maintainability and Availability:

(8 Hrs.)

Objectives of maintenance, types of maintenance, Maintainability, factors affecting maintainability, system downtime. Availability - Inherent, Achieved, and Operational availability, reliability, and maintainability trade-off. Markov models for availability estimation.

Unit V: System Reliability Analysis:

(7 Hrs.)

Reliability allocation or apportionment. Reliability apportionment techniques. Reliability block diagrams and models. Reliability predictions. Life testing and accelerated testing.

Unit VI: Strength-based reliability:

(8Hrs.)

Safety factor, safety margin, Stress strength interaction, Failure Mode, Effects and Criticality Analysis-, FMECA examples, Ishikawa diagram .fault tree construction, basic symbols development of functional reliability block diagram, Fault tree analysis, fault tree evaluation techniques, Design of Mechanical components and systems:-Material strengths and loads.

Total Lecture 45 Hours

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Text Books

1	Concepts of Reliability Engg 1985 L.S. Srinath Affiliated East-Wast Press (P) Ltd
2	Reliability Engineering 1983 A.K. Govil Tata McGraw-Hill Publishing Co. Ltd
3	Reliability Engineering 1984 E. Balagurusmy Tata McGraw-Hill Publishing Co. Ltd

Reference Books

1	Engineering Reliability 1980 B.S. Dhillion, C. Singh John Wiley & Sons
2	Probabilistic, Reliability 1968 M.L. Shooman McGraw-Hill Book Co.,
3	Reliability in Engineering Design 1977 K.C. Kapur, L.R. Lamberson John-Wiley and sons.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

1	
2	
MOOCs Links and additional reading, learning, video material	
1	

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Mechanical Engineering)

SoE No.
22ME-101

B.Tech in Mechanical Engineering

VI SEMESTER

22ME693 : OE IV : Power Generation Engineering

Course Outcomes:

Students will be able to:

1. Analyze and compare the various Thermal power plants.
2. Analyze the hydroelectric and nuclear power plant
3. Evaluate and compare the economics of various power plants.
4. Interpret the non-conventional and combined operations of different power plants.

Unit:1 THERMAL POWER PLANT- I	8 Hours
Introduction to thermal power plants and power plant layouts. Site selection. Fuel characteristics, handling, storage, preparation & firing methods. Ash & dust collection and handling. • Boiler: classification, general arrangement, details of different components and system like draught system, steam turbine systems, condenser, cooling towers	
Unit:2 THERMAL POWER PLANT- II	7 Hours
Gas Turbine Power Plant: -Introduction, power plant layouts, Open cycle, close cycle power plants. Various components and systems. Methods to improve efficiency. Reheat and Regeneration cycle and their combinations Diesel Electric Power Plant: - Introduction, Outline, type of engines, different components, performance, plant layout. Comparison with other power plant. (visit to nearby power plant shall be arrange for the students)	
Unit:3 HYDROELECTRIC POWER PLANT.	8 Hours
Hydrology: - Rainfall, Runoff, Hydro graph, flow duration curve, mass curve. Hydroelectric power plant: - Site selection, classification of hydroelectric power plant, general arrangement, details of different components, turbine selection. Governing. • Comparison with other power plant.	
Unit:4 POWER PLANT ECONOMICS	7 Hours
Load Analysis - Fluctuating Load on power plants, Load curves, various terms & definition, peak load, effect of fluctuating load. • Economic Analysis: - Cost of electric energy	
Unit:5 NUCLEAR POWER PLANT	8Hours
ion to Nuclear Engineering, Global scenario, prominent installations worldwide, present & proposed nuclear plant in India. Nuclear Reactors: - Types of reactors, PWR, BWR, CANDU, Gas cooled, liquid metal cooled, Breeder reactor. Operational requirements and difficulties, site selection for location of a nuclear power station Nuclear Waste Disposal. • Comparison with other power plant.	

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(Department of Mechanical Engineering)

**SoE No.
22ME-101**

B.Tech in Mechanical Engineering

Unit :6 COMBINED OPERATION OF DIFFERENT POWER PLANTS	7 Hours
Combined operation: - Need division, combination of different plant & their coordination, advantages.	
NON-CONVENTIONAL POWER GENERATION SYSTEMS	
Introduction to Non-Conventional power Generation Systems • Geo-Thermal Power Plant, Tidal Power Plant, Wind Power Plant, Solar Power Plant.	
Total Lecture Hours	45 Hours

Text books

- 1 "Power Plant Engineering" by A.K. Raja, Amit Prakash Srivastava, and Manish Dwivedi, published in its 1st edition by New Age International Publisher
- 2 "Power Plant Engineering" by Frederick T. Morse, now in its 3rd edition and published by Van Nostrand Reinhold
- 3 "Power Plant Engineering" by P.K. Nag, which is currently in its 4th edition and published by McGraw Hill Education

Reference Books

- 1 Power Plant Engineering Larry Drbal, Kayla Westra, and Pat Boston 1st Edition Springer

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- 1 [http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20\(ER%20Series\).pdf](http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/MECHANICAL%20ENGINEERING%20(ER%20Series).pdf)
- 2 [http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20\(E%20Series\).pdf](http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/MECHANICAL%20ENGINEERING/PRODUCTION%20ENGINEERING%20(E%20Series).pdf)

MOOCs Links and additional reading, learning, video material

- 1 <https://youtu.be/8jaleXu5mzs>
- 2 <https://youtu.be/AAeXqnhwPZ4>
- 3 <https://www.digimat.in/nptel/courses/video/112106134/L02.html>

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(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Mechanical Engineering)

B.Tech in Mechanical Engineering

SoE No.
22ME-101

VI SEMESTER

22ME694 : OE IV : Project Evaluation & Management

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Examine and screen project ideas.
2. Analyze the Technical and Economical feasibility of the project.
3. Design and analyze the project and prepare project report
4. Evaluate the project on Economical, Social and Environmental aspects.

Unit:1	Project Identification	7 Hours
Project identification considering objectives - B2B, B2C and SWOT analysis, Screening of Project Ideas, Technical, Market, Financial, Socioeconomic and Ecological Appraisal of a project, demand forecasting, secondary data, accuracy, confidence level, uncertainty.		
Contemporary Issues related to Topic		
Unit:2	Technical feasibility	7 Hours
Technical feasibility- Process selection, Level of automation, Plant capacity, Acquiring technology, Appropriate technology Plant location, Skill requirement & availability of Manpower- Both white collar & Blue collar, Equipment selection & procurement, Govt. policies, Value analysis and project evaluation.		
Contemporary Issues related to Topic		
Unit:3	Economic feasibility	9 Hours
Economic feasibility- Cost of Project, working capital analysis, fixed cost, means of finance, estimation of sales & production, price analysis, Break-even point, Projected cash flow statements, projected balance sheet, projected profit & loss statement, projected cash flow, rate of return, Discounted payback period, cost benefit analysis, return after taxes.		
Contemporary Issues related to Topic		
Unit:4	Project Planning and Control	7 Hours
Project Planning and Control:- Work break down structure and network development, Basic Scheduling, Critical Path and four kinds of floats, Scheduling under probabilistic durations, Time Cost tradeoffs, CPM, PERT, Optimum project duration, resource allocation, updating.		
Contemporary Issues related to Topic		
Unit:5	Project report	7 Hours
Project report- Preparation of project report, Project safety management, risk analysis, sensitivity analysis, methods of raising capital		
Contemporary Issues related to Topic		

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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(Department of Mechanical Engineering)

**SoE No.
22ME-101**

B.Tech in Mechanical Engineering

Unit:6	Project review	8 Hours
Initial review, pre commissioning safety review , performance analysis, ratio analysis, sickness, project revival, Project Monitoring with PERT/Cost, Organizational aspects, Computer packages and Project Completion environmental & social aspects.		
Contemporary Issues related to Topic		
Total Lecture Hours		45 Hours

Text books	
1	Prasanna Chandra, Projects, 9th Edition, McGraw Hill Education (India) Private Limited, 2019
Reference Books	
1	L. S. Srinath, PERT and CPM-Principles and Application, 3 rd Edition, East West publisher, 2001
2	M. Y. Khan and P. K. Jain, Financial Management, Tata McGraw Hill Education Private Limited, 6 th edition, 2011
3	R. Panneerselvam, Engineering Economics, PHI Learning Private Limited, New Delhi, 2 nd edition, 2014
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2	
MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/110107081
2	https://nptel.ac.in/courses/110104073

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
22ME-101**

VI SEMESTER 22ME604 : PROJECT PHASE-1

COURSE OUTCOME

On successful completion of the course students will be able to:

- Demonstrate a sound technical knowledge of their selected project topic.
- Undertake problem identification, formulation and solution.
- Design engineering solutions to complex problems utilizing a systems approach including ability to work in a team.
- Communicate effectively to discuss and solve engineering problems.

The group of students will continue to work for the project allotted previously and will submit a project report based on their studies. Evaluation will be done continuously and viva voce conducted at the end of the semester.

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2022




(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Mechanical Engineering)

B.Tech in Mechanical Engineering

**SoE No.
22ME-101**

**Audit Course
VI SEMESTER
MLC2126: YCAP6**

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Electrical Engineering

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

(Accredited 'A' Grade by NAAC with a score of 3.25)

Hingna Road, Wanadongri, Nagpur - 441 110



Bachelor of Engineering SoE & Syllabus 2018 3rd to 8th Semester Electrical Engineering



Electrical Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
TOTAL FIRST & SECOND SEM										47				
Third Semester														
1	3	BS	GE2201	Engineering Mathematics III	T	3	0	0	3	3	30	20	50	3 Hours
2	3	PC	EL2201	Analog Electronics	T	3	0	0	3	3	30	20	50	3 Hours
3	3	PC	EL2202	Lab. : Electronics Engineering Workshop	P	0	0	2	2	1		60	40	
4	3	PC	EL2203	Electrical Machines	T	4	0	0	4	4	30	20	50	3 Hours
5	3	PC	EL2204	Lab.:Electrical Machines	P	0	0	2	2	1		60	40	
6	3	PC	EL2205	Network Analysis	T	3	0	0	3	3	30	20	50	3 Hours
7	3	PC	EL2206	Lab.:Computer Programming	P	0	0	2	2	1		60	40	
8	3	PC	EL2207	Electrical Measurement & Instrumentation	T	3	0	0	3	3	30	20	50	3 Hours
9	3	PC	EL2208	Lab.:Electrical Measurement & Instrumentation	P	0	0	2	2	1		60	40	
TOTAL						16	0	8	24	20				

Fourth Semester														
1	4	BS	GE2204	Advance Mathematical Techniques	T	3	0	0	3	3	30	20	50	3 Hours
2	4	PC	EL2251	Electrical Machines in Power System	T	3	0	0	3	3	30	20	50	3 Hours
3	4	PC	EL2252	Lab.:Electrical Machines in Power System	P	0	0	2	2	1		60	40	
4	4	PC	EL2253	Electrical Energy Generation System	T	3	0	0	3	3	30	20	50	3 Hours
5	4	PC	EL2254	Lab.:Renewable Energy System	P	0	0	2	2	1		60	40	
6	4	PC	EL2255	Electric & Magnetic Fields	T	3	0	0	3	3	30	20	50	3 Hours
7	4	PC	EL2256	Lab.:Electrical Engineering Workshop	P	0	0	2	2	1		60	40	
8	4	PC	EL2257	Microprocessor	T	3	0	0	3	3	30	20	50	3 Hours
9	4	PC	EL2258	Lab.:Microprocessor	P	0	0	2	2	1		60	40	
10	4	PC	EL2259	Signals & Systems	T	4	0	0	4	4	30	20	50	3 Hours
TOTAL						19	0	8	27	23				

List of Audit Courses														
1	3	HS	GE2121	Env Studies for 3 Sem. EL,ET,CT	A	3	0	0	3	0				
2	3	HS	AU2123	YCCE Communication Aptitude Preparation (YCAP3)	A	3	0	0	3	0				
3	4	HS	AU2125	YCCE Communication Aptitude Preparation (YCAP4.2) for EL,EE,ET	A	3	0	0	3	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activited decided by course teacher, 4 marks on class attendance**

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.05	Applicable for AY 2022-23 Onwards
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Electrical Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Fifth Semester														
1	5	HS	GE2312	Fundamental of Economics	T	3	0	0	3	3	30	20	50	3 Hours
2	5	PC	EL2301	Power Electronics	T	3	0	0	3	3	30	20	50	3 Hours
3	5	PC	EL2302	Lab.:Power Electronics	P	0	0	2	2	1		60	40	
4	5	PC	EL2303	Fundamentals of Power System	T	3	0	0	3	3	30	20	50	3 Hours
5	5	PC	EL2304	Electrical Drives	T	3	0	0	3	3	30	20	50	3 Hours
6	5	PC	EL2305	Lab.:Electrical Drives	P	0	0	2	2	1		60	40	
7		OE		Open Elective - I *	T	3	0	0	3	3	30	20	50	3 Hours
8	5	OE		Open Elective - II *	T	3	0	0	3	3	30	20	50	3 Hours
TOTAL						18	0	4	22	20				

Audit Courses														
1	5	HS	AU2127	YCCE Communication Aptitude Preparation (YCAP5.2) for EL,EE,ET	A	3	0	0	3	0				

Open Electives - I

1	5	OE	EL2311	OEI:Renewable Energy Generation System
2	5	OE	EL2312	OEI:Electrical Machines and their Applications
3	5	OE	EL2313	OEI:Testing and Maintenance of Electrical Machines
4	5	OE	EL2314	OEI: Solar power plant design and Installation

Open Electives -II

4	5	OE	EL2321	OEII:Electrical Energy Audit and Safety
5	5	OE	EL2322	OEII:Utilization of Electrical Energy
6	5	OE	EL2323	OEII:Power System Engineering

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

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Electrical Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Sixth Semester														
1	6	HS	GE2311	Fundamental of Management	T	3	0	0	3	3	30	20	50	3 Hours
2	6	PC	EL2351	Control System	T	3	0	0	3	3	30	20	50	3 Hours
3	6	PC	EL2352	Lab.:Control System	P	0	0	2	2	1		60	40	
4	6	PC	EL2353	Power System Analysis	T	3	0	0	3	3	30	20	50	3 Hours
5	6	PE		Professional Elective I	T	3	0	0	3	3	30	20	50	3 Hours
6	6	PE	EL2354	Lab.:Simulation of Power Electronics & Power System	P	0	0	2	2	1		60	40	
7	6	OE		Open Elective III *	T	3	0	0	3	3	30	20	50	3 Hours
8	6	OE		Open Elective IV *	T	3	0	0	3	3	30	20	50	3 Hours
9	6	PC	EL2355	Lab.:Substation Design	P	0	0	2	2	1		60	40	
10	5/6	STR	EL2360	Industry Visit and its report	P	0	0	0	0	1		60	40	
TOTAL						18	0	6	24	22				

Professional Electives -I

1	6	PE	EL2361	PEI:Advanced Power Electronics
2	6	PE	EL2362	PEI:Electrical Distribution in Power System
3	6	PE	EL2363	PEI:Illumination Engineering (MOOC)
4	6	PE	EL2364	PEI:Electric Vehicles
5	6	PE	EL2365	PEI:Electric Power Utilization
6	6	PE	EL2366	PEI: Grid Integration of Renewable Energy
7	6	PE	EL2367	PEI: Switched Mode Power Supply
8	6	PE	EL2368	PEI: Programming in C for beginners

Open Electives -III

9	6	OE	EL2371	OEIII:Renewable Energy Generation System
10	6	OE	EL2372	OEIII:Electrical Machines and their Applications
11	6	OE	EL2373	OEIII:Testing and Maintenance of Electrical Machines
12	6	OE	EL2374	OEIII:Solar power plant design and Installation

Open Electives -IV

13	6	OE	EL2381	OEIV:Electrical Energy Audit and Safety
14	6	OE	EL2382	OEIV:Utilization of Electrical Energy
15	6	OE	EL2383	OEIV:Power System Engineering
16	6	OE	EL2384	OEIV: Electrical Wiring: Estimation and Costing

Audit Courses

1	6	HS	AU2128	YCCE Communication Aptitude Preparation (YCAP6.1) for CV,EL	A	3	0	0	3	0				
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MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.05	Applicable for AY 2022-23 Onwards
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Electrical Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Seventh Semester														
1	7	PC	EL2401	Switchgear & Protection	T	3	0	0	3	3	30	20	50	3 Hours
2	7	PC	EL2402	Lab.:Switchgear & Protection	P	0	0	2	2	1		60	40	
3	7	PC	EL2403	High Voltage Engineering	T	3	0	0	3	3	30	20	50	3 Hours
4	7	PC	EL2404	Lab.:High Voltage Engineering	P	0	0	2	2	1		60	40	
5	7	PE		Professional Elective II	T	3	0	0	3	3	30	20	50	3 Hours
6	7	PE		Professional Elective III	T	3	0	0	3	3	30	20	50	3 Hours
7	7	PE		Professional Elective IV	T	3	0	0	3	3	30	20	50	3 Hours
8	7	STR	EL2409	Mini Project	P	0	0	4	4	2		60	40	
9	7	STR	EL2410	Campus Recruitment Training (CRT)	P	0	0	0	0	2		100		
TOTAL						15	0	8	23	21				

Professional Electives -II

1	7	PE	EL2411	PEII: Fundamentals of Power Quality
2	7	PE	EL2412	PEII:Electrical Installation Design
3	7	PE	EL2413	PEII:Electrical Machine Design
4	7	PE	EL2421	PEII: Power System Operation and Control
5	7	PE	EL2428	PEII: Sensors and Actuators
6	7	PE	EL2429	PEII: Micro Grid

Professional Electives -III

7	7	PE	EL2422	PEIII:FACTS Devices
8	7	PE	EL2423	PEIII: Electrical Energy Management and Audit
9	7	PE	EL2424	PEIII:Advanced Control System
10	7	PE	EL2425	PEIII:Artificial Intelligence Based System
11	7	PE	EL2426	PEIII: Converters and Configurations of Renewable Energy Systems
12	7	PE	EL2427	PEIII: Distributed Generation in Power System

Professional Electives -IV

13	7	PE	EL2431	PEIV:Advanced Electrical Drives
14	7	PE	EL2432	PEIV:Fundamentals of Smart Grid
15	7	PE	EL2433	PEIV:Computer Methods in Power System
16	7	PE	EL2434	PEIV:EHVAC-HVDC Transmission
17	7	PE	EL2436	PEIV:Project Planning
18	7	PE	EL2437	PEIV: Industrial Safety

Coursera Electives

1	6	PE	EL2366	PEI:Energy Production, Distribution and Safety
1	7	PE	EL2435	PEIV: Power Electronics Specialization

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TA = for Practical : MSPA will be 15 marks each**

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Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2020-21
(Revised Scheme of Examination w.e.f. 2022-23 onward)

SoE No.
EL-202.1



Electrical Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours	
						L	T	P	Hrs		MSEs*	TA**	ESE		
Eighth Semester															
1	8	STR	EL2451	Major Project	P	0	0	12	12	9		60	40		
2	8	STR	EL2452	Extra curricular Activity Evaluation	P	0	0	0	0	1		100			
TOTAL						0	0	12	12	10					
GRAND TOTAL						86	0	46	132	163					

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance**

TA = for Practical : MSPA will be 15 marks each**

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Electronics Engineering

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER															
1	1	BS	GE/MTH	22EE101	Differential Equation, Complex Variables & Matrices	T	3	1	0	4	4	30	20	50	3 Hrs
2	1	BS	GE/PHY	22EE102	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hrs
3	1	BS	GE/PHY	22EE103	Lab: Engineering Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22EE104	Social Science	T	3	0	0	3	3	30	20	50	3 Hrs
5	1	BES	ME/ME	22EE105	Engineering Graphics	T	1	0	0	1	1	30	20	50	3 Hrs
6	1	BES	ME/ME	22EE106	Lab: Engineering Graphics	P	0	0	4	4	2		60	40	
7	1	BES	CT/CT	22EE107	Elements of AIML	T	3	0	0	3	3	30	20	50	3 Hrs
8	1	BES	EL/EL	22EE108	Electrical workshop	P	0	0	2	2	1		60	40	
9	1	BES	EE/EE	22EE109	Digital Logic Design	T	3	0	0	3	3	30	20	50	3 Hrs
10	1	BES	EE/EE	22EE110	Lab: Digital Logic Design	P	0	0	2	2	1		60	40	
TOTAL							16	1	10	27	22				
List of Mandatory Learning Course (MLC)															
1	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	A	2	0	0	2	0				
2	1	BES	GE/CHE	GE2132	Environmental Science	A	2	0	0	2	0				

SECOND SEMESTER															
1	2	BS	GE/MTH	22EE201	Differential & Integral Calculus	T	3	1	0	4	4	30	20	50	3 Hrs
2	2	BS	GE/CHE	22EE202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hrs
3	2	BS	GE/CHE	22EE203	Lab: Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22EE204	Professional Communication	T	3	0	0	3	3	30	20	50	3 Hrs
5	2	BES	CV/CV	22EE205	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hrs
6	2	BES	CV/CV	22EE206	Lab: Engineering Mechanics	P	0	0	2	2	1		60	40	
7	2	BES	EE/EE	22EE207	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
8	2	BES	IT/IT	22EE208	Programming for Problem Solving	T	3	0	0	3	3	30	20	50	3 Hrs
9	2	BES	IT/IT	22EE209	Lab: Programming for Problem Solving	P	0	0	2	2	1		60	40	
TOTAL							18	1	6	25	22				

List of Mandatory Learning Course (MLC)															
1	2	HS	GE/HUM	GE2131	Universal Human Value	A	2	0	0	2	0				
2	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	A	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activities decided by course teacher, TA3 - 3 marks on class attendance**

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
Third Semester															
1	3	BS	EE/EE	22EE301	Signal and Systems	T	3	0	0	3	3	30	20	50	3 Hrs
2	3	HS	GE/HUM	22EE302	Fundamentals of Management and Economics	T	3	0	0	3	3	30	20	50	3 Hrs
3	3	PC	EE/EE	22EE303	Electronic Devices and Circuits	T	3	1	0	3	3	30	20	50	3 Hrs
4	3	PC	EE/EE	22EE304	Lab: Electronic Devices and Circuits	P	0	0	2	2	1		60	40	
5	3	PC	EE/EE	22EE305	Microprocessor and Interfacing	T	3	0	0	3	3	30	20	50	3 Hrs
6	3	PC	EE/EE	22EE306	Lab: Microprocessor and Interfacing	P	0	0	2	2	1		60	40	
7	3	PC	EE/EE	22EE307	Network Analysis	T	3	0	0	2	3	30	20	50	3 Hrs
8	3	PC	EE/EE	22EE308	Lab: Network Analysis	P	0	0	2	2	1		60	40	
9	3	PC	EE/EE	22EE309	Switching Theory and Finite Automata	T	3	0	0	2	3	30	20	50	3 Hrs
10	3	PC	EE/EE	22EE310	Lab: Programming Language	P	0	0	2	2	1		60	40	
TOTAL THIRD SEM							18	1	8	24	22				

List of Mandatory Learning Course (MLC)

1	3	HS	T&P	MLC2123	YCCE Communication Aptitude Preparation (YCAP3)	A	3	0	0	3	0				
2	3	BES	EE	MLC107	Basics of MATLAB	A	2	0	0	2	0				

Fourth Semester

1	4	BS	GE/HUM	22EE401	Probability and Statistical Theory	T	3	0	0	3	3	30	20	50	3 Hrs
2	4	PC	EE/EE	22EE402	Digital System Modelling	T	3	0	0	3	3	30	20	50	3 Hrs
3	4	PC	EE/EE	22EE403	Microcontroller and its Applications	T	3	0	0	3	3	30	20	50	3 Hrs
4	4	PC	EE/EE	22EE404	Lab: Microcontroller and its Applications	P	0	0	2	2	1		60	40	
5	4	PC	EE/EE	22EE405	Algorithm and Data Structure	T	3	0	0	3	3	30	20	50	3 Hrs
6	4	PC	EE/EE	22EE406	Lab: Algorithm and Data Structure	P	0	0	2	2	1		60	40	
7	4	PC	EE/EE	22EE407	Digital CMOS Circuits	T	3	0	0	3	3	30	20	50	3 Hrs
8	4	PC	EE/EE	22EE408	Lab: Digital CMOS Circuits	P	0	0	2	2	1		60	40	
9	4	PC	EE/EE	22EE409	Electromagnetic Fields	T	3	1	0	3	3	30	20	50	3 Hrs
10	4	PC	EE/EE	22EE410	Lab: Electronics Workshop	P	0	0	2	2	1		60	40	
11	4	PC	CV/EE	22EE411	Environmental Sustainability, Pollution and Management	T	3	0	0	3	3	30	20	50	3 Hrs
TOTAL FOURTH SEM							21	1	8	29	25				



List of Mandatory Learning Course (MLC)

1	4	HS	T&P	MLC2124	YCCE Communication Aptitude Preparation (YCAP4)	A	3	0	0	3	0				
2	4	BES	EE	MLC108	Basics of Arduino Programming	A	2	0	0	2	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4 activities

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.00	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

B.TECH SCHEME OF EXAMINATION 2022

(Scheme of Examination w.e.f. 2022-23 onward)

(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
Fifth Semester															
1	5	PC	EE	22EE501	Analog Communication	T	3	0	0	3	3	30	20	50	3 Hrs
2	5	PC	EE	22EE502	Lab: Analog Communication	P	0	0	2	2	1		60	40	
3	5	PC	EE	22EE503	Embedded System	T	3	0	0	3	3	30	20	50	3 Hrs
4	5	PC	EE	22EE504	Lab: Embedded System	P	0	0	2	2	1		60	40	
5	5	PC	EE	22EE505	Analog Integrated Circuits & Design	T	3	0	0	3	3	30	20	50	3 Hrs
6	5	PC	EE	22EE506	Lab: Analog Integrated Circuits & Design	T	0	0	2	2	1	30	20	50	3 Hrs
7	5	PE	EE		Professional Elective-I	T	3	0	0	3	3	30	20	50	3 Hrs
8	5	PE	EE		Lab.: Professional Elective-I	P	0	0	2	2	1		60	40	
9	5	STR	EE	22EE507	Industrial training, Seminar & Report	P	0	0	2	2	1		60	40	
10	5	OE-I	EE		Open Elective - I	T	3	0	0	3	3	30	20	50	3 Hrs
11	5	OE-II	EE		Open Elective - II	T	3	0	0	3	3	30	20	50	3 Hrs
TOTAL FOURTH SEM							18	0	10	28	23				

List of Professional Electives-I *

1	5	PE-I	EE	22EE511	PE-I: Operating System
2	5	PE-I	EE	22EE512	PE-I: Lab: Operating System
3	5	PE-I	EE	22EE513	PE-I: Object Oriented Programming
4	5	PE-I	EE	22EE514	PE-I: Lab: Object Oriented Programming
5	5	PE-I	EE	22EE515	PE-I: Computer Communication Networks
6	5	PE-I	EE	22EE516	PE-I: Lab: Computer Communication Networks
7	5	PE-I	EE	22EE517	PE-I: Analog VLSI Design
8	5	PE-I	EE	22EE518	PE-I: Lab: Analog VLSI Design

Open Elective-I

1	5	OE-I	EE	22EE531	OE I : Fuzzy Logic & Neural Networks
2	5	OE-I	EE	22EE532	OE I : Basics of Analog and Digital Communication
3	5	OE-I	EE	22EE533	OE I : Biomedical Instrumentation
4	5	OE-I	EE	22EE534	OE I : Digital Logic Design

Open Elective-II

1	5	OE-II	EE	22EE551	OE II : Sensors and Actuators
2	5	OE-II	EE	22EE552	OE II : Computer Architecture
3	5	OE-II	EE	22EE553	OE II : Consumer Electronics
4	5	OE-II	EE	22EE554	OE II : Industrial Automation



List of Mandatory Learning Course (MLC)

1	5	HS		MLC125	YCCE Communication Aptitude Preparation (YCAP5)	A	3	0	0	3	0
2	5	HS			Design thinking	A	2	0	0	2	0

MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4

TA = for Practical : MSPA will be 15 marks each**

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B.TECH SCHEME OF EXAMINATION 2022

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(Department of Electronics Engineering)

B. Tech in Electronics Engineering

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
Sixth Semester															
1	6	PC	EE	22EE601	Control System Engineering	T	3	0	0	3	3	30	20	50	3 Hrs
2	6	PC	EE	22EE602	Digital Signal Processing	T	3	0	0	3	3	30	20	50	3 Hrs
3	6	PC	EE	22EE603	Lab:Digital Signal Processing	P	0	0	2	2	1		60	40	
4	6	PC	EE	22EE604	Lab:Electronics Design Automation	P	0	0	2	2	1		60	40	
5	6	PE	EE		Professional Elective-II	T	0	0	2	2	3	30	20	50	3 Hrs
6	6	PE	EE		Lab.: Professional Elective-II	P	3	0	0	3	1		60	40	
7	6	PE	EE		Professional Elective-III	T	3	0	0	3	3	30	20	50	3 Hrs
8	6	OE-III	EE		Open Elective - III	T	3	0	0	3	3	30	20	50	3 Hrs
9	6	OE-IV	EE		Open Elective - IV	T	3	0	0	3	3	30	20	50	3 Hrs
10	6	PR	EE	22EE605	Project Phase -I	P	0	0	4	4	2		60	40	
TOTAL SIXTH SEM							18	0	10	28	23				

List of Professional Electives- II & III

Professional Electives-II

1	6	PE-II	EE	22EE611	PE II:Digital Image Processing
2	6	PE-II	EE	22EE612	Lab: PE II: Digital Image Processing
3	6	PE-II	EE	22EE613	PE II:Machine Learning
4	6	PE-II	EE	22EE614	Lab: PE II: Machine Learning
5	6	PE-II	EE	22EE615	PE II:CMOS Subsystem Design
6	6	PE-II	EE	22EE616	Lab:CMOS Subsystem Design
7	6	PE-II	EE	22EE617	PE II:Soft Computing & OptimizationTechniques
8	6	PE-II	EE	22EE618	Lab:PE II:Soft Computing & OptimizationTechniques
9	6	PE-II	EE	22EE619	PE II: RF and Microwave
10	6	PE-II	EE	22EE620	Lab: PE II: RF and Microwave

Professional Electives-III

1	6	PE-III	EE	22EE631	PE III: Industrial Automation
2	6	PE-III	EE	22EE632	PE III :Power Electronics
3	6	PE-III	EE	22EE633	PE III: Optical Communication
4	6	PE-III	EE	22EE634	PE III: Computer Orgnization
5	6	PE-III	EE	22EE635	PE III:Transmission line and wave Guide

Open Electives-III

1	6	OE-III	EE	22EE651	OE III : Fuzzy Logic & Neural Networks
2	6	OE-III	EE	22EE652	OE III : Basics of Analog and Digital Communication
3	6	OE-III	EE	22EE653	OE III : Biomedical Instrumentation
4	6	OE-III	EE	22EE654	OE III : Digital Logic Design

Open Electives-IV

1	6	OE-IV	EE	22EE671	OE IV : Sensors and Actuators
2	6	OE-IV	EE	22EE672	OE IV : Computer Architecture
3	6	OE-IV	EE	22EE673	OE IV : Consumer Electronics
4	6	OE-IV	EE	22EE674	OE IV : Industrial Automation

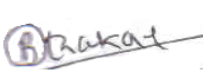

List of Mandatory Learning Course (MLC)

1	6	HS		MLC126	YCCE Communication Aptitude Preparation (YCAP6)	A	3	0	0	3	0
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MSEs* = Two MSEs of 15 Marks each will conducted and marks of of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4

TA = for Practical : MSPA will be 15 marks each**

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Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
 (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2022
 (Scheme of Examination w.e.f. 2022-23 onward)
(Department of Electronics Engineering)
B. Tech in Electronics Engineering

SoE No.
22EE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
Seventh Semester															
1	7	PC	EE	22EE701	Digital Communication	T	3	0	0	3	3	30	20	50	3 Hrs
2	7	PC	EE	22EE702	Lab: Digital Communication	P	0	0	2	2	1		60	40	
3	7	PC	EE	22EE703	Internet of Things	T	3	0	0	3	3	30	20	50	3 Hrs
4	7	PC	EE	22EE704	Lab: Internet of Things	P	0	0	2	2	1		60	40	
5	7	PE	EE		Professional Elective-IV	T	3	0	0	3	3	30	20	50	3 Hrs
6	7	PE	EE		Professional Elective-V	T	3	0	0	3	3	30	20	50	3 Hrs
7	7	PE	EE		Professional Elective-VI	T	3	0	0	3	3	30	20	50	3 Hrs
8	7	STR	EE	22EE705	Project Phase-II	P	0	0	10	10	5		60	40	
9	7	STR	EE	22EE706	Campus Recruitment Training (CRT)	P	0	0	0	0	2		100		
TOTAL SEVENTH SEM							15	0	14	29	24				

List of Professional Electives-IV, V & VI

Professional Electives -IV

1	7	PE-IV	EE	22EE721	PE IV: Introduction to remote sensing and Image Analysis
2	7	PE-IV	EE	22EE722	PE IV: Wireless Sensor Networks
3	7	PE-IV	EE	22EE723	PE IV: System on Chip Design
3	7	PE-IV	EE	22EE724	PE IV: Deep learning

Professional Electives -V

1	7	PE-V	EE	22EE741	PE V: Biomedical Engineering
2	7	PE-V	EE	22EE742	PE V: Wireless Communication
3	7	PE-V	EE	22EE743	PE V: Cryptography and Network Security
4	7	PE-V	EE	22EE744	PE V: Nano Electronics
5	7	PE-V	EE	22EE745	PE V: VLSI Signal Processing

Professional Electives -VI

1	7	PE-VI	EE	22EE761	PE-VI: Design Verification and Test of Digital VLSI Circuits
2	7	PE-V	EE	22EE762	PE-VI: Micro Electro Mechanical Systems (MEMS)
3	7	PE-V	EE	22EE763	PE-VI: Mechatronics
4	7	PE-V	EE	22EE764	PE-VI: Computer Vision



Eighth Semester

1	8	STR	EE	22EE801	Industrial Internship	P	0	0	12	12	3		60	40		
2	8	STR	EE	22EE802	Extra Curricular Activity Evaluation	P	0	0	0	0	2		100			
TOTAL EIGHTH SEM							0	0	12	12	5					
GRAND TOTAL							124	4	78	202	166					

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TA ** = for Theory : 12 marks on lecture quizzes, 12 marks on two TA2 activitied decided by course teacher, 2 marks on class attendance and 4 marks on TA4

TA = for Practical : MSPA will be 15 marks each**

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Electronics Telecommunication Engineering



B.TECH SCHEME OF EXAMINATION 2020-21
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Electronics & Telecommunication Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
TOTAL FIRST & SECOND SEM										47				
Third Semester														
1	3	BS	GE2201	Engineering Mathematics III	T	3	0	0	3	3	30	20	50	3 Hours
2	3	PC	ET2201	Electronic Devices and Circuits	T	3	1	0	4	4	30	20	50	3 Hours
3	3	PC	ET2202	Lab: Electronic Devices and Circuits	P	0	0	2	2	1		60	40	
4	3	PC	ET2203	Digital Circuits and Fundamentals of Microprocessor.	T	3	0	0	3	3	30	20	50	3 Hours
5	3	PC	ET2204	Lab: Digital Circuits and Fundamentals of Microprocessor.	P	0	0	2	2	1		60	40	
6	3	PC	ET2205	Electronic Measurement and Instrumentation	T	3	0	0	3	3	30	20	50	3 Hours
7	3	PC	ET2206	Lab: Electronic Measurement and Instrumentation	P	0	0	2	2	1		60	40	
8	3	PC	ET2207	Network Analysis	T	3	0	0	3	3	30	20	50	3 Hours
TOTAL THIRD SEM						15	1	6	22	19				

Fourth Semester														
1	4	BS	GE2204	Advance Mathematical Techniques	T	3	0	0	3	3	30	20	50	3 Hours
2	4	PC	ET2251	Electromagnetic Fields	T	3	1	0	4	4	30	20	50	3 Hours
3	4	PC	ET2252	Microcontroller and Interfacing	T	3	0	0	3	3	30	20	50	3 Hours
4	4	PC	ET2253	Lab: Microcontroller and Interfacing	P	0	0	2	2	1		60	40	
5	4	PC	ET2254	Analog Communication	T	3	0	0	3	3	30	20	50	3 Hours
6	4	PC	ET2255	Lab: Analog Communication	P	0	0	2	2	1		60	40	
7	4	PC	ET2256	Control Systems	T	3	0	0	3	3	30	20	50	3 Hours
8	4	PC	ET2257	Lab.: Control Systems	P	0	0	2	2	1		60	40	
TOTAL FOURTH SEM						15	1	6	22	19				

List of Audit Courses														
1	3	HS	GE2121	Env Studies for 3 Sem. EL,ET,CT	A	3	0	0	3	0				
2	3	HS	AU2123	YCCE Communication Aptitude Preparation (YCAP3)	A	3	0	0	3	0				
3	4	HS	AU2125	YCCE Communication Aptitude Preparation (YCAP4.2) for EL,EE,ET	A	3	0	0	3	0				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.05	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	



B.TECH SCHEME OF EXAMINATION 2020-21
 (Revised Scheme of Examination w.e.f. 2022-23 onward)
Electronics & Telecommunication Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Fifth Semester														
1	5	HS	GE2312	Fundamental of Economics	T	3	0	0	3	3	30	20	50	3 Hours
2	5	PC	ET2301	Analog Integrated circuits	T	3	0	0	3	3	30	20	50	3 Hours
3	5	PC	ET2302	Lab: Analog Integrated circuits	P	0	0	2	2	1		60	40	
4	5	PC	ET2303	Fields & Radiating Systems	T	3	1	0	4	4	30	20	50	3 Hours
5	5	PC	ET2304	Signals & Systems	T	3	0	0	3	3	30	20	50	3 Hours
6	5	PC	ET2305	Lab. :Signals & Systems	P	0	0	2	2	1		60	40	
7	5	OE		Open Elective - I *	T	3	0	0	3	3	30	20	50	3 Hours
8	5	OE		Open Elective - II *	T	3	0	0	3	3	30	20	50	3 Hours
9	5		ET2306	Lab.: Electronics Workshop	P	0	0	2	2	1		60	40	
10	5/6	STR	ET2310	Industry Visit and its report	P	0	0	0	0	1		100		
TOTAL FIFTH SEM						18	1	6	25	23				

Audit Courses

1	5	HS	AU2127	YCCE Communication Aptitude Preparation (YCAP5.2) for EL,EE,ET	A	3	0	0	3	0				
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Open Electives -I

1	5	OE 1	ET2311	OE I : Microcontroller & Embedded Systems
2	5	OE 1	ET2312	OE I : Principles of Communication Engineering
3	5	OE 1	ET2313	OE I : Fundamentals of Image Processing
4	5	OE 1	ET2314	OE I : Fundamentals of IoT

Open Electives -II

1	5	OE 2	ET2321	OE II : Soft computing
2	5	OE 2	ET2322	OE II : Industrial Instrumentation
3	5	OE 2	ET2323	OE II : Medical Electronics
4	5	OE 2	ET2324	OE II : Display Technology & Applications
5	5	OE 2	ET2325	OE II : PLCs and SCADA

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

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B.TECH SCHEME OF EXAMINATION 2020-21
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Electronics & Telecommunication Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Sixth Semester														
1	6	HS	GE2311	Fundamental of Management	T	3	0	0	3	3	30	20	50	3 Hours
2	6	PC	ET2351	Digital Signal Processing	T	3	0	0	3	3	30	20	50	3 Hours
3	6	PC	ET2352	Lab: Digital Signal Processing	P	0	0	2	2	1		60	40	
4	6	PE		Professional Elective I	T	3	0	0	3	3	30	20	50	3 Hours
5	6	PE		Lab. : Professional Elective I	P	0	0	2	2	1		60	40	
6	6	PE		Professional Elective II	T	3	0	0	3	3	30	20	50	3 Hours
7	6	PE		Lab. : Professional Elective II	P	0	0	2	2	1		60	40	
8	6	OE		Open Elective - III **	T	3	0	0	3	3	30	20	50	3 Hours
9	6	OE		Open Elective - IV **	T	3	0	0	3	3	30	20	50	3 Hours
TOTAL SIXTH SEM						18	0	6	24	21				

Professional Electives - I

1	6	PE I	ET2361	PE I : Object Oriented Programming
2	6	PE I	ET2362	PE I : Lab. Object Oriented Programming
3	6	PE I	ET2363	PE I : Discrete Structures
4	6	PE I	ET2364	PE I : Lab. Discrete Structures
5	6	PE I	ET2365	PE I : Microprocessors and Peripherals
6	6	PE I	ET2366	PE I : Lab. Microprocessors and Peripherals
7	6	PE I	ET2367	PE I : Electronic Instrumentation
8	6	PE I	ET2368	PE I : Lab Electronic Instrumentation
9	6	PE I	ET2371	PE I : Fundamentals of Computing
10	6	PE I	ET2372	PE I : Lab Fundamentals of Computing
11	6	PE I	ET2373	PE I : Algorithms and data structures
12	6	PE I	ET2374	PE I : Lab Algorithms and data structures

Professional Electives - II

1	6	PE II	ET2377	PE II : Antenna Theory & Design
2	6	PE II	ET2378	PE II : Lab. Antenna Theory & Design
3	6	PE II	ET2379	PE II : Digital system Design
4	6	PE II	ET2380	PE II : Lab. Digital system Design
5	6	PE II	ET2381	PE II : Internet of Things (IoT)
6	6	PE II	ET2382	PE II : Lab. Internet of Things (IoT)
7	6	PE II	ET2383	PE II : Optical Communication
8	6	PE II	ET2384	PE II : Lab. Optical Communication
9	6	PE II	ET2385	PE II : Principles of image processing
10	6	PE II	ET2386	PE II : Lab. Principles of image processing
11	6	PE II	ET2387	PE II : TV & Video Engineering
12	6	PE II	ET2388	PE II : Lab. TV & Video Engineering

Open Electives -III

1	6	OE 3	ET2391	OE III : Microcontroller & Embedded Systems
2	6	OE 3	ET2392	OE III : Principles of Communication Engineering
3	6	OE 3	ET2393	OE III : Fundamentals of Image Processing
4	6	OE 3	ET2394	OE III : Fundamentals of IoT

Open Electives -IV

4	6	OE 4	ET2396	OE IV : Soft computing
5	6	OE 4	ET2397	OE IV : Industrial Instrumentation
6	6	OE 4	ET2398	OE IV : Medical Electronics
7	6	OE 4	ET2399	OE IV : Display Technology & Applications
7	6	OE 4	ET2400	OE IV : PLCs & SCADA

Audit Courses

1	6	HS	AU2129	YCCE Communication Aptitude Preparation (YCAP6.2) for ME, EE, ETC	A	3	0	0	3	0				
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MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

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B.TECH SCHEME OF EXAMINATION 2020-21
 (Revised Scheme of Examination w.e.f. 2022-23 onward)
Electronics & Telecommunication Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Seventh Semester														
1	7	PC	ET2401	RF & Microwave	T	3	0	0	3	3	30	20	50	3 Hours
2	7	PC	ET2402	Lab: RF & Microwave	P	0	0	2	2	1		60	40	
3	7	PC	ET2403	Digital Communication	T	3	0	0	3	3	30	20	50	3 Hours
4	7	PC	ET2404	Lab: Digital Communication	P	0	0	2	2	1		60	40	
5	7	PE		Professional Elective III	T	3	0	0	3	3	30	20	50	3 Hours
6	7	PE		Professional Elective IV	T	3	0	0	3	3	30	20	50	3 Hours
7	7	PE		Professional Elective V	T	3	0	0	3	3	30	20	50	3 Hours
8	7	PE		Professional Elective VI	T	3	0	0	3	3	30	20	50	3 Hours
9	7	STR	ET2409	Mini Project	P	0	0	4	4	2		60	40	
10	7	STR	ET2410	Campus Recruitment Training (CRT)	P	0	0	0	0	2		100		
TOTAL SEVENTH SEM						18	0	8	26	24				

Professional Electives -III

1	7	PE	ET2411	PE III : Power Electronics
2	7	PE	ET2412	PE III : Data Compression & Encryption
3	7	PE	ET2413	PE III : Analog VLSI
4	7	PE	ET2414	PE III : Error Correcting Codes
5	7	PE	ET2415	PE III : Wireless Mobile Communication Systems

Professional Electives -IV

6	7	PE	ET2421	PE IV : Satellite Communication & RADAR Engineering
7	7	PE	ET2422	PE IV : Embedded System
8	7	PE	ET2423	PE IV : Switching Theory
9	7	PE	ET2424	PE IV : Topics in Machine Learning
10	7	PE	ET2425	PE IV : Multimedia Communications

Professional Electives -V

11	7	PE	ET2431	PE V : Display Technology
12	7	PE	ET2432	PE V : Biomedical Instrumentation
13	7	PE	ET2433	PE V : Fuzzy Logic & Neural Network
14	7	PE	ET2434	PE V : Wireless Sensor Networks
15	7	PE	ET2435	PE V : RF Circuit Design

Professional Electives -VI

16	7	PE	ET2441	PE VI : CMOS VLSI Design
17	7	PE	ET2442	PE VI : Digital Image Analysis for Remote Sensing
18	7	PE	ET2443	PE VI : Microwave Integrated circuits
19	7	PE	ET2444	PE VI : Communication Networks
20	7	PE	ET2445	PE VI : Computer Architecture and Organization
21	7	PE	ET2446	PE VI : PLCs & SCADA

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TA ** = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

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B.TECH SCHEME OF EXAMINATION 2020-21
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Electronics & Telecommunication Engineering

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Eighth Semester														
1	8	STR	ET2451	Major Project	P	0	0	12	12	9		60	40	
2	8	STR	ET2452	Extra curricular Activity Evaluation	P	0	0	0	0	1		100		
TOTAL						0	0	12	12	10				
GRAND TOTAL						84	3	44	131	163				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance**

TA = for Practical : MSPA will be 15 marks each**

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Electronics & Telecommunication Engineering

**SoE No.
ET-201**

VI Semester

ET2377 - PE II : Antenna Theory & Design

Course Objective

Students should be able to

1. Learn the basic principles and of antenna parameters.
2. Design and analyze dipole antennas.
3. Design and analyze loop antennas & Arrays.
4. Design and Analyze Travelling wave & Broadband Antennas.
5. Design & Analyze aperture, Reflector and Patch Antennas.
6. Study different antenna measurements.

Course Outcome

Students will be able to

1. Evaluate various parameters of antennas.
2. Analyze performance parameters of various antennas & antenna array.
3. Perform of antenna measurements by using different antenna measurement techniques.
4. Design and Analyze various antennas

UNIT I : BASIC ANTENNA CONCEPTS:

Introduction to antenna , need of Antenna, Types of antennas, Radiation mechanism of single wire and two wire , Radiation Pattern, Antenna field zones, Beam solid angle, radiation power density , radiation intensity, Directivity, Gain, Antenna efficiency, Beam efficiency, Polarization, impedance, bandwidth, impedance, effective length and equivalent area

(6 Hours)

UNIT II : DIPOLE ANTENNA:

Vector potentials for electric current source , Vector potentials for Magnetic current source, Infinitesimal Dipole, Finite dipole, Half wavelength dipole.

(6 Hours)

UNIT III : LOOP ANTENNAS AND ARRAYS:

circular loop ,polygonal loop and ferrite loop antenna, Two element array, N-element linear array ,broad side, end fire, phase array , planar Array system.

(6 Hours)

UNIT IV : TRAVELING WAVE ANTENNA

Introduction to traveling wave antenna, long wire, V antenna, rhombic antenna, Helical antenna, Electric - Magnetic Dipole, Yagi - Uda array of linear Elements.

(6 Hours)

UNIT V: SPECIAL ANTENNAS:

Babinet's principle, Rectangular Horn antenna, conical horn, corrugated Horn, plane reflector antenna, corner reflector antenna, parabolic reflector antenna, Cassegrain reflector antenna, Patch Antenna, antenna feeding techniques.

(6 Hours)

UNIT VI: ANTENNA MEASUREMENTS

Antenna reflection Ranges, Antenna Free space Ranges, Anechoic Chamber, Near field to farfield method, instrumentation system for measurement, Gain Measurement, Impedance Measurement, Current Measurement, Polarization Measurement. **New topic to be announced time to time**

(06 Hours)

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Electronics & Telecommunication Engineering

**SoE No.
ET-201**

VI Semester

ET2377 - PE II : Antenna Theory & Design

Text books:

1.	Antenna Theory Analysis and Design Technology	2009 Third edition	Balanis C.A	Wiley India
2.	Antennas	Second edition 1988	John D.Krauss	McGraw - Hill International edition

Reference books:

1.	Electromagnetic waves and Radiating systems	1993	Edward C.Jordan, Keith G.Balmain	Prentice Hall of India.
2.	Antennas and Radio Propagation	1985	R.E. Collins	McGraw-Hill

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**SoE No.
ET-201**

VI Semester

ET2378 - PE II : Lab. Antenna Theory & Design

SN	List of Experiment
1	To measure radiation Pattern of Yagi-Uda Antenna and its Characteristic using Antenna trainer Kit.
2	To measure radiation Pattern of Log Periodic Antenna and its Characteristic using Antenna trainer Kit.
3	To measure radiation Pattern of $\lambda/2$ Dipole Antenna and its Characteristic using Antenna trainer Kit.
4	To measure radiation Pattern of $3\lambda/2$ Dipole Antenna and its Characteristic using Antenna trainer Kit.
5	To design and Simulate Patch Antenna with Probe Feed using Simulation software.
6	To design and Simulate Patch Antenna with Microstrip Feed line using Simulation software.
7	To Study parametric analysis of Patch Antenna using Simulation software.
8	To design and Simulate $\lambda/2$ Dipole Antenna using Simulation software and study it's Characteristic.
9	To design and Simulate Yagi-Uda Antenna using Simulation software and study it's Characteristic.
10	To design and Simulate Horn Antenna using Simulation software and study it's Characteristic.
11	To design and Simulate Parabolic reflector Antenna using Simulation software and study it's Characteristic.
12	Study the fabrication process of Antenna
13	Measurement of Antenna Parameter Using Vector Network Analyzer.
14	Mini Project on antenna.

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Electronics & Telecommunication Engineering

**SoE No.
ET-201**

VI Semester

ET2381- PE II : Internet of Things (IoT)

Course Learning Objective Students should be able	Course Outcomes Students will be able to
1. To understand the physical and Logical design of IoT. 2. To study the M2M and NETCONF. 3. To understand python programming. 4. To understand physical servers and cloud offerings.	1. Explore the physical and Logical design of IoT. 2. Explore the M2M and NETCONF. 3. Explore python programming. 4. Apply basic skills of IoT to solve real life problems.

UNIT-1:

5

Hrs.

Introduction & Concepts: Introduction to Internet of Things, Physical Design of IOT, Logical Design of IOT, IOT Enabling Technologies, IOT Levels.

UNIT-2:

6Hrs

Domain Specific IOTs: Home Automation, Cities, Environment, Energy, Retail, Logistics, Agriculture, Industry, Health & Life Style.

UNIT-3:

7Hrs

M2M & System Management with NETCONF-YANG: M2M, Difference between IOT and M2M, SDN and NFV for IOT, Software defined Networking, Network Function Virtualization, Need for IOT Systems Management, Simple Network Management Protocol, Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IOT Systems management with NETCONF-YANG.

UNIT-4:

6Hrs

Developing Internet of Things & Logical Design using Python: Introduction, IOT Design Methodology, Installing Python, Python Data Types & Data Structures, Control Flow, Functions,

UNIT-5:

6Hrs

Python Modules, Packages, File Handling, Date/ Time Operations, Classes, Python Packages, IoT Device- Raspberry Pi, Programming Raspberry pi with Python

UNIT-6:

7Hrs

IoT physical servers and cloud offerings, Introduction to cloud storage models and communication APIs, Python web application frame work-Django, Amazon web service for IoT

New topic to be announced time to time

Text books:

1	Internet of Things: A Hands-On Approach	1 st edition 2015	by Arshdeep Bahga, Vijay Madiseti	Orient Blackswan Private Limited - New Delhi
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Reference books:

1	Designing the Internet of Things	1 st edition	By Adrian McEwen	Wiley
2	Python for Everybody		Charles R. Severance	

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**SoE No.
ET-201**

VI Semester

ET2382- PE II : Lab. Internet of Things (IoT)

Expt. No.	Name of Experiment
01	Add ten natural numbers in python
02	Experiment on functions in python
03	Experiment on string manipulation in python
04	Interfacing LED with Raspberry pi.
05	Interfacing DHT11 sensor with Raspberry pi.
06	File handling using Python.
07	Reading data from server.
08	Experiment on python Django.
09	Experiment on python Django.
10	Preparing complete IoT system using AWS server
11	Mini-project

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Electronics & Telecommunication Engineering

**SoE No.
ET-201**

VI Semester

ET2379 - PE II : Digital System Design

Course Objective	Course Outcome
<p>Students should be able to</p> <ol style="list-style-type: none"> 1) Understand programmable devices and discuss the architecture of CPLD and FPGA 2) Learn basics of Hardware description Language, design flow and design Methodology. 3) Understand the concept of modeling digital systems. 4) Understand the concept of generic, generate and attributes. 5) Comprehend combinational and sequential circuit design approaches. 	<p>Students will be able to</p> <ol style="list-style-type: none"> 1) Compare and contrast different FPGA and CPLD architectures. 2) Design, develop and analyze combinational circuits. 3) Design, develop and analyze sequential circuits. 4) Implement digital system using CAD tool.

UNIT-1:

Digital Design Fundamentals, Combinational & Sequential design issues, Introduction to finite state machines, Moore & Mealy Machine, Introduction to programmable devices, PLA, PAL, PROM, Structure of CPLDs, Introduction to FPGA, Architecture, CLB, IOB, Programmable Interconnect Points, Different type of programmable switches used in PLDs **(06 Hours)**

UNIT-2:

HDL Based Design flow, Requirements of HDL, Design Methodologies, Different Modelling styles, Introduction to Verilog, Elements of Verilog, Verilog Module definition, Elements of Module **(06 Hours)**

UNIT-3

Basic Concepts in Verilog, Reserved Keywords, Syntax & Semantics, Comments, Identifiers, Number Representation, System Representation, Verilog Ports, Verilog Data Types, Wire & Variables, Physical & Abstract, Constants, Parameter, Verilog Data Operators, Design entry in Verilog & Testbench, Compilation and synthesis, Timing analysis **(06 Hours)**

UNIT-4:

Data Flow Modelling , Delay, Continuous Assignment, Delayed Continuous assignment, Structural Modelling Feature, Module Instantiation, Gate level Primitives, Gate Delays, Switch Level Primitives, User Defined Primitives **(06 Hours)**

UNIT 5:

Behavioural Modelling, Initial, Always, Procedural Assignment, Blocking and Non-Blocking assignments, Sequential & Parallel Blocks, Race around Condition, Timing Control, Procedural Statements, Conditional Statements if case loop repeat forever etc, Zero Delay Control, Event Based Timing Control, Compiler Directives, Assign De-assign, Force Release, Latch Models, FF Models, State Machine Coding ,Moore and Mealy Machines **(06 Hours)**

Unit 6: Advanced feature:

Combinational & sequential system Design examples like Shift Registers, Counters, LFSR, Stacks and Queues, Multi bit Adders & Multiplier, Huffman Coding, Processor and Memory Model, CPU, System Tasks and Functions, Design Verification, **New topic to be announced time to time** **(06 Hours)**

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**SoE No.
ET-201**

VI Semester

ET2380- PE II : Lab. Digital system Design

Course Objective	Course Outcome
<p>Students should be able to</p> <ol style="list-style-type: none"> 1) Understand programmable devices and discuss the architecture of CPLD and FPGA 2) Learn basics of Hardware description Language, design flow and design Methodology. 3) Understand the concept of modeling digital systems. 4) Understand the concept of generic, generate and attributes. 5) Comprehend combinational and sequential circuit design approaches. 	<p>Students will be able to</p> <ol style="list-style-type: none"> 1) Compare and contrast different FPGA and CPLD architectures. 2) Design, develop and analyze combinational circuits. 3) Design, develop and analyze sequential circuits. 4) Implement digital system using CAD tool.

Expt. No.	Experiments based on
1	Write a VERILOG code for Basic gates.
2	Write a VERILOG Dataflow code for Half Adder, Half Subtractor.
3	Write a VERILOG Dataflow code for 4:1 MUX, 2:4 Decoder, 1:4 DEMUX.
4	Write a VERILOG Dataflow code for 1-bit, 2-bit Comparator
5	VERILOG code for Full Adder
6	write VERILOG code for Full Subtractor
7	Write Behavioral VERILOG code for SR latch.
8	Write Behavioral VERILOG code for D latch
9	Write Behavioral VERILOG code for 4-bit Shift register, 4-bit counter.
10	Write VERILOG code for 8 Bit Carry Look Ahead Adder using FA.
11	Write VERILOG Code for 4 bit Sequence Detector MEALY M/C, Overlapping allowed
12	Write VERILOG Code for 4 bit Sequence Detector MOORE M/C, Overlapping allowed

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Electronics & Telecommunication Engineering

**SoE No.
ET-201**

VI Semester

ET2367 - PE I : Electronic Instrumentation

Course Objective	Course Outcome
<p>Students should be able to</p> <ol style="list-style-type: none"> 1. Study the characteristics of Instruments. 2. Understand the Concepts of Pressure and temperature Measurements and its calibration process. 3. Learn the working principle of various flow & level transducers. 4. Learn the working principle of various transducers like level , thickness speed, ph value etc. 5. Learn Programmable logic controller and their programming language 	<p>Students will be able to</p> <ol style="list-style-type: none"> 1. Design instrumentation system using various transducers and its calibration process. 2. Analyze pressure and temperature using measuring instruments and its calibration process. 3. Measure and analyze flow and level using flow transducers. 4. Measure and analyze various parameters like level, thickness speed, ph value etc. 5. Develop PLC programs by using ladder diagram

UNIT-I INTRODUCTION

Block diagram of instrumentation system, functions of instruments, characteristic equation of instrument in general form, calibration process, cables and connectors and its analysis.

05 Hours

UNIT-II PRESSURE MEASUREMENT

Units of pressure - Manometers – Different types – Elastic type pressure gauges – Bourdon type bellows – Diaphragms – Electrical methods – Elastic elements with LVDT and strain gauges – Capacitive type pressure gauge – Piezo resistive pressure sensor –Testing and calibration of pressure gauges – Dead weight tester.

06 Hours

UNIT-III TEMPERATURE MEASUREMENT, THERMOCOUPLES AND PYROMETERS

Different types of filled in system thermometer , Bimetallic thermometers – Electrical methods of temperature measurement – Signal conditioning of industrial RTDs and their characteristics – Three lead and four lead RTDs and their circuits. Thermocouples – Laws of thermocouple – Signal conditioning of thermocouples output –cold junction compensation – Response of thermocouple, Radiation methods of temperature measurement – Radiation fundamentals – Total radiation & selective radiation pyrometers – Optical pyrometer – Two color radiation pyrometers.

07 Hours

UNIT-IV FLOWMETERS& LEVEL MEASUREMENT

Variable head type flow meters: – Orifice plate – Venturi tube – Pitot tube. Variable area flow meter: – Rotameter, Principle and constructional details of electromagnetic flow meter – Ultrasonic flow meters flow measurements for gases. Float type level indication, capacitive, ultrasonic level measurement

06 Hours

UNIT-V MISCELLANEOUS MEASUREMENT

Electrical level gauge: – Resistive , capacitive , Nuclear radiation , Radar type ,Speed measurement -D.C and A.C tachogenerators ,rotary encoder, Proximity sensors- Inductive and capacitive, pH Measurement, measurement of AC current by Hall effect transducer.

06 Hours

UNIT- VI Data Logger & PLC

Data Logger, Introduction to PLC, PLC programming, ladder diagram logic for process control applications, Introduction to SCADA.

New topic to be announced time to time

06 Hours

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ELECTRONICS & COMMUNICATION ENGINEERING

VII Semester

ET 2413 –PE III :Analog VLSI Design

Prerequisites	-----
Course Objective Students should be able to 1. Understand the concept and basics of small signal model of MOS transistor & Perform analysis of single stage amplifiers with or without load 2. Understand small signal parameters of Differential Amplifier. 3. Understand current mirrors as bias element and single stage amplifiers in frequency domain 4. Study Performance parameters of CMOS op amp	Course Outcome Students will be able to 1. Analyze small signal model of MOS transistor & Perform analysis of single stage amplifiers with or without load. 2. Analyze small signal parameters of Differential Amplifier. 3. Analyze Performance parameters of CMOS op amp. 4. Analyze Performance parameters of converters.

UNIT-1 Basic MOS Device Physics

Threshold voltage, Derivation of I/V characteristics, second order effects, MOS device capacitance, MOS small signal models, MOS SPICE models

(06 Hours)

UNIT-2: Single stage amplifiers

Basic concept, common source, common source stage with resistive load, CS stage with source degeneration, source follower, common gate. (06 Hours)

UNIT-3: Differential amplifiers

Single ended & differential operation, Basic differential pair, qualitative and quantitative analysis, Common mode response.

(06 Hours)

UNIT 4: Operational amplifiers

Performance parameters, one stage op amp, Gain boosting, Noise in op amp

(06 Hours)

Unit 5: ADC converter and DAC converter

Converting Analog Signals to Digital Signals, Sample-and-Hold (S/H) Characteristics, Digital-to-Analog Converter (DAC) Specifications, Analog-to-Digital Converter (ADC) Specifications. (06 Hours)

Unit 6: Sigma Delta Converter

The Oversampling ADC, The First-Order Sigma Delta Modulator, The Higher Order Sigma Delta Modulators.

(06 Hours)

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ELECTRONICS & COMMUNICATION ENGINEERING

VII Semester

ET 2424 – PE IV: Topics in Machine Learning

Prerequisites	Basic probability and statistics, linear algebra and calculus
Course Objective Students should be able to 1) Understand the concepts of machine learning and regression models 2) Understand the concept of classification for model evaluation. 3) Learn Supervised and unsupervised learning algorithms. 4) Learn the concept of artificial neural network and deep networks	Course Outcome Students will be able to 1) Apply and analyze the model using regression. 2) Apply and evaluate the performance of system for classification. 3) Apply Supervised and unsupervised learning for problem solving. 4) Apply neural network algorithms for classification. 5) Describe and evaluate deep neural network with computational complexity.

UNIT-1 Regression

Supervised and Unsupervised Learning, Regression, Model and Cost Function, Gradient Descent, Multivariate Linear Regression, Feature Scaling, Gradient Descent for multivariable **(06 Hours)**

UNIT-2: Classification

Classification, Hypothesis Representation, Decision Boundary, Cost function and Gradient Descent, Multi-classification, Regularization, Model Evaluation **(06 Hours)**

UNIT-3: Supervised Learning

KNN, SVM, Decision tree, Naive Bayes Classifiers, Random Forest **(06 Hours)**

UNIT 4: Unsupervised learning

K-means clustering, Hierarchical Clustering, DBSCAN Clustering, PCA, Anomaly Detection, Recommender System **(06 Hours)**

Unit 5: Artificial Neural Network

Introduction to neural network, Activation Functions, Perceptron rule, backpropagation **(06 Hours)**

Unit 6: Deep Learning

Introduction to deep learning, building blocks of CNN, Computational Complexity, case studies based on CNN architectures, **New topics to be announced time to time.** **(06 Hours)**

Text books:				
1	Understanding Machine Learning. https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/copy.html	2017	Shai Shalev-Shwartz and Shai Ben-David.	Cambridge University Press.
2	The Elements of Statistical Learning. https://web.stanford.edu/~hastie/ElemStatLearn/	2009	Trevor Hastie, Robert Tibshirani and Jerome Friedman.	Second Edition
3	Pattern Recognition and Machine Learning. https://www.microsoft.com/en-us/research/people/cmbishop/downloads/	2006	Christopher Bishop.	Springer

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ELECTRONICS & COMMUNICATION ENGINEERING

VII Semester

ET2431-PE V: Display Technology

Prerequisites	-----
Course Objective Students should be able to <ol style="list-style-type: none">To provide the fundamental knowledge for understanding concepts of different display technologies related to manufacturing techniques and materials selectionTo explore specifications required for display technologies and understand properties of Luminescence materials for different display types.To understand the addressing methods, backplane Technology and Driver Integration part of different new displays.To understand new displays properties of materials modes.	Course Outcome Students will be able to <ol style="list-style-type: none">Identify different display technologies and manufacturing process.Characterized and analyzed specifications of display technology and Luminescence materials.Explore design parameters for displays and analyze addressing matrix and backlight unit technologies.Elaborate applications of different new displays.

UNIT I :

Overview of display technologies, information capacity of displays, introduction to different flat panel display technologies. LCD Display Internal structure and working, Fundamentals of Photometry,

(06 Hours)

UNIT II :

Characterization and performance of displays: Concepts of aspect ratio, color gamut, contrast and gradation, directional visibility, driving power, efficiency, speed, memory and storage, degradation, resolution, addressability, physiological factors, and measurement instrumentation, Colorimetry, CIE colorimetry

(06 Hours)

UNIT III :

Luminescence and luminescent materials: Physical processes and interactions leading to emission of light, processes responsible for the transfer of energy in luminescent materials, chemistry and preparation of luminescent materials, and emission properties of the prepared materials;

(06 Hours)

UNIT IV:

Basics of matrix addressing of displays: active and passive matrix. Technical discussion of display technologies: LEDs, OLEDs, LCDs, Active matrix TFT backplanes for OLED and LCD displays. Other displays and associated technologies.

(06 Hours)

UNIT V:

Advanced TFT Backplane Technologies (IGZO, LTPS, etc.) and Driver Integration. Back Light Unit Technologies (CCFL, LED, QD, etc.)

(06 Hours)

UNIT VI:

Future and New Applications of Displays. Materials for Display – TFT, EL and LC Materials and Modes

(06 Hours)

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**VII Semester****ET2435 – PE V : RF Circuit Design**

Prerequisites	-----
Course Objective Students should be able to 1. Learn fundamentals of series and parallel RF circuits. 2. Understand the use of HF component in design the RF circuit and bandwidth estimation techniques. 3. Learn the design of high frequency amplifier an phase detectors 4. Understand the concept of CMOS technology in RF circuits.	Course Outcome Students will be able to 1. Compare the behavior of series and parallel RLC circuit at HF. 2. Analyze the HF circuit design and Distinguish the different bandwidth estimation techniques. 3. Compare the power amplifier parameters with HF amplifier with phase detector. 4. Apply the knowledge of CMOS technology for design of supply independent bias circuit

UNIT-1 Fundamentals of RF Circuits

Introduction, History of wireless Communication, Noncellular wireless Applications, Propagation, Parallel RLC Tank Circuit, Series RLC Circuit , RLC Network as Impedance Transformer, Skin Effect, Resistor, Capacitor, Inductor
(06 Hours)

UNIT-2: MOSFET and Transmission Lines

MOSFET Physics, MOS Device Physics in Short Channel Regime , Other Effects, Link Between Lumped and Distributed Regime ,Driving Point impedance at iterated structures , Transmission line , Behavior of finite length Transmission line.
(06 Hours)

UNIT-3: Bandwidth Estimation

Review of Smith Chart and S-Parameter, Application of smith chart, Rise time, Delay, Bandwidth Estimation Techniques - Open Circuit Time Constant , Short Circuit Time constant
(06 Hours)

UNIT 4: HF RF Amplifier and Bandwidth Detection

Introduction to High Frequency Amplifier Design, Zeros as Bandwidth Enhancer , The shunt series Amplifier, Tuned Amplifiers, Neutralization and Unilateralization Cascaded Amplifiers,
(06 Hours)

Unit 5: Biasing of RF Circuit

Introduction to Voltage references and Biasing, Review of Diode Behavior, Diodes and Bipolar transistors in CMOS Technology Supply independent bias circuits, Band gap Voltage References, Amplifier linearity.
(06 Hours)

Unit 6: RF Power Amplifier and Phase Detectors

Introductions to RF Power Amplifiers, Classification of Power Amplifiers, Modulation of Power Amplifiers, Introduction to Phase lock loops , Linear zed PLL Model, Phase Detector, Sequential Phase Detector, Loop Filters and Charge Pumps
(06 Hours)

Text books:

1.	The Design of CMOS Radio Frequency Integrated Circuits	2 nd Edition	Thomas H. Lee	Cambridge University Press
2.	RF Circuit Design Theory and Applications	2 nd Edition	R. Ludwig & P. Bretchko	Pearson Publication

Reference books:

1.	Analysis and Design of Analog Integrated Circuits	4 th Edition	Paul R. Gray	Wiley India Publication
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Analog Integrated Circuits	Publication
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VII Semester

ET2441-PE VI : CMOS VLSI Design

Prerequisites	Logic Circuit Design, MOSFET Operation, Sequential Circuits .
Course Objective Students should be able to	Course Outcome Students will be able to
<ol style="list-style-type: none"> To understand and study analysis of the MOS transistor with first order and second order effects. To study the static and dynamic operating principles of inverter circuit. To understand the different CMOS implementation process. To learn switching characteristics and interconnection effects of MOS device, advanced techniques in CMOS logic. 	<ol style="list-style-type: none"> An ability to analyze the characteristics of MOSFET. An ability to analyze the voltage transfer characteristics of MOS inverters. An ability to apply the LAMBDA design rules for design of optimized CMOS circuits and describe the process of fabrication for CMOS circuits An ability to design and analyze switching characteristics and interconnection effects of MOS device, advance CMOS logic circuits.

UNIT –I : Basic MOS Device Physics

General Consideration: MOS as a switch, MOS Structure & Symbols, MOS I/V Characteristics, MOS Enhancement Transistor, Second order effect of MOS: Body Effect, Junction Effect, Gate Leakage Effect, Channel Length Effect, Tunneling Effect, Velocity Modulation, Mobility Variation **06 Hrs.**

UNIT-2:

MOSFET Inverter Characteristics

Resistive Load Inverter , Inverter with n type MOSFET load, CMOS Inverter, Principle of operation & DC Characteristics, Tri-stated Inverter, Noise Margin Calculation. **07 Hrs**

UNIT-3:

Fabrication & Layout of CMOS IC

CMOS Fabrication Technology: N-well, P-well, Twin Tub Process, Silicon on Insulator (SOI) Process, Physical Design of Logic Gates, Euler's Path, Stick Diagram, Layout, Latch-up Effect. **06 Hrs.**

UNIT-4:

Switching Characteristics & Interconnection Effect

MOS Device Capacitance Estimation, Switching Characteristics: Rise Time, Fall Time, Propagation Delay, Delay Estimation: Propagation Delay, Contamination Delay, Power Dissipation in CMOS: Static & Dynamic Power Calculation, Charge Sharing, Fan-in, Fan-out. **05 Hrs**

UNIT-5: Combinational Circuit Design

Circuit Families, Static CMOS , Ratioed Circuits , Cascode Voltage Switch Logic, Dynamic Circuits, Pass-Transistor Circuits, Circuit Pitfalls, More Circuit Families. **06 Hrs**

UNIT-6: Sequential Circuit Design

Introduction, Sequencing Static Circuits . . Sequencing Methods , Max-Delay Constraints, Min-Delay Constraints, Time Borrowing, Clock Skew, Circuit Design of Latches and Flip-Flops, Conventional CMOS Latches, Conventional CMOS Flip-Flops, Design Using Various Logic Families such as Pseudo NMOS Logic, Dynamic CMOS Logic, CMOS Domino Logic, Zipper Logic, Clocked CMOS Logic, CVSL, Bi-CMOS Logic Family **06 Hrs**

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VII Semester

ET2442- PE VI: Digital Image Analysis for Remote Sensing

Prerequisites	Principles of Image Analysis
<p>Course Objective Students should be able to</p> <ol style="list-style-type: none"> 1) Understand Remote Sensing & sensor Concepts 2) Understand the fundamentals and image characteristics of remote sensing. 3) Learn image enhancement techniques 4) Study image classification technique and hyperspectral image analysis 	<p>Course Outcome Students will be able to</p> <ol style="list-style-type: none"> 1) Comprehend the basic and applied principles of remote sensing, RS image characteristics 2) Understand and evaluate image spatial and spectral transforms and their effect on image quality and data integrity 3) Apply the image correction techniques and classification algorithms on remote sensing images 4) Analyze high-dimensional remote sensing imagery with appropriate remote sensing data and processing methods.

UNIT-1: Remote Sensing Concepts

Review of Remote Sensing Concepts: spatial and radiometric characteristics – spectral and temporal characteristics, Optical Radiation Model: The wave/ particle models - energy/matter interaction – Radiometric Correction–Atmospheric Correction, Image sensors

(06 Hours)

UNIT-2: Digital Image Formation and Characteristics

Digital Image Formation: point spread functions – sampling and quantization

Digital Image Characteristics: Univariate and multivariate image statistics – noise models- power spectral density- co-occurrence matrix

(06 Hours)

UNIT-3: Image Enhancement and Spectral Transforms

Contrast enhancement – band rationing – principal component analysis – vegetation transforms – texture transforms, Spatial Transforms: convolution concept - low and high pass filtering – spatial transformations – Fourier transform – wavelet transforms.

(06 Hours)

UNIT 4: Geometric Correction

Sensor geometry and empirical models for geometric corrections techniques.

(06 Hours)

Unit 5:RS Image Classification

Thematic Information Extraction: review of supervised and unsupervised Image classification – Maximum Likelihood and Bayesian classification, Non-parametric & parametric classification.

(06 Hours)

Unit 6: High Dimension Image Analysis

Subpixel classification: Linear mixing model, fuzzy set classification, Hyperspectral Image Analysis: Feature extraction, classification algorithms for hyperspectral data, Applications of Remote Sensing, **New topic to be announced time to time**

(06 Hours)

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VII Semester

ET 2411 – PE III : Power Electronics

Prerequisites	-----
Course Objective Students should be able to 1. Understand the characteristics of different power electronics switches and selection of components for different applications, 2. Learn different types of power devices 3. Understand the switching behaviour of power electronics circuits such as DC/DC converters. 4. Learn the role of different type of inverters.	Course Outcome Students will be able to 1. Analyze and design Power semiconductor devices. 2. Analyze and design DC/DC converter and Cyclo-converters. 3. Analyze and design inverter circuits. 4. Apply the knowledge of power electronics to solve real Life problems.

UNIT I: Power semiconductor devices (part A)

Power Semiconductor Diodes, classification, reverse recovery Characteristics, series and shunt connection of power diodes, Power Transistors, Switching characteristics of power transistor, Base drive control.

06Hrs

UNIT II : Power semiconductor devices(part B)

Power MOSFETs, IGBT, Silicon controlled rectifier(SCR), dynamic Turn ON and Turn OFF characteristics of SCR, Firing circuit, Diac, Triac.

06Hrs

UNIT III : AC –DC Converter

Commutation methods of SCR, Single phase half wave and full wave Controlled Rectifier with resistive and inductive load,

06Hrs

UNIT IV: DC-DC Converters (Chopper) Step up, step down Choppers, design of choppers AC Voltage Controllers. Principle of ON-OFF control, Phase control, single phase cyclo-converter

06Hrs

UNIT V : DC –AC Converter

Inverters—Series resonant inverters, Modified series inverter, parallel inverter, single phase bridge inverter, current source inverter, Three phase bridge Inverter: 120 degree and 180 degree mode, design of inverter applications.

06Hrs

UNIT VI:

Solar converter, buck converter, boost converter, Cuk converter, Design of Gate Drive circuits for SCR, SCR protection circuits, design of snubber circuit, Introduction to AC and DC drives, SMPS.

06Hrs

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VII Semester

ET2422- PE IV: Embedded System

Prerequisites	-----
<p>Course Objective Students should be able to</p> <ol style="list-style-type: none"> 1. Study & understand the detailed architectural features of ARM processor. 2. Study instruction set of ARM processor and apply the same for programming 3. Explore the details about LPC 2148 Develop programs in interfacing of different peripherals with NODE MCU ESP8266 4. Understand memory management in ARM and operating system.. 	<p>Course Outcome Students will be able to</p> <ol style="list-style-type: none"> 1. Explore the architectural features of ARM processors 2. Apply ARM instruction set in developing assembly language programs. 3. Explore Basic embedded C programs for GPIO and interfacing with LPC 2148 and Develop programs in interfacing of different peripherals with NODE MCU ESP8266 4. Acquire knowledge about memory management in ARM and operating system.

UNIT-1 Introduction to embedded system and ARM Processor

Difference between RISC & CISC, Advantages of architectural features of ARM Processor, Processor modes, Register Organization, Exceptions and its handling. 3/5- stage pipeline ARM organization. LPC2148 ARM 7 microcontroller, Features of LPC2148, Block diagram of LPC2148, Pin diagram of LPC2148, Architectural overview, On-chip flash program memory, On-chip RAM.

(06 Hours)

UNIT-2: Memory and memory-mapped I/Os

ARM and THUMB instruction sets, ARM programmer's model, addressing modes, Instruction set in detail and programming, data processing instruction, data transfer instruction, Control flow instructions, simple assembly language programs.

(06 Hours)

UNIT-3: ARM floating point architecture and DSP extensions

ARM floating point architecture and DSP extensions, ARM co-processors. ARM 9 TDMI ARCHITECTURAL STUDY: - HW architecture, Timing diagrams for various accesses, Memory buses: AMBA, ASB, & APB. Architectural support for system development

(06 Hours)

UNIT 4: Basic embedded C programs

Basic embedded C programs for GPIO and interfacing of different devices like LED, LCD, Stepper Motor, Study and programming of on-chip peripherals like timers, counters, on-chip ADC, DAC, Introduction to NODE MCU ESP8266 and ESP 32, NODE MCU ESP8266 Features & Using It with Arduino IDE, NODE MCU ESP8266 Pinout, Power requirement.

(06 Hours)

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ELECTRONICS & COMMUNICATION ENGINEERING

VII Semester

ET2444 – PE VI: Communication Networks

Prerequisites: Digital Communication	-----
Course Objective Students should be able to Understand Networks, Network topologies and service primitives. 1. Learn the structure and applications of Connecting devices. 2. Learn basics of LAN, MAN, WAN. 3. Understand Multimedia Networking. 4. Comprehend Network applications and Network Securities	Course Outcome Students will be able to 1. Compare data transmission protocols and understand the applications of communication network 2. Apply the knowledge of LAN structure to design data communication system. 3. Detect Data transmission errors in communication networks. 4. Compare different data security protocols.

Unit-1 Computer Network and Internet

6 Hours

Internet, the network edge, ISPs and Internet backbone, Protocol layers and their service models, History of Computer network and Internet

Unit-2 Application Layer

6 Hours

Principles of Network Applications, the web and HTTP, FTP, Email, DNS,

Unit-3: Transport Layer

6 Hours

Transport layer design issues, transport service primitives, internet transport protocol TCP/IP architecture, TCP/IP protocol, TCP/IP utilities, wireless TCP

Unit-4: Network layer

6 Hours

Network layer design issues, IP packets, IP addressing, virtual circuit and datagram networks, router and routing algorithms, congestion, internetworking, UDP, routers and gateways

Unit-5: The link layer and Local area Network

6 Hours

Services, error detection and correction techniques, multiple access protocols, and link layer addressing, Ethernet, Hubs and Switches, PPP

Unit-6: Security in Communication Networks

6 Hours

Network Security, cryptography, authentication, Integrity, firewalls, attacks and countermeasures,

Text books:				
1	Data Communication and Networking	Behrouz Forouzan	Fifth Edition	McGraw Hill
2	Computer Networking A top down Approach Featuring and Internet	James F. Kurose	Third Edition	Pearson
Reference books:				
1	Computer Networks	Andrew Tanenbaum	Fourth Edition	Prentice Hall PTR

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ELECTRONICS & COMMUNICATION ENGINEERING

VII Semester

ET2446 – PE VI: PLCs & SCADA

Prerequisites	-----
Course Objective Students should be able to: <ol style="list-style-type: none"> 1) Understand the fundamentals of Automation and their applications, systems used in industry such as PLC, Memory devices, Input /Output system and Relays. 2) Understand the working of Timing Circuits, Programming techniques with Input/Output Instructions and Addressing, overview of PLC timers and their application in industrial control. 3) Understand the PLC Counters, Data Comparators Instructions and application of sequencers based on these systems 4) Understand the networking using PLC systems and peripherals advanced PLC programming languages which are widely used in industrial automation. 	Course Outcome Students will be able to: <ol style="list-style-type: none"> 1) Describe automation, its importance, expectations from automation and applications in industry. 2) Describe and analyze Timing Circuits and Program PLC using ladder diagram for various applications. 3) Analyze and apply various instructions of PLC, PLC counters. 4) Explain the basic concepts of networking using PLC systems and peripherals

UNIT-1 :-

Introduction to Programmable Controllers

Definition , A Historical Background , Principles of Operation , PLCs Versus Other Types of Controls , PLC Product Application Ranges, Ladder Diagrams and the PLC , Advantages of PLCs, PLC Sizes and Scopes of Applications

Processors, the Power Supply, and Memory

Introduction , Processors, Processor Scan , The System Power Supply , Programming Devices, Memory Overview , Memory Types, Memory Structure and Capacity. Configuring the PLC Memory—I/O Addressing.

The Input/Output System

Introduction to Discrete I/O Systems , I/O Rack Enclosures and Table Mapping , Remote I/O Systems PLC Instructions for Discrete Inputs, Types of Discrete Modules, PLC Instructions for Discrete Outputs Overview of Analog Input Signals , Analog Input Connections, Special Analog, Temperature, and PID Interfaces.

(06Hours)

UNIT-2:

Introduction to Programming Languages

Types of PLC Languages, Ladder Diagram Format , Ladder Relay Instructions , Ladder Relay Programming, IEC 1131-3 Programming Languages – FBD/ST/IL/SFC, Control Task Definition, Control Strategy , Implementation Guidelines.

Programming Instructions

NO-NC & coil based instructions(Relay based Instructions), Timers, Counters, Compare, Mathematics, Jump and Subroutines, Scaling (Analog Instructions).

Installation & Wiring

I/O Installation, Wiring, and Precautions ,PLC Start-Up and Checking Procedures.

(06 Hours)

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**VI Semester****ET2361 - PE I : Object Oriented Programming**

Course Objective	Course Outcome
Students should be able to 1. Learn the basic concepts of Object Oriented Programming. 2. Understand the concepts of function, class, object and operator overloading. 3. Understand the fundamentals of data structures: lists, stacks, queues, trees, graphs. 4. Learn concepts of file handling, template, exception handling and command line arguments.	Students will be able to 1. Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects. 2. Demonstrate the use of various OOPs concepts with the help of C++ programs. 3. Design and develop C++ programs for implementing data structures using array and linked list. 4. Implement the concept of file handling, template and exception handling to develop the software.

UNIT-1:

Principles of Object Oriented Programming (OOP), Software Evaluation, OOP Paradigm, Basic Concepts of OOP, Benefits of OOP, Application of OOP. Introduction to C++, Tokens, Keywords, Identifiers, Variables, Operators, Manipulators. Expressions and Control Structures, Pointer, Arrays **06Hrs**

UNIT-2:

Functions, Function Prototyping Parameters Passing in Functions, Values Return by Functions, Inline Functions, Friend and Virtual Functions. Classes and Objects, Constructors and Destructors **06Hrs**

UNIT-3:

Operator overloading, Function Overloading, Inheritance, Types of Inheritance, **Polymorphism, Friend and Virtual Functions.** **06 Hrs**

UNIT-4:

Definition of a data structure, Primitive and Composite data types, Asymptotic notations, Operations of Arrays, Order lists, Stacks, Applications of Stack, Infix to Postfix Conversion, Queues, Operations of Queues. **06 Hrs**

UNIT-5:

Singly linked list, Operations, Doubly linked list, Operations, Trees and Graphs: Binary tree, Tree traversal; Graph, Definition, Types of Graphs, Traversal (BFS & DFS), Dijkstra's algorithm. **06Hrs**

UNIT-6:

Files – classes for file stream operations – Opening, Closing and Processing files – End of file detection – File pointers – Updating a file – Error Handling during file operations – Command line arguments – Templates – Exception Handling.

New topic to be announced time to time

06 Hrs**Text books:**

1	Object Oriented programming with C++	3rd. Edition Year 2008	E. Balagurusamy	McGraw-Hill
2	Object Oriented Programming in Microsoft C++	4 th edition 2002	Robert Lafore	Galgotia

Reference books:

1	Fundamental of data structure in C++	5 th edition,	Horowitz and S.Shani	Galgotia
2	Computer algorithms	2 nd Edition	Horowitz, S.Shani and S.Rajasekaran	Galgotia

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VI Semester

ET2362 - Lab.: PE I: Object Oriented Programming

Course Objective

Students should be able to

1. Learn the basic concepts of Object Oriented Programming.
2. Understand the concepts of function, class, object and operator overloading.
3. Understand the fundamentals of data structures: lists, stacks, queues, trees, graphs.
4. Learn concepts of file handling, template, exception handling and command line arguments.

Course Outcome

Students will be able to

1. Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
2. Demonstrate the use of various OOPs concepts with the help of C++ programs.
3. Design and develop C++ programs for implementing data structures using array and linked list.
4. Implement the concept of file handling, template and exception handling to develop the software.

Sr.No.	Name of Experiment
1	To implement <ul style="list-style-type: none">• Different Control Structures in C++• Concept of type casting
2	To implement the concept of <ul style="list-style-type: none">• Function• Function overloading
3	To implement concepts of Class, Object And Constructor.
4	To implement concepts of Inheritance and Virtual function
5	To implement concepts of operator overloading.
6	To implement concepts of friend function.
7	To implement Stack and Queue using array
8	To implement Stack and Queue using link list.
9	To implement the concepts of file handling and template.
10	To implement the concept of command line arguments and exception handling

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VI Semester

ET2371 - PE I : Fundamentals of Computing

Course Objective	Course Outcome
<p>Students should be able to</p> <ol style="list-style-type: none"> Understand the use of Python as a scripting language for programmers. Learn Python programming and to design applications 	<p>Students will be able to</p> <ol style="list-style-type: none"> Describe and develop Python programming using data types, operators and control structures Develop python programs using loops and decision statements. Describe and apply strings, lists, tuples, Numpy and dictionaries in Python programs. Develop python programs using functions and recursions .

UNIT-1

Introduction to Python ,Python syntax ,comments variables, basic programming

(06 Hours)

UNIT-2:

Data types, numbers, Casting strings Booleans, python operators: basic, membership and bitwise

(06 Hours)

UNIT-3:

Conditions, Control statements: if-else, loops, Use of while loops in python Loop manipulation using pass, continue, break and else

(06 Hours)

UNIT 4

Python String Defining list and list slicing, Use of Tuple data Types

(06 Hours)

UNIT 5:

List and Dictionary Manipulations Building blocks of python programs

(06 Hours)

UNIT 6:

Numpy, Functions, recursion and advanced programming

(06 Hours)

Text books:				
1	NPTEL material		Swayam.gov.in	NPTEL material
2	Complete Reference	Martin C Brown		TATA McGraw Hill
Reference books:				
1.	Core Python Programing	Wesley Chun,		Prentice Hall publications

VI Semester

ET2372 - Lab: PE I -Fundamentals of Computing

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VI Semester

ET2372 - Lab: PE I -Fundamentals of Computing

Expt. No.	Name of Experiment
1.	Write, test, and debug simple Python Programs
2.	Develop Python programs using different data types and understand their use
3.	Implement Python programs with conditionals and loops
4.	Implement Python programs with strings
5.	Develop Python programs for Python lists and understand their use
6.	Develop Python programs for Python tuples and understand their use
7.	Develop Python programs step-wise by Python dictionaries for representing compound data.
8.	Develop Python programs step-wise by defining functions and calling them
9.	Read and write data from/to files in Python.
10.	Mini Project

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Computer Technology



Computer Technology

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Fifth Semester														
1	5	HS	GE2312	Fundamentals of Economics	T	3	0	0	3	3	30	20	50	3 Hours
2	5	PC	CT2301	Computer Networks	T	3	0	0	3	3	30	20	50	3 Hours
3	5	PC	CT2302	Lab: Computer Networks	P	0	0	2	2	1		60	40	
4	5	PC	CT2303	Theoretical Foundations of Computer Science	T	4	0	0	4	4	30	20	50	3 Hours
5	5	PE		Professional Elective-I	T	3	0	0	3	3	30	20	50	3 Hours
6	5	PE		Lab: Professional Elective-I	P	0	0	2	2	1		60	40	
7	5	OE		Open Elective - I *	T	3	0	0	3	3	30	20	50	3 Hours
8	5	OE		Open Elective - II *	T	3	0	0	3	3	30	20	50	3 Hours
9	5/6	STR	CT2310	IND VISIT and its report	P	0	0	0	0	1		100		
TOTAL						19	0	4	23	22				

Professional Electives -I

1	5	PE-I	CT2311	PE I: Randomized Algorithm										
	5	PE-I	CT2312	PE I: Lab Randomized Algorithm										
2	5	PE-I	CT2313	PE I: Mobile Operating System										
	5	PE-I	CT2314	PE I: Lab: Mobile Operating System										
3	5	PE-I	CT2315	PE I: Advanced Web Technologies										
	5	PE-I	CT2316	PE I: Lab: Advanced Web										
4	5	PE-I	CT2317	PE I: Introduction to Geographical										
	5	PE-I	CT2318	PE I: Lab: Introduction to										
5	5	PE-I	CT2319	PE I: Computer Graphics										
	5	PE-I	CT2320	PE I: Lab: Computer Graphics										
6	5	PE-I	CT2321	PE I: Realtime Systems										
	5	PE-I	CT2322	PE I: Lab:Realtime Systems										
7	5	PE-I	CT2323	PEI : Privacy and Security in Online										
	5	PE-I	CT2324	PEI : Lab: Privacy and Security in										
8	5	PE-I	CT2390	PE I: Machine Learning using										
	5	PE-I	CT2391	PE I: Lab: Machine Learning using										

Open Electives -I

1	5	OE-I	CT2325	OE I: Introduction to DBMS										
2	5	OE-I	CT2326	OE I: Essentials of IT										
3	5	OE-I	CT2327	OE I: Image Processing										
4	5	OE-I	CT2328	OE I: Operating System Concepts										
5	5	OE-I	CT2329	OE-I Introduction to Salesforce										

Open Electives -II

1	5	OE-II	CT2331	OE II: Soft Computing										
2	5	OE-II	CT2332	OE II: Software Testing										
3	5	OE-II	CT2333	OE II: Internet Technology										
4	5	OE-II	CT2334	OE II: Multimedia and Animation										
5	5	OE-II	CT2335	OE II: Current Trends and Technologies										

Audit Courses

1	5	HS	AU2126	YCCE Communication Aptitude Preparation (YCAP5.1) for CV,ME,CT,IT,CSE	A	3	0	0	3	0				
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MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.05	Applicable for AY 2022-23 Onwards
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Computer Technology

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Sixth Semester														
1	6	HS	GE2311	Fundamentals of Management	T	3	0	0	3	3	30	20	50	3 Hours
2	6	PC	CT2351	Design & Analysis of Algorithms	T	3	0	0	3	3	30	20	50	3 Hours
3	6	PC	CT2352	Lab: Design & Analysis of Algorithms	P	0	0	2	2	1		60	40	
4	6	PC	CT2353	Language Processor	T	3	0	0	3	3	30	20	50	3 Hours
5	6	PC	CT2354	Lab: Language Processor	P	0	0	2	2	1		60	40	
6	6	PC	CT2355	Software Engineering	T	3	0	0	3	3	30	20	50	3 Hours
7	6	PC	CT2356	Lab: Software Engineering	P	0	0	2	2	1		60	40	
8	6	PE		Professional Elective-II	T	3	0	0	3	3	30	20	50	3 Hours
9	6	PE		Lab: Professional Elective-II	P	0	0	2	2	1		60	40	
10	6	OE		Open Elective - III **	T	3	0	0	3	3	30	20	50	3 Hours
11	6	OE		Open Elective - IV **	T	3	0	0	3	3	30	20	50	3 Hours
TOTAL						21	0	8	29	25				

Professional Electives -II

1	6	PE-II	CT2361	PE II: Digital Image Processing
	6	PE-II	CT2362	PE II: Lab: Digital Image Processing
2	6	PE-II	CT2363	PE II: Internet of Things
	6	PE-II	CT2364	PE II: Lab: Internet of Things
3	6	PE-II	CT2365	PE II: Business Intelligence
	6	PE-II	CT2366	PE II: Lab: Business Intelligence
4	6	PE-II	CT2367	PE II: Introduction to Natural Language Processing
	6	PE-II	CT2368	PE II: Lab: Introduction to Natural Language Processing
5	6	PE-II	CT2369	PE II: Customer Relationship Management
	6	PE-II	CT2370	PE II: Lab: Customer Relationship Management
6	6	PE-II	CT2392	PE II: Machine Learning using Tensorflow Part-2
	6	PE-II	CT2393	PE II: Lab: Machine Learning using Tensorflow Part-2
7	6	PE-II	CT2394	PE-II : Programming with Javascript
	6	PE-II	CT2395	PE-II : Lab. Programming with Javascript

Open Electives -III

1	6	OE-III	CT2371	OE III: Introduction to DBMS
2	6	OE-III	CT2372	OE III: Essentials of IT
3	6	OE-III	CT2373	OE III: Image Processing
4	6	OE-III	CT2374	OE III: Operating System Concepts
5	6	OE-III	CT2375	OE III: Introduction to Salesforce

Open Electives -IV

1	6	OE-IV	CT2381	OE IV: Soft Computing
2	6	OE-IV	CT2382	OE IV: Software Testing
3	6	OE-IV	CT2383	OE IV: Internet Technology
4	6	OE-IV	CT2384	OE IV: Multimedia and Animation
5	6	OE-IV	CT2385	OE IV: Current Trends and Technologies

Audit Courses

1	6	HS	AU2130	YCCE Communication Aptitude Preparation (YCAP6.3) for CT, IT, CSE	A	3	0	0	3	0				
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B.TECH SCHEME OF EXAMINATION 2020-21

(Revised Scheme of Examination w.e.f. 2022-23 onward)

Computer Technology

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activitied decided by course teacher, 4 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.05	Applicable for AY 2022-23 Onwards
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Computer Technology

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
Seventh Semester														
1	7	PC	CT2401	Artificial Intelligence	T	3	0	0	3	3	30	20	50	3 Hours
2	7	PC	CT2402	Lab: Artificial Intelligence	P	0	0	2	2	1		60	40	
3	7	PC	CT2403	Network Security	T	3	0	0	3	3	30	20	50	3 Hours
4	7	PE		Professional Elective-III	T	3	0	0	3	3	30	20	50	3 Hours
5	7	PE		Professional Elective-IV	T	3	0	0	3	3	30	20	50	3 Hours
6	7	PE		Lab: Professional Elective-IV	P	0	0	2	2	1		60	40	
7	7	PE		Professional Elective-V	T	3	0	0	3	3	30	20	50	3 Hours
8	7	STR	CT2409	Mini Project	P	0	0	4	4	2		60	40	
9	7	STR	CT2410	Campus Recruitment Training (CRT)	P	0	0	0	0	2		100		
TOTAL						15	0	8	23	21				

Professional Electives -III

1	7	PE-III	CT2411	PE III: Neural Network & Fuzzy Logic
2	7	PE-III	CT2412	PE III: Adhoc Wireless Network
3	7	PE-III	CT2413	PE III: Information Retrival System
4	7	PE-III	CT2414	PE III: Human Computer Interaction
5	7	PE-III	CT2415	PE III: Business Intelligence and Applications

Professional Electives -IV

1	7	PE-IV	CT2421	PE IV: Pattern Recognition
	7	PE-IV	CT2422	PE IV: Lab: Pattern Recognition
2	7	PE-IV	CT2423	PE IV: Cyber Forensic
	7	PE-IV	CT2424	PE IV: Lab: Cyber Forensic
3	7	PE-IV	CT2425	PE IV: Machine Learning
	7	PE-IV	CT2426	PE IV: Lab: Machine Learning
4	7	PE-IV	CT2427	PE IV: Design Patterns
	7	PE-IV	CT2428	PE IV: Lab: Design Patterns
5	7	PE-IV	CT2429	PE IV: Mobile Communication
	7	PE-IV	CT2430	PE IV: Lab: Mobile Communication
6	7	PE-IV	CT2431	PE IV: Software Project Management
	7	PE-IV	CT2432	PE IV: Lab: Software Project Management
7	7	PE-IV	CT2433	PE IV: Numerical Computing
	7	PE-IV	CT2434	PE IV: Lab: Numerical Computing
8	7	PE-IV	CT2491	PE IV: Java Full Stack Development
	7	PE-IV	CT2492	PE IV: Lab: Java Full Stack Development
9	7	PE-IV	CT2493	PE IV: DOT NET Full Stack Development
	7	PE-IV	CT2494	PE IV: Lab: DOT NET Full Stack Development

Professional Electives -V

1	7	PE-V	CT2435	PE V: Cloud Computing
2	7	PE-V	CT2436	PE V: Parallel Programming
3	7	PE-V	CT2437	PE V: Data Mining
4	7	PE-V	CT2438	PE V: Embedded Systems
5	7	PE-V	CT2439	PE V: Operations Research
5	7	PE-V	CT2440	PE V: Bioinformatics

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TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.05	Applicable for AY 2022-23 Onwards
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Information Technology



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
 (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2020-21
 (Revised Scheme of Examination w.e.f. 2022-23 onward)

SoE No.
IT-202.1

Information Technology

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
TOTAL FIRST & SECOND SEM										47				
Third Semester														
1	3	BS	GE2201	Engineering Mathematics III	T	3	0	0	3	3	30	20	50	3
2	3	PC	IT2201	Digital Circuits & Microprocessors	T	3	0	0	3	3	30	20	50	3
3	3	PC	IT2202	Digital Circuits & Microprocessors Lab	P	0	0	2	2	1		60	40	
4	3	PC	IT2203	Object Oriented Programming	T	3	0	0	3	3	30	20	50	3
5	3	PC	IT2204	Object Oriented Programming Lab	P	0	0	2	2	1		60	40	
6	3	PC	IT2205	Data Structures and Program Design-I	T	4	0	0	4	4	30	20	50	3
7	3	PC	IT2206	Data Structures and Program Design-I Lab	P	0	0	2	2	1		60	40	
8	3	PC	IT2207	Computer Architecture & Organization	T	3	0	0	3	3	30	20	50	3
9	3	PC	IT2208	Software Lab	P	0	0	2	2	1		60	40	
TOTAL THIRD SEM						16	0	8	24	20				

Fourth Semester														
1	4	BS	GE2206	Discrete Mathematics and Probability Theory	T	3	0	0	3	3	30	20	50	3
2	4	PC	IT2251	Data Structures and Program Design-II	T	3	0	0	3	3	30	20	50	3
3	4	PC	IT2252	Data Structures and Program Design-II Lab	P	0	0	2	2	1		60	40	
4	4	PC	IT2253	Computer Networks	T	4	0	0	4	4	30	20	50	3
5	4	PC	IT2254	Computer Networks Lab	P	0	0	2	2	1		60	40	
6	4	PC	IT2255	Operating Systems	T	3	0	0	3	3	30	20	50	3
7	4	PC	IT2256	Operating Systems Lab	P	0	0	2	2	1		60	40	
8	4	PC	IT2257	Theory of Computation	T	3	0	0	3	3	30	20	50	3
TOTAL FOURTH SEM						16	0	6	22	19				

Audit Courses														
1	4	HS	GE2121	Env Studies for 4 Sem. CV,ME,EE,IT	A	3	0	0	3	0				
2	3	HS	AU2123	YCCE Communication Aptitude Preparation (YCAP3)	A	3	0	0	3	0				
3	4	HS	AU2124	YCCE Communication Aptitude Preparation (YCAP4.1) for CV,ME,CT,IT,CSE	A	3	0	0	3	0				

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TA = for Practical : MSPA will be 15 marks each**

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B.TECH SCHEME OF EXAMINATION 2020-21
 (Revised Scheme of Examination w.e.f. 2022-23 onward)

SoE No.
IT-202.1

Information Technology

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
TOTAL FIRST & SECOND SEM										47				
Fifth Semester														
1	5	HS	GE2312	Fundamental of Economics	T	3	0	0	3	3	30	20	50	3
2	5	PC	IT2301	Data Base Management Systems	T	3	0	0	3	3	30	20	50	3
3	5	PC	IT2302	Lab : Data Base Management Systems	P	0	0	2	2	1		60	40	
4	5	PC	IT2303	Software Engineering	T	3	0	0	3	3	30	20	50	3
5	5	PE		Professional Elective - I	T	3	0	0	3	3	30	20	50	3
6	5	PE		Lab : Professional Elective-I	P	0	0	2	2	1		60	40	
7	5	OE		Open Elective-I	T	3	0	0	3	3	30	20	50	3
8	5	OE		Open Elective-II	T	3	0	0	3	3	30	20	50	3
9	5	STR	IT2310	Industrial Visit and Learning	P	0	0	0	0	1		100		
TOTAL FIFTH SEM						18	0	4	22	21				

Professional Electives -I

1	5	PE-1	IT2311	PE I: Web Programming
	5	PE-1	IT2312	PE I: Lab.: Web Programming
2	5	PE-1	IT2313	PE I: Data Analysis and Statistics
	5	PE-1	IT2314	PE I: Lab.: Data Analysis and Statistics
3	5	PE-1	IT2315	PE I: Customer Relationship Management
	5	PE-1	IT2316	PE I: Lab. Customer Relationship Management
4	5	PE-1	IT2317	PE I: Mobile Operating System
	5	PE-1	IT2318	PE I: Lab. Mobile Operating System
5	5	PE-1	IT2391	PE I: Java Full Stack Development Part-1
	5	PE-1	IT2392	PE I: Lab. Java Full Stack Development Part-1
6	5	PE-1	IT2393	PE I: Dot Net Full Stack Development Part-1
	5	PE-1	IT2394	PE I: Lab. Dot Net Full Stack Development Part-1

Open Electives -I

1	5	OE I	IT2321	OE I: Industry 4.0
2	5	OE I	IT2322	OE I: Core JAVA
3	5	OE I	IT2323	OE I: Introduction to Data Science

Open Electives -II

1	5	OE-II	IT2331	OE II: Introduction to Machine Learning
2	5	OE-II	IT2332	OE II: Information Security
3	5	OE-II	IT2333	OE II: Concepts in Web Programming

Audit Courses

1	5	HS	AU2126	YCCE Communication Aptitude Preparation (YCAP5.1) for CV,ME,CT,IT,CSE	A	3	0	0	3	0				
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SoE No.
IT-202.1

Information Technology

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
TOTAL FIRST & SECOND SEM										47				
Sixth Semester														
1	6	HS	GE2311	Fundamentals of Management	T	3	0	0	3	3	30	20	50	3
2	6	PC	IT2351	Design & Analysis of Algorithms	T	3	0	0	3	3	30	20	50	3
3	6	PC	IT2352	Lab: Design & Analysis of Algorithms	P	0	0	2	2	1		60	40	
4	6	PC	IT2353	Principles of Compiler Design	T	3	0	0	3	3	30	20	50	3
5	6	PC	IT2354	Lab: Principles of Compiler Design	P	0	0	2	2	1		60	40	
6	6	PE		Professional Elective - II	T	3	0	0	3	3	30	20	50	3
7	6	PE		Lab : Professional Elective-II	P	0	0	2	2	1		60	40	
8	6	OE		Open Elective-III	T	3	0	0	3	3	30	20	50	3
9	6	OE		Open Elective-IV	T	3	0	0	3	3	30	20	50	3
TOTAL SIXTH SEM						18	0	6	24	21				

List of Professional Electives-I & II

Professional Electives -II

1	6	PE-2	IT2361	PE II::Machine Learning
	6	PE-2	IT2362	PE II::Machine Learning Lab
2	6	PE-2	IT2363	PE II: Business Intelligence
	6	PE-2	IT2364	PE II: Lab.: Business Intelligence
3	6	PE-2	IT2365	PE II: Internet of Things
	6	PE-2	IT2366	PE II: Lab.: Internet of Things
4	6	PE-2	IT2367	PE II: Big Data Analytics
	6	PE-2	IT2368	PE II: Lab. Big Data Analytics
5	6	PE-2	IT2395	PE II: Java Full Stack Development Part-2
	6	PE-2	IT2396	PE II: Lab. Java Full Stack Development Part-2
6	6	PE-2	IT2397	PE II: Dot Net Full Stack Development Part-2
	6	PE-2	IT2398	PE II: Lab. Dot Net Full Stack Development Part-2
7	6	PE-2	IT2399	PE II: Software Testing & Automation
	6	PE-2	IT2300	PE II: Lab. Software Testing & Automation

Open Electives -III

1	6	OE-III	IT2371	OE-III : Industry 4.0
2	6	OE-III	IT2372	OE-III : Core JAVA
3	6	OE-III	IT2373	OE-III : Introduction to Data Science

Open Electives -IV

1	6	OE-IV	IT2381	OE-IV: Introduction to Machine Learning
2	6	OE-IV	IT2382	OE-IV: Information Security
3	6	OE-IV	IT2383	OE-IV: Concepts in Web Programming

Audit Courses

1	6	HS	AU2130	YCCE Communication Aptitude Preparation (YCAP6.3) for CT, IT, CSE	A	3	0	0	3	0				
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MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

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Information Technology

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
TOTAL FIRST & SECOND SEM										47				
Seventh Semester														
1	7	PC	IT2401	Data Mining	T	3	0	0	3	3	30	20	50	3
2	7	PC	IT2402	Lab.: Data Mining	P	0	0	2	2	1		60	40	
3	7	PC	IT2403	Principles of Artificial Intelligence	T	3	0	0	3	3	30	20	50	3
4	7	PE		Professional Elective III	T	3	0	0	3	3	30	20	50	3
5	7	PE		Professional Elective IV	T	3	0	0	3	3	30	20	50	3
6	7	PE		Lab.: Professional Elective IV	P	0	0	2	2	1		60	40	
7	7	PE		Professional Elective V	T	3	0	0	3	3	30	20	50	3
8	7	PE		Professional Elective VI	T	3	0	0	3	3	30	20	50	3
9	7	STR	IT2409	Mini Project	P	0	0	4	4	2		60	40	
10	7	STR	IT2410	Campus Recruitment Training (CRT)	P	0	0	0	0	2		100		
TOTAL SEVENTH SEM						18	0	8	26	24				

List of Professional Electives-III, IV,V & VI

Professional Electives -III

1	7	PE-3	IT2411	PE III: Cloud Computing
2	7	PE-3	IT2412	PE III:Real Time Systems
3	7	PE-3	IT2413	PE III: Network Security
4	7	PE-3	IT2414	PE III: Information Retrieval

Professional Electives -IV

1	7	PE-4	IT2421	PE IV: Neural Network and Fuzzy Logic
	7	PE-4	IT2422	PE IV: Lab.: Neural Network and Fuzzy Logic
2	7	PE-4	IT2423	PE IV: Ethical Hacking and Cyber Forensics
	7	PE-4	IT2424	PE IV:Lab:Ethical Hacking and Cyber Forensics
3	7	PE-4	IT2425	PE IV: Human Computer Interaction
	7	PE-4	IT2426	PE IV: Lab:Human Computer Interaction
4	7	PE-4	IT2427	PE IV: Parallel Computing
	7	PE-4	IT2428	PE IV: Lab: Parallel Computing
5	7	PE-4	IT2491	PE IV: Java Full Stack Development
	7	PE-4	IT2492	PE IV: Lab. Java Full Stack Development
6	7	PE-4	IT2493	PE IV: Dot Net Full Stack Development
	7	PE-4	IT2494	PE IV: Lab. Dot Net Full Stack Development

Professional Electives - V

1	7	PE-5	IT2431	PE V: Digital Image Processing
2	7	PE-5	IT2432	PE V: Distributed Systems
3	7	PE-5	IT2433	PE V: Coding Standard and Technical Documentation
4	7	PE-5	IT2434	PE V: Introduction to Deep Learning
5	7	PE-5	IT2435	PE V: Wireless Sensor Network

Professional Electives - VI

1	7	PE-6	IT2441	PE VI: Advanced Computer Architecture
2	7	PE-6	IT2442	PE VI: Mobile Communication
3	7	PE-6	IT2443	PE VI: E-commerce
4	7	PE-6	IT2444	PE VI: Natural Language Processing

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TA = for Practical : MSPA will be 15 marks each**

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Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
B.TECH SCHEME OF EXAMINATION 2020-21
(Revised Scheme of Examination w.e.f. 2022-23 onward)

SoE No.
IT-202.1

Information Technology

SN	Sem	Type	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
						L	T	P	Hrs		MSEs*	TA**	ESE	
TOTAL FIRST & SECOND SEM										47				
Eighth Semester														
1	8	STR	IT2451	Major Project	P	0	0	12	12	9		60	40	
2	8	STR	IT2452	Extra curricular Activity Evaluation	P	0	0	0	0	1		100		
TOTAL EIGHTH SEM						0	0	12	12	10				
GRAND TOTAL						86	0	44	130	162				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : 5 marks on lecture quizzes, 11 marks on TA2+TA4 activities decided by course teacher, 4 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		June 2022	1.05	Applicable for AY 2022-23 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

Computer Science & Engineering



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
 (An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B.TECH SCHEME OF EXAMINATION 2023
 (Scheme of Examination w.e.f. 2023-24 onward)
 (Department of Computer Science & Engineering)
B. Tech. in Computer Science & Engineering

**SoE No.
 23CSE-101**

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1103	Differential Equation and Complex Analysis	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1110	Applied Physics	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1111	Lab : Applied Physics	P	0	0	2	2	1		60	40	
4	1	BES	ME	23ME1101	Engineering Graphics	T	1	0	0	1	1	30	20	50	3
5	1	BES	ME	23ME1102	Lab : Engineering Graphics	P	0	0	4	4	2		60	40	
6	1	BES	EL	23EL1101	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	1	BES	CT	23CT1103	Lab : Computer WorkShop	P	0	0	2	2	1		60	40	
8	1	PC	CSE	23CSE1101	Object Oriented Programming using Python	T	3	0	0	3	3	30	20	50	3
9	1	PC	CSE	23CSE1102	Lab : Object Oriented Programming using Python	P	0	0	2	2	1		60	40	
10	1	VSEC	GE	23GE1117	Get Set Go	P	0	0	2	2	2		60	40	
11	1	CC2	GE		Liberal Learning Course (LLC2)	P	0	0	2	2	2		60	40	
TOTAL FIRST SEM							13	0	14	27	22				

MANDATORY LEARNING COURSES

1	1	HS	GE2131	Universal Human Values (UHV)	A	2	0	0	2	0					
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SECOND SEMESTER (GROUP-A)

1	2	BS	GE	23GE1201	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1206	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1207	Lab : Engineering Chemistry	P	0	0	2	2	1		60	40	
4	2	HS/AEC1	GE	23GE1212	Professional Communication	T	2	0	0	2	2	30	20	50	3
5	2	HS/IKS	GE	23GE1215	Indian Knowledge System	T	2	0	0	2	2	30	20	50	3
6	2	BES	CV	23CV1201	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3
7	2	BES	CV	23CV1202	Lab : Engineering Mechanics	P	0	0	2	2	1		60	40	
8	2	BES	IT	23IT1203	Programming for Problem Solving	T	2	0	0	2	2	30	20	50	3
9	2	BES	IT	23IT1204	Lab : Programming for Problem Solving	P	0	0	2	2	1		60	40	
10	2	VSEC	GE	23GE1218	Functional English	P	0	0	2	2	2		60	40	
11	2	CC2	GE		Liberal Learning Course (LLC1)	P	0	0	2	2	2		60	40	
TOTAL SECOND SEM							15	0	10	25	22				

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activities decided by course teacher, TA3 - 3 marks on class attendance**

TA = for Practical : MSPA will be 15 marks each**

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's
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B.TECH SCHEME OF EXAMINATION 2023
 (Scheme of Examination w.e.f. 2023-24 onward)
 (Department of Computer Science & Engineering)
B. Tech. in Computer Science & Engineering

SoE No.
23CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
Liberal Learning Course															
SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject										
1	2	CC2	GE	LLC1201	Music (Vocal)										
2	2	CC2	GE	LLC1202	Music (Instrumental)										
3	2	CC2	GE	LLC1203	Indian Classical Dance										
4	2	CC2	GE	LLC1204	Folk Dances										
5	2	CC2	GE	LLC1205	Painting										
6	2	CC2	GE	LLC1206	Theatre and acting										
7	2	CC2	GE	LLC1207	Photography										
8	2	CC2	GE	LLC1208	Yoga										
9	2	CC2	GE	LLC1209	Chess										
10	2	CC2	GE	LLC1210	Athletics										
11	2	CC2	GE	LLC1211	Basket Ball										
12	2	CC2	GE	LLC1212	Judo										
13	2	CC2	GE	LLC1213	Elements of Japanese Language										
14	2	CC2	GE	LLC1214	Elements of German Language										
15	2	CC2	GE	LLC1215	Elements of French Language										
16	2	CC2	GE	LLC1216	Elements of Spanish Language										
17	2	CC2	GE	LLC1217	Basics of Vedic Maths										
18	2	CC2	GE	LLC1218	Skilling in Microsoft Visio and Inkscape										
19	2	CC2	GE	LLC1219	Art of Public Speaking										

Liberal Learning Course														
SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject									
1	1	CC1	GE	LLC1101	Music (Vocal)									
2	1	CC1	GE	LLC1102	Music (Instrumental)									
3	1	CC1	GE	LLC1103	Indian Classical Dance									
4	1	CC1	GE	LLC1104	Folk Dances									
5	1	CC1	GE	LLC1105	Painting									
6	1	CC1	GE	LLC1106	Theatre and acting									
7	1	CC1	GE	LLC1107	Photography									
8	1	CC1	GE	LLC1108	Yoga									
9	1	CC1	GE	LLC1109	Chess									
10	1	CC1	GE	LLC1110	Athletics									
11	1	CC1	GE	LLC1111	Basket Ball									
12	1	CC1	GE	LLC1112	Judo									
13	1	CC1	GE	LLC1113	Elements of Japanese Language									
14	1	CC1	GE	LLC1114	Elements of German Language									
15	1	CC1	GE	LLC1115	Elements of French Language									
16	1	CC1	GE	LLC1116	Elements of Spanish Language									
17	1	CC1	GE	LLC1117	Basics of Vedic Maths									
18	1	CC1	GE	LLC1118	Skilling in Microsoft Visio and Inkscape									
19	1	CC1	GE	LLC1119	Art of Public Speaking									

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA ** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance

TA = for Practical : MSPA will be 15 marks each**

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
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SoE No.
23CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
2	3	BS	GE	23GE1303	Linear Algebra	T	3	0	0	3	3	30	20	50	3
3	3	PC	CSE	23CSE1301	Computer Architecture and Organization	T	3	0	0	3	3	30	20	50	3
4	3	PC	CSE	23CSE1302	Data structures	T	3	0	0	3	3	30	20	50	3
5	3	PC	CSE	23CSE1303	Lab : Data structures	P	0	0	2	2	1		60	40	
6	3	PC	CSE	23CSE1304	Lab : Programming with JAVA	P	0	0	2	2	1		60	40	
7	3	VEC-2	CSE	23CSE1305	Digital & Tecnological Solution / Understanding India-Ethics in IT	T	2	0	0	2	2	30	20	50	3
8	3	CEP	CSE	23CSE1306	Lab : Field Project-Computer Literacy	P	0	0	2	4	2		60	40	
9	3	OE-1	OE		Open Elective - I	T	2	0	0	2	2	30	20	50	3
10	3	MDM			MD Minor Course - I	T	2	0	0	2	2	30	20	50	3
Total							17	0	6	25	21				

List of Mandatory Learning Course (MLC)

1	3	HS	T&P	MLC2123	YCAPP3 : YCCE Communication Aptitude Preparation	A	3	0	0	3	0				
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Open Elective - I

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chemistry & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management
23	3	OE1	MGT	23OE1323	OE-I : Designated approved online NPTEL/KKSU Course
24	3	OE1	MGT	23OE1324	OE-I : Indian Archeology
25	3	OE1	MGT	23OE1325	OE-I : Social & Positive Psychology
26	3	OE1	MGT	23OE1326	OE-I : Seismology & Earthquake

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
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B.TECH SCHEME OF EXAMINATION 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Computer Science & Engineering)
B. Tech. in Computer Science & Engineering

SoE No.
23CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
Chairperson			Dean (Acad. Matters)			Date of Release				Version					



Nagar Yuwak Shikshan Sanstha's
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SoE No.
23CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FOURTH SEMESTER															
1	4	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
2	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language / Hindi Language	T	2	0	0	2	2	30	20	50	3
3	4	VEC-1	CV	23CV1411	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
4	4	PC	CSE	23CSE1401	Discrete Mathematics and Graph theory	T	3	0	0	3	3	30	20	50	3
5	4	PC	CSE	23CSE1402	Operating system	T	3	0	0	3	3	30	20	50	3
6	4	PC	CSE	23CSE1403	Lab : Operating system	P	0	0	2	2	1		60	40	
7	4	PC	CSE	23CSE1404	Introduction to data analysis	T	3	0	0	3	3	30	20	50	3
8	4	PC	CSE	23CSE1405	Lab : Introduction to data analysis	T	0	0	2	2	1		60	40	
9	4	VSEC-3	CSE	23CSE1406	Lab : Vocational & Skill Enhancement - Web Technology	P	0	0	2	4	2		60	40	
10	4	OE-2	OE		Open Elective - II	T	2	0	0	2	2	30	20	50	3
11	4	MDM	CSE		MD Minor Course - II	T	2	0	0	2	2	30	20	50	3
TOTAL							19	0	6	27	23				

List of Mandatory Learning Course (MLC)

1	4	HS	T&P	MLC2124	YCAP4 : YCCE Communication Aptitude Preparation	A	3	0	0	3	0				
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Open Elective - II

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management
23	4	OE2	MGT	23OE2423	OE-II : Designated approved online NPTEL/KKSU Course
24	4	OE2	MGT	23OE2424	OE-II : Indian Archeology
25	4	OE2	MGT	23OE2425	OE-II : Social & Positive Psychology
26	4	OE2	MGT	23OE2426	OE-II : Seismology & Earthquake

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
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B.TECH SCHEME OF EXAMINATION 2023
(Scheme of Examination w.e.f. 2023-24 onward)
(Department of Computer Science & Engineering)
B. Tech. in Computer Science & Engineering

SoE No.
23CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
Chairperson			Dean (Acad. Matters)			Date of Release				Version		At 2023-24 Onwards			



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B. Tech. in Computer Science & Engineering

SoE No.
23CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	CSE	23CSE1501	Theory of computation	T	3	0	0	3	3	30	20	50	3
2	5	PC	CSE	23CSE1502	Database management systems	T	3	0	0	3	3	30	20	50	3
3	5	PC	CSE	23CSE1503	Lab : Database management systems	P	0	0	2	2	1		60	40	
4	5	PC	CSE	23CSE1504	Design and analysis of algorithms	T	3	0	0	3	3	30	20	50	3
5	5	PC	CSE	23CSE1505	Lab : Design and analysis of algorithms	P	0	0	2	2	1		60	40	
6	5	PE	CSE		Professional Elective I	T	3	0	0	3	3	30	20	50	3
7	5	PE	CSE		Lab : Professional Elective I	P	0	0	2	2	1		60	40	
8	5	STR	CSE	23CSE1506	Industrial training, Internship, Seminar and Report	P	0	0	2	2	1		60	40	
9	5	MDM	CSE		MD Minor Course-III	T	3	0	0	3	3	30	20	50	3
10	5	OE-3	OE		Open Elective -III	T	3	0	0	3	3	30	20	50	3
11	5	OE-3	OE		Lab : Open Elective -III	P	0	0	2	2	1		60	40	
TOTAL							18	0	10	28	23				

List of Mandatory Learning Course (MLC)

1	5	HS	T&P	MLC2125	YCAP5 :	A	3	0	0	3	0				
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Professional Elective - I

1	5	PE-I	CSE	23CSE1521	PE-I : Digital Image Processing
2	5	PE-I	CSE	23CSE1522	PE-I : Lab : Digital Image Processing
3	5	PE-I	CSE	23CSE1523	PE-I : Business Intelligence
4	5	PE-I	CSE	23CSE1524	PE-I : Lab : Business Intelligence
5	5	PE-I	CSE	23CSE1525	PE-I : Mobile Application Development
6	5	PE-I	CSE	23CSE1526	PE-I : Lab : Mobile Application Development
7	5	PE-I	CSE	23CSE1527	PE-I : Internet of Things
8	5	PE-I	CSE	23CSE1528	PE-I : Lab : Internet of Things
9	5	PE-I	CSE	23CSE1529	PE-I : Introduction to geographical information system
10	5	PE-I	CSE	23CSE1530	PE-I : Lab : Introduction to geographical information system
11	5	PE-I	CSE	23CSE1531	PE-I : Neural networks and applications
12	5	PE-I	CSE	23CSE1532	PE-I : Lab : Neural networks and applications
13	5	PE-I	CSE	23CSE1533	PE-I : Advanced web technology
14	5	PE-I	CSE	23CSE1534	PE-I : Lab : Advanced web technology Lab

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SoE No.
23CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	CSE	23CSE1601	Machine Learning	T	3	0	0	3	3	30	20	50	3
2	6	PC	CSE	23CSE1602	Lab : Machine Learning	P	0	0	2	2	1		60	40	
3	6	PC	CSE	23CSE1603	Language processors	T	3	0	0	3	3	30	20	50	3
4	6	PC	CSE	23CSE1604	Lab : Language processors	P	0	0	2	2	1	60	40		
5	6	VSEC-4	CSE	23CSE1605	Lab : Vocational & Skill Enhancement - Linux Administration and shell programming	P	0	0	2	4	2		60	40	
6	6	STR	CSE	23CSE1606	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
7	6	STR	CSE	23CSE1607	Project Phase-I	P	0	0	4	4	2		60	40	
8	6	PE	CSE		Professional elective - II	T	3	0	0	3	3	30	20	50	3
9	6	PE	CSE		Professional elective - III	T	3	0	0	3	3	30	20	50	3
10	6	PE	CSE		Professional elective - IV	T	3	0	0	3	3	30	20	50	3
11	6	MDM	MDM		MD Minor Course - IV	T	3	0	0	3	3	30	20	50	3
TOTAL							20	0	10	32	26				

List of Mandatory Learning Course (MLC)

1	6	HS	T&P	MLC126	YCAP6 :	A	3	0	0	3	0				
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Professional Elective - II

1	6	PE-II	CSE	23CSE1621	PE-II : Big Data Analytics
2	6	PE-II	CSE	23CSE1622	PE-II : Computer Graphics
3	6	PE-II	CSE	23CSE1623	PE-II : Parallel computing
4	6	PE-II	CSE	23CSE1624	PE-II : Game Theory
5	6	PE-II	CSE	23CSE1625	PE-II : Real time system
6	6	PE-II	CSE	23CSE1626	PE-II : Edge computing
7	6	PE-II	CSE	23CSE1627	PE-II : Management Information system

Professional Elective - III

1	6	PE-III	CSE	23CSE1641	PE-III : Financial Data analysis
2	6	PE-III	CSE	23CSE1642	PE-III : Augmented Reality
3	6	PE-III	CSE	23CSE1643	PE-III : Information Retrieval System
4	6	PE-III	CSE	23CSE1644	PE-III : Optimization Techniques
5	6	PE-III	CSE	23CSE1645	PE-III : Human Computer interaction
6	6	PE-III	CSE	23CSE1646	PE-III : Blockchain Technology
7	6	PE-III	CSE	23CSE1647	PE-III : Bioinformatics

Professional Elective - IV

1	6	PE-IV	CSE	23CSE1661	PE IV : GPU architecture and Programming
2	6	PE-IV	CSE	23CSE1662	PE IV : Quantum Computing
3	6	PE-IV	CSE	23CSE1663	PE IV : Prompt Engineering
4	6	PE-IV	CSE	23CSE1664	PE IV : Nature Inspired Computing
5	6	PE-IV	CSE	23CSE1665	PE IV : Distributed algorithms
6	6	PE-IV	CSE	23CSE1666	PE IV : Industry 4.0
7	6	PE-IV	CSE	23CSE1667	PE IV : Embedded systems

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B.TECH SCHEME OF EXAMINATION 2023
 (Scheme of Examination w.e.f. 2023-24 onward)
(Department of Computer Science & Engineering)
B. Tech. in Computer Science & Engineering

SoE No.
23CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
SEVENTH SEMESTER															
1	7	PC	CSE	23CSE1701	Computer system security	T	3	0	0	3	3	30	20	50	3
2	7	PC	CSE	23CSE1702	Artificial Intelligence	T	3	0	0	3	3	30	20	50	3
3	7	PC	CSE	23CSE1703	Lab : Artificial Intelligence	P	0	0	2	2	1		60	40	
4	7	PC	CSE	23CSE1704	Software Engineering	T	3	0	0	3	3	30	20	50	3
5	7	PC	CSE	23CSE1705	Computer Networks	T	3	0	0	3	3	30	20	50	3
6	7	PC	CSE	23CSE1706	Lab : Computer Networks	P	0	0	2	2	1		60	40	
7	7	PC	CSE	23CSE1707	Comprehensive Evaluation of Core Knowledge	P	0	0	2	2	1		60	40	
8	7	STR	CSE	23CSE1708	Project Phase -II	P	0	0	8	8	4		60	40	3
9	7	STR	CSE	23CSE1709	CRT	P	0	0	0	0	2			100	
10	7	PE	CSE		Professional elective V	T	3	0	0	3	3	30	20	50	3
11	7	PE	CSE		Lab : Professional elective V	P	0	0	2	2	1		60	40	
12	7	MDM	CSE		MD Minor Course-V	T	2	0	0	2	2	30	20	50	3
TOTAL							17	0	16	33	27				

Professional Elective - V

1	7	PE-V	CSE	23CSE1721	PE-V : Deep Learning
2	7	PE-V	CSE	23CSE1722	PE-V : Lab : Deep Learning Lab
3	7	PE-V	CSE	23CSE1723	PE-V : Cloud Computing
4	7	PE-V	CSE	23CSE1724	PE-V : Lab : Cloud Computing Lab
5	7	PE-V	CSE	23CSE1725	PE-V : Java Fullstack Development
6	7	PE-V	CSE	23CSE1726	PE-V : Lab : Java Fullstack Development
7	7	PE-V	CSE	23CSE1727	PE-V : Natural Language Processing
8	7	PE-V	CSE	23CSE1728	PE-V : Lab : Natural Language Processing
9	7	PE-V	CSE	23CSE1729	PE-V : NET fullstack development
10	7	PE-V	CSE	23CSE1730	PE-V : Lab : NETfullstack development
11	7	PE-V	CSE	23CSE1731	PE-V : MLOps
12	7	PE-V	CSE	23CSE1732	PE-V : Lab : MLOps
13	7	PE-V	CSE	23CSE1733	PE-V : DevOps
14	7	PE-V	CSE	23CSE1734	PE-V : Lab : DevOps

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 (Department of Computer Science & Engineering)
B. Tech. in Computer Science & Engineering

SoE No.
23CSE-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
EIGHTH SEMESTER															
1	8	MDM	CSE		MD Minor Course-VI	T	2	0	0	2	2	30	20	50	3
2	8	STR	CSE	23CSE1801	Internship / On Job training	P	0	0	18	18	9			100	
3	8	PE	CSE		Professional Elective-VI	T	3	0	0	3	3	30	20	50	3
TOTAL							5	0	18	23	14				

GRAND TOTAL							124	0	90	220	178				
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Professional Elective - VI

1	8	PE-VI	CSE	23CSE1821	PE VI : Advanced AI
2	8	PE-VI	CSE	23CSE1822	PE VI : Virtual Reality
3	8	PE-VI	CSE	23CSE1823	PE VI : Health care Analytics
4	8	PE-VI	CSE	23CSE1824	PE VI : Reinforcement Learning
5	8	PE-VI	CSE	23CSE1825	PE VI : E- Commerce
6	8	PE-VI	CSE	23CSE1826	PE VI : Adhoc wireless networks
7	8	PE-VI	CSE	23CSE1827	PE VI : Multicore technologies

Multidisciplinary Minor Courses

		Track 1		Track 2	
Courses	Sem	MDMT1CSE101 : Image processing and Computer Vision		MDMT2CSE201 : Cryptography and Digital Forensics	
MDM-I	3	(MDM1CSE101) Algorithms and Data Structure		(MDM1CSE201) Internet technologies and Cyber laws	
MDM-II	4	(MDM2CSE102) Fundamentals of Digital Image Processing		(MDM2CSE202) Digital Forensic	
MDM-III	5	(MDM3CSE103) Computer Vision Essentials		(MDM3CSE203) Ethical Hacking	
MDM-IV	6	(MDM4CSE104) Programming Framework for Computer Vision		(MDM4CSE204) Cryptography	
MDM-V	7	(MDM5CSE105) Basics of Artificial Neural Network		(MDM5CSE205) Cyber Audit	
MDM-VI	8	(MDM6CSE106) Machine Learning fundamentals		(MDM6CSE206) IOT Security	

		Track 3	
Courses	Sem	MDMT3CSE301 : Software Systems	
MDM-I	3	(MDM1CSE301) Data Structure Essentials	
MDM-II	4	(MDM2CSE302) Object Oriented Concepts using Java	
MDM-III	5	(MDM3CSE303) Software Engineering Concepts	
MDM-IV	6	(MDM4CSE304) Software Design Patterns	
MDM-V	7	(MDM5CSE305) Software Testing Essentials	
MDM-VI	8	(MDM6CSE306) Software Project Management in Practice	

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 (Department of Computer Science & Engineering)
B. Tech. in Artificial Intelligence and Machine Learning

SoE No.
23AML-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FIRST SEMESTER (GROUP-A)															
1	1	BS	GE	23GE1101	Calculus and Vector	T	3	0	0	3	3	30	20	50	3
2	1	BS	GE	23GE1106	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3
3	1	BS	GE	23GE1107	Lab : Engineering Chemistry	P	0	0	2	2	1		60	40	
4	1	HS/AEC1	GE	23GE1113	Technical Communication	T	2	0	0	2	2	30	20	50	3
5	1	HS/AEC2	GE	23GE1114	Lab : Technical Communication	P	0	0	2	2	1		60	40	
6	1	HS/IKS	GE	23GE1115	Indian Knowledge System	T	2	0	0	2	2	30	20	50	3
7	1	BES	AML	23AML103	Web Technology	T	2	0	0	2	2	30	20	50	3
8	1	BES	AML	23AML104	Lab : Web Technology	P	0	0	2	2	1		60	40	
9	1	BES	AML	23AML1101	Introduction to Computer Programming	T	2	0	0	2	2	30	20	50	3
10	1	BES	AML	23AML1102	Lab : Introduction to Computer Programming	P	0	0	2	2	1		60	40	
11	1	VSEC	GE	23GE1117	Get Set Go	P	0	0	2	2	2		60	40	
12	1	CC1	GE		Liberal Learning Course (LLC1)	P	0	0	2	2	2		60	40	
TOTAL FIRST SEM							14	0	12	26	22				

MANDATORY LEARNING COURSES															
1	1	HS	GE213	Universal Human Values (UHV)		A	2	0	0	2	0				

SECOND SEMESTER (GROUP-A)															
1	2	BS	GE	23GE1203	Differential Equation and Complex Analysis	T	3	0	0	3	3	30	20	50	3
2	2	BS	GE	23GE1210	Applied Physics	T	3	0	0	3	3	30	20	50	3
3	2	BS	GE	23GE1211	Lab : Applied Physics	P	0	0	2	2	1		60	40	
4	2	BES	AML	23AML1205	Data Structure	T	3	0	0	3	3	30	20	50	3
5	2	BES	AML	23AML1206	Lab : Data Structure	P	0	0	2	2	1		60	40	
6	2	BES	EL	23EL1201	Basic Electrical and Electronics Engineering	T	3	0	0	3	3	30	20	50	3
7	2	PC	AML	23AML1207	Object Oriented Programming	T	3	0	0	3	3	30	20	50	3
8	2	PC	AML	23AML1208	Lab : Object Oriented Programming	P	0	0	2	2	1		60	40	
9	2	VSEC	GE	23GE1218	Functional English	P	0	0	2	2	2		60	40	
10	2	CC2	GE		Liberal Learning Course (LLC2)	P	0	0	2	2	2		60	40	
TOTAL SECOND SEM							15	0	10	25	22	150			

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment
TA** = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activities decided by course teacher, TA3 - 3 marks on class attendance
TA** = for Practical : MSPA will be 15 marks each

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B. Tech. in Artificial Intelligence and Machine Learning

**SoE No.
23AML-101**

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							L	T	P	Hrs		MSEs*	TA**	ESE	
Liberal Learning Course															
SN	Sem	Type	BoS / Deptt	Sub. Code	Subject										
1	2	CC2	GE	LLC1201	Music (Vocal)										
2	2	CC2	GE	LLC1202	Music (Instrumental)										
3	2	CC2	GE	LLC1203	Indian Classical Dance										
4	2	CC2	GE	LLC1204	Folk Dances										
5	2	CC2	GE	LLC1205	Painting										
6	2	CC2	GE	LLC1206	Theatre and acting										
7	2	CC2	GE	LLC1207	Photography										
8	2	CC2	GE	LLC1208	Yoga										
9	2	CC2	GE	LLC1209	Chess										
10	2	CC2	GE	LLC1210	Athletics										
11	2	CC2	GE	LLC1211	Basket Ball										
12	2	CC2	GE	LLC1212	Judo										
13	2	CC2	GE	LLC1213	Elements of Japanese Language										
14	2	CC2	GE	LLC1214	Elements of German Language										
15	2	CC2	GE	LLC1215	Elements of French Language										
16	2	CC2	GE	LLC1216	Elements of Spanish Language										
17	2	CC2	GE	LLC1217	Basics of Vedic Maths										
18	2	CC2	GE	LLC1218	Skilling in Microsoft Visio and Inkscape										
19	2	CC2	GE	LLC1219	Art of Public Speaking										

Liberal Learning Course														
SN	Sem	Type	BoS / Deptt	Sub. Code	Subject									
1	1	CC1	GE	LLC1101	Music (Vocal)									
2	1	CC1	GE	LLC1102	Music (Instrumental)									
3	1	CC1	GE	LLC1103	Indian Classical Dance									
4	1	CC1	GE	LLC1104	Folk Dances									
5	1	CC1	GE	LLC1105	Painting									
6	1	CC1	GE	LLC1106	Theatre and acting									
7	1	CC1	GE	LLC1107	Photography									
8	1	CC1	GE	LLC1108	Yoga									
9	1	CC1	GE	LLC1109	Chess									
10	1	CC1	GE	LLC1110	Athletics									
11	1	CC1	GE	LLC1111	Basket Ball									
12	1	CC1	GE	LLC1112	Judo									
13	1	CC1	GE	LLC1113	Elements of Japanese Language									
14	1	CC1	GE	LLC1114	Elements of German Language									
15	1	CC1	GE	LLC1115	Elements of French Language									
16	1	CC1	GE	LLC1116	Elements of Spanish Language									
17	1	CC1	GE	LLC1117	Basics of Vedic Maths									
18	1	CC1	GE	LLC1118	Skilling in Microsoft Visio and Inkscape									
19	1	CC1	GE	LLC1119	Art of Public Speaking									

MSEs* = Two MSEs of 15 Marks each will conducted and marks of these 2 MSEs will be considered for Continuous Assessment

TA = for Theory : TA1-5 marks on Proctored Online Exam, TA2-12 marks on activitied decided by course teacher, TA3 - 3 marks on class attendance**

TA = for Practical : MSPA will be 15 marks each**

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SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
THIRD SEMESTER															
1	3	BS	GE	23GE1303	Linear Algebra	T	3	0	0	3	3	30	20	50	3
2	3	HSSM-1	GE	23GE1301	Fundamentals of Management & Economics	T	2	0	0	2	2	30	20	50	3
3	3	VEC-1	CV	23CV1311	Environmental Sustainability, Pollution and Management	T	2	0	0	2	2	30	20	50	3
4	3	PC	AML	23AML1301	Computer Architecture & Organisation	T	3	0	0	3	3	30	20	50	3
5	3	PC	AML	23AML1302	Database Management Systems	T	3	0	0	3	3	30	30	40	3
6	3	PC	AML	23AML1303	Lab : Database Management Systems	P	0	0	2	2	1		60	40	
7	3	PC	AML	23AML1304	Lab : Programming with Python	P	0	0	2	2	1		60	40	
8	3	CEP	AML	23AML1305	Lab : Field Project- Computer Literacy	P	0	0	2	4	2		60	40	
9	3	OE-1	OE		Open Elective -I	T	2	0	0	2	2	30	20	50	3
10	3	MDM	AML		MD Minor Course-I	T	2	0	0	2	2	30	20	50	3
TOTAL							17	0	6	25	21				

List of Mandatory Learning Course (MLC)

1	3	HS	T&P	MLC2123	YCAP3 : YCCE Communication Aptitude Preparation	A	3	0	0	3	0				
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Open Elective - I

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	3	OE1	GE	23OE1301	OE-I : Combinatorics
2	3	OE1	GE	23OE1302	OE-I : Fuzzy Set Theory, Arithmetic And Logic
3	3	OE1	GE	23OE1303	OE-I : Green Chem. & Sustainability
4	3	OE1	GE	23OE1304	OE-I : Hydrogen Fuel
5	3	OE1	GE	23OE1305	OE-I : Electronic Materials And Applications
6	3	OE1	GE	23OE1306	OE-I : Laser Technology And Applications
7	3	OE1	MGT	23OE1307	OE-I : Finance And Cost Management
8	3	OE1	MGT	23OE1308	OE-I : Operation Research Techniques
9	3	OE1	MGT	23OE1309	OE-I : Project Evaluation & Management
10	3	OE1	MGT	23OE1310	OE-I : Total Quality Management
11	3	OE1	MGT	23OE1311	OE-I : Value Engineering
12	3	OE1	MGT	23OE1312	OE-I : Maintenance Management
13	3	OE1	MGT	23OE1313	OE-I : Industrial Safety
14	3	OE1	MGT	23OE1314	OE-I : Industry 4.0
15	3	OE1	MGT	23OE1315	OE-I : Operation Management
16	3	OE1	MGT	23OE1316	OE-I : Material Management
17	3	OE1	MGT	23OE1317	OE-I : Hospitality Management
18	3	OE1	MGT	23OE1318	OE-I : Human Resource Management & Organizational Behaviour
19	3	OE1	MGT	23OE1319	OE-I : Agri-Business Management
20	3	OE1	MGT	23OE1320	OE-I : Rural Marketing
21	3	OE1	MGT	23OE1321	OE-I : Marketing Management
22	3	OE1	MGT	23OE1322	OE-I : Health Care Management

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B. Tech. in Artificial Intelligence and Machine Learning

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23AML-101**

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSEs*	TA**	ESE	
FOURTH SEMESTER															
1	4	HSSM-2	GE	23GE1401	Entrepreneurship Development	T	2	0	0	2	2	30	20	50	3
2	4	AEC-2	GE	23GE1405 23GE1406	Marathi Language Hindi Language	T	2	0	0	2	2	30	20	50	3
3	4	PC	AML	23AML1401	Operating Systems	T	3	0	0	3	3	30	30	40	3
4	4	PC	AML	23AML1402	Lab : Operating Systems	P	0	0	2	2	1		60	40	
5	4	PC	AML	23AML1403	Discrete Mathematics and Probability theory	T	3	0	0	3	3	30	30	40	3
6	4	PC	AML	23AML1404	Statistics for data science	T	3	0	0	3	3	30	30	40	3
7	4	PC	AML	23AML1405	Lab : Statistics for data science	P	0	0	2	2	1		60	40	
8	4	VEC-2	AML	23AML1406	Digital & Technological Solution- Open source tools	T	2	0	0	2	2	30	20	50	3
9	4	VSEC-3	AML	23AML1407	Lab : Vocational & Skill Enhancement - Web Application development	P	0	0	2	4	2		60	40	
10	4	OE-2	OE		Open Elective -II	T	2	0	0	2	2	30	20	50	3
11	4	MDM	AML		MD Minor Course-II	T	2	0	0	2	2	30	20	50	3
TOTAL							19	0	6	27	23				

List of Mandatory Learning Course (MLC)

1	4	HS	T&P	MLC2124	YCAP4 : YCCE Communication Aptitude Preparation	A	3	0	0	3	0				
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Open Elective - II

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject
1	4	OE2	GE	23OE2401	OE-II : Combinatorics
2	4	OE2	GE	23OE2402	OE-II : Fuzzy Set Theory, Arithmetic And Logic
3	4	OE2	GE	23OE2403	OE-II : Green Chem. & Sustainability
4	4	OE2	GE	23OE2404	OE-II : Hydrogen Fuel
5	4	OE2	GE	23OE2405	OE-II : Electronic Materials And Applications
6	4	OE2	GE	23OE2406	OE-II : Laser Technology And Applications
7	4	OE2	MGT	23OE2407	OE-II : Finance And Cost Management
8	4	OE2	MGT	23OE2408	OE-II : Operation Research Techniques
9	4	OE2	MGT	23OE2409	OE-II : Project Evaluation & Management
10	4	OE2	MGT	23OE2410	OE-II : Total Quality Management
11	4	OE2	MGT	23OE2411	OE-II : Value Engineering
12	4	OE2	MGT	23OE2412	OE-II : Maintenance Management
13	4	OE2	MGT	23OE2413	OE-II : Industrial Safety
14	4	OE2	MGT	23OE2414	OE-II : Industry 4.0
15	4	OE2	MGT	23OE2415	OE-II : Operation Management
16	4	OE2	MGT	23OE2416	OE-II : Material Management
17	4	OE2	MGT	23OE2417	OE-II : Hospitality Management
18	4	OE2	MGT	23OE2418	OE-II : Human Resource Management & Organizational Behaviour
19	4	OE2	MGT	23OE2419	OE-II : Agri-Business Management
20	4	OE2	MGT	23OE2420	OE-II : Rural Marketing
21	4	OE2	MGT	23OE2421	OE-II : Marketing Management
22	4	OE2	MGT	23OE2422	OE-II : Health Care Management

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 (Department of Computer Science & Engineering)
B. Tech. in Artificial Intelligence and Machine Learning

SoE No.
23AML-101

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							L	T	P	Hrs		MSEs*	TA**	ESE	
FIFTH SEMESTER															
1	5	PC	AML	23AML1501	Formal Language & Automata Theory	T	3	0	0	3	3	30	20	50	3
3	5	PC	AML	23AML1502	Design & Analysis of Algorithms	T	3	0	0	3	3	30	30	40	3
4	5	PC	AML	23AML1503	Lab : Design & Analysis of Algorithms	P	0	0	2	2	1		60	40	
5	5	PC	AML	23AML1504	Fundamentals of Artificial Intelligence	T	0	0	3	3	3	30	40	3	
6	5	PC	AML	23AML1505	Lab : Fundamentals of Artificial Intelligence	P	0	0	2	2	1	1	60	40	
7	5	PE	AML		Professional Elective-I	T	3	0	0	3	3	30	30	40	3
8	5	PE	AML		Lab : Professional Elective-I	P	0	0	2	2	1	1	60	40	
9	5	STR	AML	23AML1506	Industrial training, Intership, Seminar and Report	P	0	0	2	2	1		60	40	
10	5	MDM	AML		MD Minor Course - III	T	3	0	0	3	3	30	20	50	3
11	5	OE-3	OE		Open Elective - III	T	3	0	0	3	3	30	20	50	3
12	5	OE-3	OE		Lab : Open Elective - III	P	0	0	2	2	1		60	40	
TOTAL							15	0	13	28	23				

List of Mandatory Learning Course (MLC)															
1	5	HS	T&P	MLC2125	YCAP5 :	A	3	0	0	3	0				

Professional Elective - I					
1	6	PE-I	AML	23AML1521	PE-I : Neural Network algorithms and applications
2	6	PE-I	AML	23AML1522	PE-I : Lab : Neural Network algorithms and applications
3	6	PE-I	AML	23AML1523	PE-I : Digital Image Processing
4	6	PE-I	AML	23AML1524	PE-I : Lab : Digital Image Processing
5	6	PE-I	AML	23AML1525	PE-I : Business Intelligence and Analytics
6	6	PE-I	AML	23AML1526	PE-I : Lab : Business Intelligence and Analytics
7	6	PE-I	AML	23AML1527	PE-I : Internet of Things
8	6	PE-I	AML	23AML1528	PE-I : Lab : Internet of Things

		July, 2023	1.00	Applicable for
Chairperson	Dean (Acad. Matters)	Date of Release	Version	AY 2023-24 Onwards



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
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B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of **Computer Science & Engineering**)

B. Tech. in Artificial Intelligence and Machine Learning

**SoE No.
23AML-101**

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
							L	T	P	Hrs		MSES*	TA**	ESE	
SIXTH SEMESTER															
1	6	PC	AML	23AML1601	Machine Learning Essentials	T	3	0	0	3	3	30	30	40	3
2	6	PC	AML	23AML1602	Lab : Machine Learning Essentials	P	0	0	2	2	1		60	40	
3	6	PC	AML	23AML1603	Computer Networks	T	3	0	0	3	3	30	30	40	3
4	6	PC	AML	23AML1604	Advanced Artificial Intelligence	T	3	0	0	3	3	30	30	40	3
5	6	PC	AML	23AML1605	Lab: Advanced Artificial Intelligence	P	0	0	2	2	1	30	30	40	3
6	6	PE	AML		Professional Elective - II	T	3	0	0	3	3	30	30	40	3
7	6	PE	AML		Professional Elective - III	T	3	0	0	3	3	30	30	40	3
8	6	STR	AML	23AML1606	Design Thinking and Research Methodology	T	2	0	0	2	2	30	20	50	3
9	6	MDM	AML		MD Minor Course-IV	T	3	0	0	3	3	30	20	50	3
10	6	VSEC-4	AML	23AML1607	Lab : Vocational & Skill Enhancement - Linux administration and shell programming	P	0	0	2	4	2		60	40	
11	6	STR	AML	23AML1608	Project Phase-I	P	0	0	4	4	2		60	40	
TOTAL							20	0	10	32	26				

List of Mandatory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	% Weightage	ESE Duration Hours
1	6	HS	T&P	MLC126	YCAP6 :	A	3	0	0	3	0		

Professional Elective - II

1	5	PE-II	AML	23AML1621	PE-II : Game Theory								
2	5	PE-II	AML	23AML1622	PE-II : Blockchain Technology								
3	5	PE-II	AML	23AML1623	PE-II : Industry 4.0								
4	5	PE-II	AML	23AML1624	PE-II : Augmented Reality								

Professional Elective - III

1	6	PE-III	AML	23AML1641	PE-III : Robotics and its Applications								
2	6	PE-III	AML	23AML1642	PE-III : Distributed systems								
3	6	PE-III	AML	23AML1643	PE-III : Software defined networking								
4	6	PE-III	AML	23AML1644	PE-III : Edge computing								

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	



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B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of **Computer Science & Engineering**)

B. Tech. in Artificial Intelligence and Machine Learning

**SoE No.
23AML-101**

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours	
							L	T	P	Hrs		MSEs*	TA**	ESE		
SEVENTH SEMESTER																
1	7	PC	AML	23AML1701	Computer Vision	T	3	0	0	3	3	30	30	40	3	
2	7	PC	AML	23AML1702	Deep Learning	T	3	0		3	3	30	30	40	3	
3	7	PC	AML	23AML1703	Lab : Deep Learning	P	0	0	2	2	1		60	40		
4	7	PC	AML	23AML1704	Software Engineering	T	3	0	0	3	3	30	30	40	3	
5	7	PC	AML	23AML1705	Language Processors	T	3	0	0	3	3	30	30	40	3	
6	7	PC	AML	23AML1706	Lab : Language Processors	P	0	0	2	2	1		60	40		
7	7	PC	AML	23AML1707	Comprehensive Evaluation of Core Knowledge	P	0	0	2	2	1		60	40		
8	7	PE	AML		Professional Elective-IV	T	3	0	0	3	3	30	30	40	3	
9	7	PE	AML		Lab : Professional Elective-IV	P	0	0	2	2	1		60	40		
10	7	MDM	AML		MD Minor Course-V	T	2	0	0	2	2	30	20	50	3	
11	7	STR	AML	23AML1708	Project Phase-II	P	0	0	8	8	4		60	40		
12	7	STR	AML	23AML1709	CRT	P	0	0	0	0	2			100		
TOTAL							17	0	16	33	27					

Professional Elective - IV

1	5	PE-IV	AML	23AML1721	PE-IV : Big data analytics
2	5	PE-IV	AML	23AML1722	PE-IV : Lab : Big data analytics
3	5	PE-IV	AML	23AML1723	PE-IV : MLops
4	5	PE-IV	AML	23AML1724	PE-IV : Lab : MLops
5	5	PE-IV	AML	23AML1725	PE-IV : Cloud computing
6	5	PE-IV	AML	23AML1726	PE-IV : Lab : Cloud computing
5	5	PE-IV	AML	23AML1727	PE-IV : Java Fullstack Development
6	5	PE-IV	AML	23AML1728	PE-IV : Lab : Java Fullstack Development

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	



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B.TECH SCHEME OF EXAMINATION 2023

(Scheme of Examination w.e.f. 2023-24 onward)

(Department of Computer Science & Engineering)

B. Tech. in Artificial Intelligence and Machine Learning

**SoE No.
23AML-101**

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours	
							L	T	P	Hrs		MSEs*	TA**	ESE		
EIGHTH SEMESTER																
1	8	PE	AML		Professional Elective-V	T	3	0	0	0	3	30	20	50	3	
2	8	MDM	AML		MD Minor Course-VI	T	2	0	0	2	2	30	20	50	3	
3	8	STR	AML	23AML1801	Internship / On Job training	P	0	0	18	18	9			100		
							5	0	18	20	14					
GRAND TOTAL							122	0	91	216	178					

Professional Elective -V					
1	6	PE-V	AML	23AML1821	PE-V : Natural Language Processing
2	6	PE-V	AML	23AML1822	PE-V : Prompt Engineering
3	6	PE-V	AML	23AML1823	PE-V : Virtual Reality
4	6	PE-V	AML	23AML1824	PE-V : AI for medical domain

Multidisciplinary Minor Courses			
Track 1			
Courses	Sem	MDMT1AML101 : Artificial Intelligence and Machine learning	
MDM-I	3	(MDM1AML101) Fundamentals of Data Structures	
MDM-II	4	(MDM2AML102) Introduction to Analysis of Algorithms	
MDM-III	5	(MDM3AML103) Data analysis and Statistics	
MDM-IV	6	(MDM4AML104) Fundamentals of Artificial Intelligence	
MDM-V	7	(MDM5AML105) Machine Learning and its Applications	
MDM-VI	8	(MDM6AML106) Practical Machine Learning for Data analysis	

		July, 2023	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

First Year



Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
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University)

Hingna Road, Wanadongri, Nagpur

Department of Applied Mathematics & Humanities

Report on Activity: Extempore

Activity -**Extempore** was conducted for section-D on 22July2022 to enhance oral presentation. Various topics of general interest like- Employment in India, Globalization, Impact of Social Media, Women Empowerment were given to students. Students were individually called and asked to pica chit with the topic written on it. They were given two minutes time to think about the key points. Students actively participated in this activity. About 55 students participated in this activity. This activity was taken with the objective of on the spot thinking skills and oral skills. Students found it very interesting.

Mrs.N.K,Thakre
Subject Teacher





Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering Nagpur
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Hingna Road, Wanadongri, Nagpur-441 110
NAAC Accredited with 'A++' Grade

ACADEMIC SESSION 2021-2022(Even)

Activity: *Extempore*

Date: 22/07/2022

Section: D

S.n.	Ennr.N.	Roll	Name of Student	Good	Very Good	Satisfactory	signature
1	21070621	1	AHIRKAR AASTHA RAMESH			✓	<i>Ahirkar</i>
2	21070382	2	DHARNE ADITI MANOJ				
3	21070566	3	SHRIRAME ANUSHKA PRABHAKAR	✓			<i>Anushka</i>
4	21070614	4	BHIWAPURKAR ASTHA VIJAYRAO	✓			<i>Astha</i>
5	21070594	5	INGOLE BHAGYASHREE GOVIND		✓		<i>Bhagya</i>
6	21070557	6	GEDAM BHUMIKA CHANDRACHUKHAR	✓			<i>Bhumika</i>
7	21070612	7	CHODHARI HIMANSHI SANJAYRAO			✓	<i>Himanshi</i>
8	21070623	8	JANHAVI ARVIND PILLEWAN				
9	21070611	9	AKNURWAR KHUSHI VIJAY	✓			<i>Aknurwar</i>
10	21070554	10	BAGDE MAHEK BHUSHAN			✓	<i>Bagde</i>
11	21070592	11	HUMNE NAYANI SEWAKDAS			✓	<i>NHumne</i>
12	21070619	12	RAUT PARUL SURESH	✓		✓	<i>Parul</i>
13	21070568	13	GATHIBANDHE RITIKA VINOD	✓			<i>Ritika</i>
14	21070588	14	RUNISHKA RUPESH PATIL	✓			<i>Runisha</i>
15	21070627	15	GULHANE SHREYA RAMESHWAR	✓		✓	<i>S.R. Gulhane</i>
16	21070593	16	DOIFODE SHRUTI SUSHIL	✓			<i>Shruti</i>
17	21070599	17	SIMRAN DHANRAJ KATKAR	✓		✓	<i>Simran</i>
18	21070574	21	AADITYA AMAR	✓			
19	21070597	22	BHOYAR AALHAD MAHENDRA	✓		✓	<i>Aalhad</i>
20	21070579	23	WAGHMARE ABHISHEK DEVESH				
21	21070564	24	MEGHE ANIRUDDHA DILIP				
22	21070613	25	SATHE ANUBHAV ANIL			✓	<i>Anubhav</i>
23	21070571	26	HANDE ANURAG SACHIN	✓			<i>Anurag</i>
24	21070572	27	VISHWAKAR ARADHYA NITIN		✓		<i>Aradhya</i>
25	21070587	28	HARDAS ARNAV SHEKHAR		✓		<i>Arnav</i>
26	21070605	29	SAWATKAR ARTH VIJAY	✓			<i>Arth</i>
27	21070591	30	CHAWARE ARYAN PRAKASH	✓			<i>Chaware</i>
28	21070625	31	NIGHOT ATHARVA SANJAY	✓			<i>Atharva</i>
29	21070565	32	CHANDEKAR AYUSH MADAN	✓			<i>Ayush</i>
30	21070552	33	PIPRODE DARSHAN SUDHIR				
31	21070569	34	PISE DEEPANSHU KAMLAKAR	✓			<i>Deepan</i>
32	21070602	35	LAMBAT DHURUV SACHIN		✓		<i>Dhruv</i>
33	21070590	36	DIXIT HARSH NIRMALSINGH	✓			<i>Dixit</i>

34	21070589	37	DESHMUKH HIMANSHU PRADIP				✓	Himant
35	21070477	38	ADE HIMANSHU RAMESH					
36	21070555	39	SAPKOTA HIMANSHU HEMANT					
37	21070563	40	BOBADE HIMANSHU SANJAY	✓	✓	✓		HB
38	21070607	41	SHETE HIMANSHU BHUSHAN	✓				Hdho
39	21070608	42	NAGRALE KARTIK KAILASH				✓	Kartik
40	21070553	43	PALANDUKAR KISHOR RAVI	✓				Kishor
41	21070549	44	WASADE KULDEEP ANIL	✓				Kuldeep
42	21070567	45	SHRIVAS KUNAL KUNDAN					
43	21070596	46	DOYE MAYANK SANTOSHKUMAR					
44	21070600	47	RATHOD MEETANSHU MUKESH		✓			Meeta
45	21070585	48	MISHRA MIHIR BHARAT					
46	21070632	49	TADAS NIKHIL MANGESH	✗	✓		✗	Nikhil
47	21070575	50	DESHMUKH OM RAVINDRA					
48	21070604	51	NIMBALKAR PRANAV SUBHCHOTTAM				✓	Pranav
49	21070499	52	NAIK PRATHAM VAIBHAV				✓	Pranav
50	21070624	53	BONDRE PRATHMESH MANOHAR	✓				Pranav
51	21070578	54	NIRWAN PRATYUSH NILKANTH					
52	21070577	55	KUMBHARE RAJ DASHARATH					Raj
53	21070580	56	CHOUDHARI RATNASH SUBHASH					
54	21070556	57	BHALAWE ROHIT SHANKARRAO					
55	21070576	58	SHRIMANKAR RONIT BHAVESH					Ronit
56	21070561	59	DEWAIKAR RUGVED NAGESH				✓	Rugved
57	21070609	60	RUSHIKESH RAVIKUMAR SARATE			✓		R. K. Sarate
58	21070622	61	TOPRE SAMAY BHARAT				✓	Samay
59	21070562	62	SHEIKH SAMEER SHERUSHAHA					Sameer
60	21070630	63	DARADE SANCHIT MAHADEV					Sanchit
61	21070618	64	DESHPANDE SANKET SANJAY		✓			Sanket
62	21070586	65	THAKARE SANKET RAJENDRA		✓			Sanket
63	21070620	66	LALE SANMAY JAGJIWAN		✓		✓	Sanjay
64	21070559	67	NASHIKWAR SARVESH YOGIRAJ					
65	21070606	68	RAMTEKE SHANTANU RAMESH		✓			Shantanu
66	21070629	69	JOSHI SHREYAS MANISH					
67	21070582	70	YADAV SUJAL KRISHNAKANT					
68	21070573	71	KATIYAR VED SANTOSH					
69	21070628	72	KOLHE YASH ARVIND					Yash


 N.K. Thakur
 Name & Signature of Faculty



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution Affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Hingna Road, Wanadongri, Nagpur

Department of Applied Mathematics & Humanities

Report on Activity: Buzz Group

Activity -**Buzz Group** was conducted for section-D non 25July2022 to enhance oral presentation. In the subject social science, topics-Industrial Democracy and Industrial Psychology etc. were given to students. The class was divided into 3 groups .Students were asked to go through the details and gather all the points related to the topics. Students discussed the topic amongst them, The selected students were asked to present the points orally. Audience students asked questions to the presenters. It was an interesting method and way of presenting the topic as all the students were given the task of finding the details of the topic. Students actively participated in this activity. About 58 students participated in this activity.

Mrs.N.K,Thakre
Subject Teacher





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Hingna Road, Wanadongri, Nagpur-441 110

NAAC Accredited with 'A++' Grade

ACADEMIC SESSION 2021-2022(Even)

Activity: Buzz Group.

Date: 25/07/2022

Section: D

S.n.	Ennr.N.	Roll	Name of Student	Good	Very Good	Satisfactory	signature
1	21070621	1	AHIRKAR AASTHA RAMESH			✓	<i>Aastha</i>
2	21070382	2	DHARNE ADITI MANOJ				
3	21070566	3	SHRIRAME ANUSHKA PRABHAKAR	✓			<i>anushka</i>
4	21070614	4	BIHWAPURKAR ASTHA VIJAYRAO	✓			<i>astha</i>
5	21070594	5	INGOLE BHAGYASHREE GOVIND		✓		<i>Bhagyashree</i>
6	21070557	6	GEDAM BHUMIKA CHANDRACHEKAR				
7	21070612	7	CHODHARI HIMANSHI SANTAPPA			✓	<i>Himanshi</i>
8	21070623	8	JANHAVI ARVIND PILLEWAN				
9	21070611	9	AKNURWAR KHUSHI VIJAY	✓			<i>khushi</i>
10	21070554	10	BAGDE MAHEK BHUSHAN	✓			<i>mahe</i>
11	21070592	11	HUMNE NAYANI SEWAKDAS			✓	<i>Nayani</i>
12	21070619	12	RAUT PARUL SURESH	✓		✓	<i>Parul</i>
13	21070568	13	GATHIBANDHE RITIKA VINOD		✓		<i>Ritika</i>
14	21070588	14	RUNISHKA RUPESH PATIL	✓			<i>Runisha</i>
15	21070627	15	GULHANE SHREYA RAMESHWAR	✓		✓	<i>S.R. Gulhane</i>
16	21070593	16	DOIFODE SHRUTI SUSHIL			✓	<i>Shruti</i>
17	21070599	17	SIMRAN DHANRAJ KATKAR	✓		✓	<i>Simran</i>
18	21070574	21	AADITYA AMAR		✓		<i>Aaditya</i>
19	21070597	22	BHOYAR AALHAD MAHENDRA	✓		✓	<i>Aalhad</i>
20	21070579	23	WAGHMARE ABHISHEK DEVESH				
21	21070564	24	MEGHE ANIRUDDHA DILIP				
22	21070613	25	SATHE ANUBHAV ANIL			✓	<i>Anubhav</i>
23	21070571	26	HANDE ANURAG SACHIN		✓		<i>Anurag</i>
24	21070572	27	VISHWAKAR ARADHYA NITIN		✓		<i>Aradhya</i>
25	21070587	28	HARDAS ARNAV SHEKHAR		✓		<i>Arnav</i>
26	21070605	29	SAWATKAR ARTH VIJAY				<i>Arth</i>
27	21070591	30	CHAWARE ARYAN PRAKASH	✓			<i>Aryan</i>
28	21070625	31	NIGHOT ATHARVA SANJAY	✓			<i>Atharva</i>
29	21070565	32	CHANDEKAR AYUSH MADAN	✓			<i>Ayush</i>
30	21070552	33	PIPRODE DARSHAN SUDHIR				
31	21070569	34	PISE DEEPANSHU KAMLAKAR	✓			<i>Deepanshu</i>
32	21070602	35	LAMBAT DHRUV SACHIN		✓		<i>Dhruv</i>
33	21070590	36	DIXIT HARSH NIRMALSINGH	✓			<i>Harsh</i>

34	21070589	37	DESHMUKH HIMANSHU PRADIP			✓	Himanshu
35	21070477	38	ADE HIMANSHU RAMESH				
36	21070555	39	SAPKOTA HIMANSHU HEMANT				
37	21070563	40	BOBADE HIMANSHU SANJAY	✓		✓	HB
38	21070607	41	SHETE HIMANSHU BHUSHAN	✓			Shete
39	21070608	42	NAGRALE KARTIK KAILASH			✓	Kartik
40	21070553	43	PALANDUKAR KISHOR RAVI			✓	Kishor
41	21070549	44	WASADE KULDEEP ANIL			✓	Wasade
42	21070567	45	SHRIVAS KUNAL KUNDAN				
43	21070596	46	DOYE MAYANK SANTOSHKUMAR				
44	21070600	47	RATHOD MEETANSHU MUKESH	✓	✓		Meetanshu
45	21070585	48	MISHRA MIHIR BHARAT	✓			Mihir
46	21070632	49	TADAS NIKHIL MANGESH	✓		✓	Nikhil
47	21070575	50	DESHMUKH OM RAVINDRA	✓			Om
48	21070604	51	NIMBALKAR PRANAV			✓	Pranav
49	21070499	52	NAIK PRATHAM VAIBHAV			✓	Pratham
50	21070624	53	BONDRE PRATHMESH MANOHAR		✓		Prathmesh
51	21070578	54	NIRWAN PRATYUSH NILKANTH				
52	21070577	55	KUMBHARE RAJ DASHARATH		✓		Raj
53	21070580	56	CHODHARI RATNASH SUBHASH				
54	21070556	57	BHALAWE ROHIT SHANKARRAO				
55	21070576	58	SHRIMANKAR RONIT BHAVESH				
56	21070561	59	DEWAIKAR RUGVED NAGESH			✓	Rugved
57	21070609	60	RUSHIKESH RAVIKUMAR SARATE			✓	Rushikesh
58	21070622	61	TOPRE SAMAY BHARAT			✓	Samay
59	21070562	62	SHEIKH SAMEER SHERUSHAHA		✓	✓	Sameer
60	21070630	63	DARADE SANCHIT MAHADEV				Sanchit
61	21070618	64	DESHPANDE SANKET SANJAY		✓		Sanket
62	21070586	65	THAKARE SANKET RAJENDRA		✓		Sanket
63	21070620	66	LALE SANMAY JAGJIWAN		✓		Sanmay
64	21070559	67	NASHIKWAR SARVESH YOGIRAJ				
65	21070606	68	RANTEKE SHANTANU RAMESH			✓	Shantanu
66	21070629	69	JOSHI SHREYAS MANISH				
67	21070582	70	YADAV SUJAL KRISHNAKANT				
68	21070573	71	KATIYAR VED SANTOSH				
69	21070628	72	KOLHE YASH ARVIND				Yash

N. K. Thakre
Name & Signature of Faculty





Nagar YuwakShikshanSanstha's
YeshwantraoChavan College of Engineering
(An Autonomous Institution affilliated to RashtrasantTukadojiMaharaj Nagpur University)

Report on UHV Interactive Activity sessions

These days students are blindly coping the western society and moving away from traditional Indian Joint family system, even in the syllabus of UHV framed for first year lots of information about Joint family system has been given, so I planned an activity in both J and S sections in which nearly 140 students participated. Students expressed their views on both Joint family system and Nuclear Family system enthusiastically and gave a great response. As I had given this as an assignment students not only participated in Interactive Activity sessions but also submitted written assignments about it.

Anjali

Subject teacher
Prof Mrs Anjali Chitale

Dr. Malabika Adak

HOD Maths and Humanities
Dr. Malabika Adak

Head, Department of Applied
Mathematics and Humanities
Yeshwantrao Chavan College
of Engineering Nagpur

Name- Naincy Pande

Rollno- J60

Reg.no- 21071235

Year_sec - I-J

Page No.

Date

Branch - AIML (CSE).

Activity (VHV)

* Joint family :-

① Advantages :-

- a) A child in a joint family is never lonely :-
If there is a working mom ~~or~~ in a joint family, she needs not worry about the child while on work. She can be chilled about who will take care of the child, as there are many people in a joint family.
- b) Happiness doubles :-
If a person lives in a joint family, even small happiness doubles up.
- c) One learns to respect :-
Growing up in a joint family with so many elders one learns to respect everyone. This also helps in shaping the personality of the person. A person who respects others is always admired.
- d) Feeling of togetherness :-
In a joint family one can never be alone ^{and} can not feel lonely. One will never be deprived of friends (cousins are always there). There are also people with whom we can share

all our problems.

② Disadvantages :-

① Privacy is compromised :-

Lack of privacy is always a concern with people living in joint families. One is always surrounded with many people and cannot spend or have quality 'ME' time.

② A small decision runs by everyone -

Living in a joint family: a small decision has to be passed by every single member of the family. A decision is not made until it gets a green signal by every member.

③ Financial responsibility :-

In a joint family, it is about 'us'. When it comes to financial responsibility, usually the head of the family bears all the financial responsibilities.

④ Interference in parenting :-

Living in a joint family sometimes deprives one of taking right decisions for one's children.

As a mother one might not get the right to take decisions for the children because the other family members might always give

one parenting tips.

- (e) Uses of a common kitchen :-
Generally, in joint families, all the female members cook together and for all. But every person has his/her own preferences and tastes, and hence catering to everyone's choice is often tiring.

* Nuclear family

(1) Advantages :-

- (a) Possibility of reduced conflicts -
Conflicts are bound to happen in every family, joint or nuclear. But the possibility of conflicts is reduced in nuclear families, as the number of members are less.

- (b) Personal responsibilities :-
There is no division of responsibilities in nuclear family. Parents are obliged to accept responsibility of their children on their own.

- (c) Harmony and peace :-
For a pleasant family relationship, peace and harmony & prosperity are crucial. Misunderstandings are bound to exist, however as the number of members are fewer there is possi

possibility of reduction in misunderstandings amongst each other.

- e) Good status of women :-
Women of nuclear families get sufficient time to take care of her kids as well as herself. They also can organise their homes according to their wish.

* Disadvantages :-

- a) Children feel insecure :-
With both the parents working children might feel neglected. They may feel anxious.
- b) Economic disadvantage -
The head of the family mostly has to bear all the expenses of the family. There is no economic advantage or support.
- c) Agency to develop bad qualities -
As there is no social control of seniors. Children become more vulnerable to bad influence and can deviate easily. They also become unsocial.
- d) Loneliness -
Feeling of loneliness is a major drawback of nuclear families.





Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to RTM Nagpur University)

Hingna Road, Wanadongri, Nagpur - 441110

NAAC Accredited with 'A'' Grade

Department of Applied Mathematics and Humanities, YCCE



Date: 1st September 2022

To,
The Principal,
YCCE, Nagpur

Subject: Statement for Settlement of SDP (Essay Competition) on the occasion of "Azadi ka Amrit Mohotsav" for first year student.

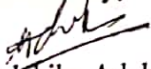
Respected Sir,

The actual expenditure for SDP for the students of first year on 17th August 2022 as follow:


S.No.	Particulars	Quantity	Amount (in Rs.)
2	Certificates	4 (25/- per certificate)	100
3	Prize	Top 3 Students 1 st Prize: 1000/- 2 nd Prize: 700/- 3 rd Prize: 500/-	2200
6	Miscellaneous	Tea (5*10), Water (5*10), Snacks (5*20)	200
Total			2500

I humbly request you to give your approval for the same.

Yours sincerely,


Dr. Malabika Adak
Head, Dept. of Applied
Mathematics and
Humanities
YCCE, Nagpur

OK


Dr. U. P. Waghe
Principal,
YCCE, Nagpur

AL



Nagar Yuwak Shikshan Sanstha's

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Hingna Road, Wanadongri, Nagpur - 441110

NAAC Accredited with 'A' Grade

Department of Applied Mathematics and Humanities, YCCE



Report On

ESSAY COMPETITION


B.TECH. FIRST YEAR/ II SEM (2021-22)

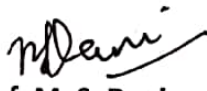
Date of program: 17th August 2022

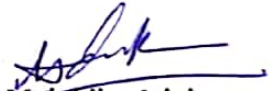
Department of Applied Sciences and Humanities, YCCE has conducted Essay Competition, over the topic "Envisioning India @2047" on the occasion of Azadi Ka Amrit Mahotsav as a part of Student Development Program on 17th August 2022. Total 40 students were participated in the competition. among them three student were selected as 1st, 2nd and 3rd winner. Winners were felicitated by the hand of Dr. M. P. Gandhi, FYC, YCCE, Dr. Malbika Adak, HOD, Department of Applied Mathematics and Humanities with Certificate and Cash Prize. DIVYANSHU NINAVE, SEC-S, ROLL NO. 41, secured 1st Prize; AISHWARYA MORONEY, SEC-K, ROLL NO-2, secured 2nd Prize and ANUSHRI JAMAR, SEC-N, ROLL NO-1, secured 3rd Prize. Program was coordinated by Dr. Arvinder Kour, Prof. V. D. Bhandarkar and Prof. M. S. Dani.

Program Coordinators:

Dr. Arvinder Kour
Assistant Professor
Mathematics


Prof. Vishakha Bhandarkar
Assistant Professor


Prof. M. S. Dani
Associate Professor


Dr. Malbika Adak
HOD, Applied

and Humanities.





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Department of Applied Mathematics and Humanities, YCCE



Notice

On the occasion of "Azadi ka Amrit Mahotsav", Department of Applied Mathematics and Humanities, YCCE is organizing

ESSAY COMPETITION

On

Envisioning India@2047

***Date*: 17th August, 2022**

***Venue*: Room No. 201, Old Science Building, YCCE, Nagpur**

***Time*: 12 pm to 1 pm**

Registration Link-

All those who are interested may register their name by following the link:

<https://forms.gle/UPPAmCbXQiBaX5z89>

Best Three Essay will be rewarded with Certificate and memento.



Dr. Arvinder Kour

Assistant Professor YCCE,
Nagpur

Prof. V. D. Bhandarkar

Assistant Professor YCCE,
Nagpur

Prof. M. S. Dani

Assistant Professor YCCE,
Nagpur

Dr. Malabika Adak

HoD, Applied Mathematics and
Humanities

ESSAY COMPETITION HELD ON 17TH AUGUST, 2022 ON "ENVISIONING INDIA@2047" AT ROOM NO. _____ AT OLD SCIENCE BUILDING CONDUCTED BY APPLIED MATHEMATICS AND HUMANITIES

ATTENDANCE SHEET

SR. NO	NAME OF THE PARTICIPANT	ROLL NO.	SEM	SEC	PHONE NO.	EMAIL ID	SIGNATURE
1.	Abhijeet Konar	25	2 nd	N	9665053466	abhijeetkonar03@gmail.com	Abhijeet Konar
2.	Aishwariya Morey	2	2 nd	K	7262972445	aishwariyamorey@gmail.com	
3.	Janhavi Thosar	7	2 nd	E	9685583963	janhavithosar32@gmail.com	
4.	Saifiya Anjar	14	2 nd	S	9665078128	saifiyaanjar@gmail.com	
5.	Saloni Tejraj Phenge	19	2 nd	N	9552815983	lshengre@gmail.com	
6.	Amushi .V. Jamar	1	2 nd	N	9146239610	shonjurnal@gmail.com	
7.	Rushikesh Konadkhajre	51	2 nd	G	8390226481	21071039@yccc.in	
8.	Jauhari Alam	05	2 nd	G	9370941768	jauhari.alam.14@gmail.com	
9.	Manaswi Padale	08	2 nd	A	726288773	manaswipadale76@gmail.com	
10.	Vaasha Bramhankar	18	2 nd	G	8080946005	vaasha.bramhankar94@gmail.com	
11.	Ayush Ojha	31	2 nd	I	7715941535	ayushbalo@gmail.com	
12.	Ayush Bhendarkar	30	2 nd	I	9130855598	21070768@yccc.in	
13.	Shweta Nasare	21	2 nd	N	9373779008	21070762@yccc.in	
14.	Divyani Thakare	4	2 nd	N	9145754461	21071096@yccc.in	
15.	Diksha Dandekar	3	2 nd	N	9175946586	21070787@yccc.in	D.P. Dandekar
16.	Pracheta Khadegi	11	2 nd	N	8806233652	21070677@yccc.in	
17.	Mohit V. Kulkarni	47	2 nd	R	9764073187	mohit.kulkarni@gmail.com	

SR. NO	NAME OF THE PARTICIPANT	ROLL NO.	SEM	SEC	PHONE NO.	EMAIL ID	SIGNATURE
1	Abhay. O. Verma	25	II	S✓	8767704905	abhayverma20084@gmail.com	
2	Aditya Kawalkar	27	II	S✓	9406579938	adityakawalkar7@gmail.com	
3	Divyanshu Ninawe	41	II	S✓	9422115499	divyanshuninawe20371@gmail.com	
4	Satyam Mahajan	64	II	S✓	9309721787	mahajansatyam2003@gmail.com	
5	Vedant Gawkar	66	II	M✓	8080954069	vedantgawkar@gmail.com	
6	Prince Yadav	51	II	S✓	9112445714	prince2328342003@gmail.com	
7	TRUTHA DAIWALKAR	06	II	R✓	9022543316	tdaiwalkar14@gmail.com	
8	Gauri Kapte	03	II	R✓	8805452203	gaurikapte610@gmail.com	
9	Nayan Mudewar	49	II	R✓	8766959612	nayanmudewar2002@gmail.com	
10	Khushal Mahalle	41	II	R✓	7558672833	khushalmahalle93@gmail.com	
11	Aniket. Bhatti	30	II	R✓	9307467318	aniketbhatti@gmail.com	
12	Anurag Gaddamwar	31	II	S✓	8080172824	gaddamwaranurag@gmail.com	
13	Madhur Natekar	41	II	R✓	9881843967	madhurnatekar@gmail.com	
14	Shahnawaz Khan	61	II	C✓	9112933134	shahnawazkhan2008@gmail.com	
15	Siya Mundhada	16	II	R✓	9403566911	siyamundhada4@gmail.com	
16	Aman Gupta	27	II	R✓	8446179486	amanmgupta614@gmail.com	



Yeshwantrao Chavan College of Engineering
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Hingna Road, Wanadongri, Nagpur-441110

Board of Studies (General Engineering)

Communication Skills Syllabus

GE- 2107

Academic session 2021-22

Objectives	Outcomes
<p>The objective of the syllabus is to</p> <ul style="list-style-type: none">➤ To make students aware about basic concepts and strategies of technical communication➤ To introduce the basic concepts of phonetics so as to convey thoughts effectively➤ To prepare students to stretch beyond their comfort zone in order to become good team members and leaders in the industry.➤ To develop skills of expressing ideas in simple, concise and direct language so that they can contribute more productively in the organization.	<p>Students will be able to</p> <ul style="list-style-type: none">➤ To explain the basic of communication process as well as identify the barriers in communication➤ To classify and describe the different speech sounds of English language➤ To apply different strategies & techniques of presentation, Interview and group skills.➤ To prepare and draft reports, memos and emails with apt content.

Unit 1- Basics of Communication

Process of Communication, Language as a tool, Levels , flows , Networks of communication and Importance of communication

Classification of Barriers (Intrapersonal, Interpersonal, Organizational)

Unit 2- Effective speaking skills

Organs of speech, Consonants and vowels sounds of English language, Phonetic translation, word and sentence stress, vocal cues (Activity of reading phonetic translation in lab), General and technical vocabulary.

Unit 3- Effective Presentation

Defining purpose, analyzing audience and locale, organizing content, preparing an outline, visual aids, understanding nuances of delivery (Kinesics, proxemics, paralinguistics and chronemics)

Listening Skills- Introduction, types, Traits of listening, active versus passive listening and implications of listening.

Unit 4 – Interview Skills

Objectives, Types of Interviews on the bases of objective and nature, three basic types of Interviews

Face to Face Interview- Expectation of the employer, Preparation that a candidate has to do, Types of question, types of answering techniques, overcoming nervousness, follow up, Telephone Interview- Types , Guidelines and preparation.

Unit 5- Group Skills

Purpose, types and difference between group and team

GD- Purpose, Organizational GD & GD as a part of selection process, approach to topic and case study, Meeting- Purpose, Preparation and procedure of meeting, follow up

Symposium and seminar

Reading Skills- Definition, Fixation, reading rates, fixation, techniques of reading.

Unit 6- Reports and Memo

Reports- Objectives, characteristics, types, importance, formats and different aspects of Prewriting

Memo- Definition, classification, purposes style and structure and layout.

Email etiquettes.

Text Book-

- 1) Raman & Sharma, " Technical communication", Oxford University Press.
- 2) T. Balsubramaniam, " Textbook of English Phonetics for Indian Students", Macmillan India LTD.

Reference books :-

- 1) Asha Kaul, "Effective Business Communication", Prentice Hall India.
- 2) Barbara & Allen Pease, "Body Language"

M. P. Gandhi
Dr.M.P Gandhi,
BOS Chairman,
General Engineering
Yeshwantrao Chavan College of Engineering,
Nagpur.

Dr. Manjusha P. Gandhi
First Year Coordinator
Yeshwantrao Chavan College Of Engineering
Nagpur





Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Semester I

Course Code: AIDS2104/CS2154/ITOT2156/AIIML
2102

Credits: 3 (3 Lecture Per Week)

Course Name: Technical Communication

Objectives	Course Outcome
<ol style="list-style-type: none">1. To Explain the fundamentals of communication2. To Classify the different speech sounds of English3. To Apply Different components of oral communication4. To Draft technical documents	Upon completion of the course, students will have the ability to, <ol style="list-style-type: none">1. Apply different modes for effective communication2. competently use the phonology of English language3. Apply nuances of LSRW skills4. Communicate through different channels

Unit No.	Contents	Max. Hrs.
1	Basics of Communication Language as a tool of communication & characteristics of language Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational).	6
2	English Phonetics Speech Mechanism, Organs of speech, Consonant and Vowels sounds, Word stress rules	6
3	Interview Skills Purpose, expectations of employer and preparation for Interview, Types, Types of Questions & Answering Techniques, Telephonic Interviews – preparation and guidelines, Reading Techniques (Exercise based on Complex Unseen passages)	5
4	Oral Skills Group Communication- (Purpose, Different types of Group Communication, Organizational GD, GD as a part of selection process), Meeting (purposes, preparation, procedure and minutes of meeting), Listening Skills -definition types and traits	6
5	Presentation & Visual Communication Presentation and audience analysis, Organizing content, Nuances of presentation, Visual Communication – Introduction & importance, Role & Psychology of color	6

YCCE-CT-1





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	in visual communication.	
6	Technical Written Communication Memo, Email, Report -Types, Characteristics, prewriting aspects of report and preparing writing aspects of report), Types of paragraphs.	6

Text Books :

1. Technical Communication, Raman & Sharma, Oxford University Press
2. Textbook of English Phonetics for Indian Students, T. Balasubramaniam, Macmillan India Ltd

Reference Books :

1. How to Develop Self – Confidence & Influence People by Public Speaking, Dale Carnegie
2. Communication Skills, Asha Kaul
3. Body Language, Allen Peas
4. Gerson's Gerson – Technical Communication

M.P. Gandhi
Dr.M.P Gandhi,
BOS Chairman,
General Engineering
Yeshwantrao Chavan College of Engineering,
Nagpur.

Dr. Manjuska P. Gandhi
First Year Coordinator
Yeshwantrao Chavan College Of Engineering
Nagpur

YCCE-CT-2





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Yeshwantrao Chavan College of Engineering Nagpur
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NAAC Accredited with 'A++' Grade

OFFICE OF FIRST YEAR COORDINATOR,

V&VI-Semester B.E. (Open Elective)

Evaluation Scheme	Introduction to Japanese Language			L=3	T=0	P=0	Credits =3
	MSEs	TA	ESE	Total	ESE Duration		
	30	30	40	100	3 Hrs		

Objectives	Course Outcome: At the end of the course students will be able to:
<p>The objective of this course is to impart preliminary knowledge about the Japanese language and civilization and is therefore of an elementary level. At the end of the 40 hours course, the student is expected to acquire the following skills:</p> <p>1) Elementary communication skills, based on oral and written comprehension of common words and simple sentences in Japanese.</p> <p>2) Simple oral and written expression.</p>	<p>a) Understand simple words and expressions spoken slowly and distinctly in Japanese and used in day-to-day situations related to the student's immediate environment.</p> <p>b) Read and understand common words and sentences in Japanese.</p> <p>c) Say a few words in Japanese in conversations related to simple day-to-day situations.</p>

Unit-I : Grammar I – 10 hours

- First Script - Hiragana
- Reading and Writing

Unit-II : Grammar II – 10 hours

- Basic Introduction
- Basic Sentences

Unit-III : Vocabulary – 6 hours

- Numbers (1-10000)
- Days of the week
- Months of the year
- Daily Greeting

Unit-IV : Communication skills I – 6 hours

- Interrogation relating to everyday situations
- Replying to simple questions

Unit-V : Communication skills II – 4 hours

- Day to day life, eg.
- Classroom
- Friends
- Family
- School
- Vacations

Unit-VI : Civilization – 4 hours

- History
- Geography

Text book recommended:

- 1) Minna no Nihongo , by JF .
- 2) Marugoto by JF
- 3) Fujichan , By Mandar Sugwekar

Manjusha P. Gandhi
Dr. Manjusha P. Gandhi
Chairman-Board of Studies-General Engineering
First Year Coordinator
Yashwantrao Chevan College Of Engineering
Nagpur

.3)



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech SoE and Syllabus 2021-22
(Scheme of Examination w.e.f. 2021-22 onward)

(Department of Computer Technology)

Artificial Intelligence and Data Science

I Semester

AIDS2104: Technical Communications

Objective	Course Outcome
<ol style="list-style-type: none">To Explain the fundamentals of communicationTo Classify the different speech sounds of EnglishTo Apply Different components of oral communicationTo Draft technical documents	Upon completion of the course, students will have the ability to, <ol style="list-style-type: none">Apply different modes for effective communicationcompetently use the phonology of English languageApply nuances of LSRW skillsCommunicate through different channels

Unit No.	Contents	Max. Hrs.
1	Basics of Communication Language as a tool of communication & characteristics of language Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational).	6
2	English Phonetics Speech Mechanism, Organs of speech, Consonant and Vowels sounds, Word stress rules	6
3	Interview Skills Purpose, expectations of employer and preparation for Interview, Types, Types of Questions & Answering Techniques, Telephonic Interviews – preparation and guidelines, Reading Techniques (Exercise based on Complex Unseen passages)	5
4	Oral Skills Group Communication- (Purpose, Different types of Group Communication, Organizational GD, GD as a part of selection process), Meeting (purposes, preparation, procedure and minutes of meeting), Listening Skills -definition types and traits	6
5	Presentation & Visual Communication Presentation and audience analysis, Organizing content, Nuances of presentation, Visual Communication – Introduction & importance, Role & Psychology of color in visual communication.	6
6	Technical Written Communication Memo, Email, Report -Types, Characteristics, prewriting aspects of report and preparing writing aspects of report), Types of paragraphs.	6

Text Books :

- Technical Communication, Raman & Sharma, Oxford University Press
- Textbook of English Phonetics for Indian Students, T. Balasubramaniam, Macmillan India Ltd

Reference Books :

- How to Develop Self – Confidence & Influence People by Public Speaking, Dale Carnegie
- Communication Skills, Asha Kaul
- Body Language, Allen Peas
- Gerson's Gerson – Technical Communication

		June 2021	1.00	Applicable for AY 2021-22 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2021-22

(Scheme of Examination w.e.f. 2021-22 onward)

(Department of Computer Technology)

Artificial Intelligence and Data Science

I Semester

AIDS2105: Lab.: Technical Communications

Objective	Course Outcome
<ol style="list-style-type: none">To Explain the fundamentals of communicationTo Classify the different speech sounds of EnglishTo Apply Different components of oral communicationTo Draft technical documents	Upon completion of the course, students will have the ability to, <ol style="list-style-type: none">Apply different modes for effective communicationcompetently use the phonology of English languageApply nuances of LSRW skillsCommunicate through different channels

Sr. No.	List of Experiment
1	Hands on for Consonants and vowel sounds
2	Grooming session for effective use of body language
3	Mock Sessions for Interview
4	Group Discussion
5	Creation of Visual Media – preparing poster boards, advertisements, banners and flyers
6	Official Report writing
7	Official Mail composing
8	Mail Merge
9	Exporting data from excel to Word

Text Books :

- Technical Communication, Raman & Sharma, Oxford University Press
- Textbook of English Phonetics for Indian Students, T. Balasubramaniam, Macmillan India Ltd

Reference Books :

- How to Develop Self – Confidence & Influence People by Public Speaking, Dale Carnegie
- Communication Skills, Asha Kaul
- Body Language, Allen Peas
- Gerson's Gerson – Technical Communication

		June 2021	1.00	Applicable for AY 2021-22 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	

Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2022

(Scheme of Examination w.e.f. 2022-23 onward)

CSE IOT

SoE No.
CSE IOT-22-**Semester IV**

	Entrepreneurship and Development			L= 2	T=0	P=0	Credits=2
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total		ESE Duration
	15	15	20	50	100		3 Hrs

Course Objectives :

To develop and strengthen entrepreneurial quality and ability among the students.

Course Outcomes:

Upon successful completion of the course the students will be able to

- Appreciate role of entrepreneurs in society and innovate, prototypes or ideas by applying theory into practice.
- Develop and complete a comprehensive business plan.
- Do the Financial and Accounting planning required for entrepreneurship
- Identify the Support rendered by various Government Agencies.

Unit:1 Entrepreneur & Entrepreneurship: 6 Hours

Meaning of entrepreneur - Evolution of the concept - Functions of an Entrepreneur - Types of Entrepreneur - Stages in entrepreneurial process, Idea Generation, Screening, Selection and Managing Resources

Contemporary Issues related to Topic

Unit:2 Legal Compliances for Incorporating Startup 7 Hours

Fundamentals of choosing the Business Organization form for startup, Incorporation of Partnership, LL.P & Co – operative, Incorporation of One Person Company, Pvt. Ltd., Pub. Ltd. and not for profit company, Financing the legal Venture and Legal Compliances

Contemporary Issues related to Topic

Unit:3 Entrepreneurship and IP Strategy 6 Hours

Intellectual Property : Definition and Concept, Trade Mark, Patent, Copyright, Industrial Design, IP Strategy and Entrepreneurship

Unit :4 Support to Entrepreneurs 7 Hours

Sickness in small Business – Concept, Magnitude, Causes and Consequences,

Chairperson	Dean (Acad. Matters)	July 2022	1.00	Applicable for AY 2022-23 Onwards
		Date of Release	Version	

Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2022
 (Scheme of Examination w.e.f. 2022-23 onward)

CSE IOT

SoE No.
CSE IOT-22-

Corrective Measures – Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.

Contemporary Issues related to Topic

Total Lecture Hours

26 Hours

Student activities:

1. Interview at least four entrepreneurs or businessman and identify Traits of successful entrepreneurs.
2. Analyse case studies of any two successful entrepreneurs.
3. Download product development and innovative films from internet.
4. Identify your hobbies and interests and convert them into business idea

Textbooks

1. Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.
2. Donald F Kuratko, "Entrepreneurship – Theory, Process and Practice", 9th Edition, Cengage Learning 2014.
3. Corporate Law, 33rd ed. 2016, Taxman New Delhi.
4. Narayanan, V. K., Managing technology and innovation for competitive advantage, first edition, Pearson education, New Delhi, (2006)
5. Idris, K. (2003), Intellectual property: a power tool for economic growth, second edition, WIPO publication no. 888, Switzerland
6. Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd., Ram Nagar, New Delhi, 2013.
7. Ramaiya's Guide to the Companies Act, 18th ed. 2014, Lexis Nexis New Delhi.

Reference Books

1. Mehta, Monica- The Entrepreneurial Instinct : How everyone has the innate ability to start a successful small business – McGraw – Hill Education, New Delhi 2012, ISBN 978-0-07-179742-9

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CSE IOT

SoE No.
CSE IOT-22-

2	Prasanna Chandra "Protect Preparation, Appraisal, Implementation" Tata McGraw Hill. New Delhi
3	S Anil Kumar "Entrepreneurship Development" New Age International Publishers
4	Nishith Dubey "Entrepreneurship Development" PHI Learning
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0
2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
MOOCs Links and additional reading, learning, video material	
1	

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Hingna Road, Wanadongri, Nagpur-441110

Department of Applied Mathematics & Humanities

V&VI-Semester B.E. (Open Elective)

Open Elective - Introduction to French Languages

Objectives	Course Outcome: At the end of the course students will be able to:
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GE-2320/ GE2370	Introduction to French Language			L=3	T=0	P=0	Credits =3
Evaluation Scheme	MSEs	TA	ESE	Total	ESE Duration		
	30	20	50	100	3 Hrs		


<p>The objective of this course is to impart preliminary knowledge about the French language and civilization and is therefore of an elementary level. At the end of the one year course, the student is expected to acquire the following skills:</p> <p>1) Elementary communication skills, based on oral and written comprehension of common words and simple sentences in French.</p> <p>2) Simple oral and written expression.</p> <p>3) able to greet in a native French way</p> <p>4) understanding about French culture and language.</p>	<p>a) Understand simple words and expressions spoken slowly and distinctly in French and used in day-to-day situations related to the student's immediate environment.</p> <p>b) Read and understand common words and sentences in French.</p> <p>c) Say a few words in French in conversations related to simple day-to-day situations.</p> <p>d) able to initiate conversation and communicate in French</p>
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Unit-I : introduction I – 6 hours

- French alphabets
- Pronunciation Guide
- Les vocabularies
- Days of the week

Unit-II : Grammar II – 6 hours

- Être , , avoir (irregular verbs)
- Nouns (singular & plural)


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- Indefinite/definite articles
- Pronouns (subject)/tonique
- Adjective démonstratif
- Adjectives possessive

Unit-III : Vocabulary – 6 hours

- Numbers (1-100)
- Months of the year
- Nationalités / colours
- Adjectives commonly used .
- Les verbes ending with -er , ir and re .

Unit-IV : Communication skills I – 7 hours

- Présentation
- Ma famille
- Ma ville
- Ma maison
- Dialogues

Unit-V : Communication skills II – 7 hours

- Interrogation relating to everyday situations
- Replying to simple questions.
- Conversation
- Article partitifs
- Talking about day schedule and leisure activities

Unit-VI : Culture and Civilization – 7 hours

- Day to day life, eg.
- Classroom
- Friends
- Family
- School
- Vacations
- Introduction to France: Geography.
- Airport
- Railway station.

Text Books: 1) Ranjit, Mahita& Singh, Monica . `Apprenons le frangais', Part 1. Saraswati House Pvt. Ltd., New Delhi. Second Revised Edition, 2007.

2) Ranjit, Mahitha&Batra, Simran. 'Cahier d'exercices', (Apprenons le francais) 1. Saraswati Book House Pvt. Ltd., New Delhi, 2007.


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B. Tech SoE and Syllabus 2022

(Scheme of Examination w.e.f. 2022-23 onward)

CSE 101

SoE No.
CSE 10T-22-**Semester III/IV**

Evaluation Scheme	Fundamentals of Management and Economics			L= 2	T=0	P=0	Credits=2
	MSE-I	MSE-II	TA	ESE	Total		ESE Duration
	15	15	20	60	100		3 Hrs

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Develop the Managerial Perspective and perform the various functions of management for optimum utilization of Engineering Resources
2. Identify and Analyze the role of Financial Accountancy and Marketing Management in the Organization
3. Develop perspective about economy based on logical reasoning and estimate the economic outcomes.
4. Interprets comparative advantage of resources.

Unit:1 | Principles of Management **6 Hours**

Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Staffing and Controlling, Motivational Theories, Concept of Leadership

Contemporary Issues related to Topic

Unit:2 | Marketing and Financial Management **7 Hours**

Marketing and Financial Management – Marketing Theories and Concept-Marketing Mix, Market Segmentation, Targeting and Positioning and Functions

Financial Management and Accountancy- Accountancy Rules and Capital, Preparation of Books of Account- Journal posting of Transaction into ledger and preparation of trial Balance, Introduction of Trading Account, Profit and loss account and balance sheet

Contemporary Issues related to Topic

Unit:3 | Introduction to Microeconomics: **7 Hours**

Nature and Scope of Microeconomics, Demand Analysis: Meaning and determinants of demand, law of demand, Elasticity of Demand - types and degrees, Utility analysis, Law of diminishing marginal utility, supply- law of supply, Law of Variable proportions and Return to Scale, Classification of market structure.

Contemporary Issues related to Topic

Unit :4 | Introduction to Macroeconomics **6 Hours**

Nature and Scope of Macroeconomics, Concept of GDP, GNP, NDP, NNP, Measurement of

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GDP; Economic Growth and development, Money – definition, types and function of money, Inflation – meaning, types, causes and measure to control, concept of deflation, functions of central and commercial bank, Sources of public revenue - direct and indirect taxes.

Contemporary Issues related to Topic**Total Lecture Hours****26 Hours****Textbooks**

1. Principle of Management, 9th edition, Harold Koontz Ramchandra, Tata McGraw hills
2. Marketing Management: Planning, Implementation and Control, 3rd Edition, Ramaswamy V.S. and Namakumari S, Macmillian
3. Fundamentals of Accounting Gupta R.L. & Radhaswamy ;
4. Modern Economics, 13th Edition, H. L. Ahuja, S. Chand Publisher, 2009
5. Modern Economic Theory, 3rd edition, K. K. Devett, S. Chand Publisher, 2007
6. Principle of Economics, 7th edition, Mankiw N. Gregory, Thomson, 2013

Reference Books

1. Foundations of Financial Markets and Institutions, 3rd Edition, Fabozzi, Prentice Hall
2. Fundamentals of Financial Instruments, 2nd Edition, Parameshwaran, Wiley India
3. Marketing Management, 3rd Edition, Rajan Saxena, Tata McGraw Hill
4. Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher, 2009
5. International Trade, 12th edition, M. L. Zingan, Vindra Publication, 2007
6. Macro Economics, 11th edition, M. L. Zingan, Vindra Publication, 2007
7. Monetary Economics, 1st Edition, M. L. Sheth, Himalaya Publisher, 1995
8. Economics of Development and Planning, 12th edition, S. K. Misra and V. K. Puri, Himalaya Publishing House, 2006.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- 1 <http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0>
- 2 <https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042>

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CSE IOT

SoE No.
CSE IOT-22-

MOOCs Links and additional reading, learning, video material

1	https://onlinecourses.nptel.ac.in/noc22_mg104/preview
2	https://archive.nptel.ac.in/courses/110/101/110101131/
3	https://onlinecourses.nptel.ac.in/noc23_mg122/preview
4	https://onlinecourses.nptel.ac.in/noc21_hs52/preview
5	https://onlinecourses.nptel.ac.in/noc22_hs67/preview

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V Semester
AIML2301 - Fundamentals of Economics & Management

AIML2301	Fundamentals of Economics & Management			L= 3	T=0	P=0	Credits=3
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration	
	15	15	20	50	100	3 Hrs	

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Explain the Functions of Management and identify tools and techniques of Marketing of goods and services
2. Analyze the role of Financial Accountancy and Management in the Organization
3. Develop perspective about economy based on logical reasoning and estimate the economic outcomes.
4. Interprets comparative advantage of resources.

Unit:1	Principles of Management	7 Hours
Evolution of Management Thought: Scientific and Administrative Theory of Management, Definition and Concept of Management, Functions of Management: Planning, Organizing, Directing, Coordinating and Controlling, Motivational Theories, Concept of Leadership.		
Unit:2	Marketing Management	7 Hours
Marketing Management - Definition & scope, Selling & Modern Concepts of Marketing, Market Research, Customer Behaviors, Product Launching, Sales Promotion, Pricing, Channels of Distribution, Advertising, Market Segmentation, Marketing Mix, Positioning, Targeting.		
Unit:3	Financial Accountancy and Management	7 Hours
Definition & Functions of Finance department, Sources of finance, Types of capital, Types of Taxes, Introduction of Accountancy and its rules, Preparation of Books of Account- Journal, Posting of transaction into ledger and preparation of trial balance, Introduction of trading account, profit and loss account and balance sheet		
Unit:4	Introduction to Economics and engineering Economy;	6 Hours
Economics and engineering economy, Utility analysis- Cardinal, ordinal, Law of diminishing marginal utility, Laws of demand and supply, elasticity of demand, its measurement and application.		
Unit:5	Engineering Production and Costs	7 Hours

Factors of Production: Land, Labour, Capital, Enterprise and their peculiarities, Concepts and types of costs, Law of Variable proportions (Law of diminishing marginal returns) and Return to Scale (Increasing, constant and decreasing), Economics and diseconomies of scale. Inflation: Meaning, types, causes and consequences, measures to control inflation, Concepts of deflation and Stagflation.

Unit :6	Market structures - equilibrium output and price	7 Hours
Forms of market structures: Perfect competition, monopolistic competition, oligopoly, duopoly and monopoly. Demand and revenue curves for firm and industry in various forms of market structure. Total, average and marginal revenue curves, equilibrium of firms and industries under various forms of market structures. Price discrimination.		
Total Lecture Hours		39 Hours

Textbooks


1.	Principle of Management, 9 th edition , Harold Koontz Ramchandra, Tata McGraw hills
2.	Marketing Management: Planning, Implementation and Control, 3rd Edition, Ramaswamy V.S. and Namakumari S, Macmillian
3.	Financial Services, 19 th Edition, Khan M Y, Tata McGraw Hill, 19
4.	Modern Economics, 13th Edition, H. L. Ahuja, S. Chand Publisher, 2009
5.	Modern Economic Theory, 3rd edition, K. K. Devett, S. Chand Publisher, 2007
6.	Principle of Economics, 7 th edition, Mankiw N. Gregory, Thomson, 2013

Reference Books


1.	Foundations of Financial Markets and Institutions, 3 rd Edition, Fabozzi, Pretice Hall
2.	Fundamentals of Financial Instruments , 2 nd Edition, Parameshwaran, Wiley India
3.	Marketing Management , 3 rd Edition , RajanSaxena, Tata McGraw Hill
4.	Advance Economic Theory, 17th Edition, H. L. Ahuja, S. Chand Publisher, 2009
5.	International Trade, 12 th edition, M. L. Zingan, Vindra Publication, 2007
6.	Macro Economics, 11 th edition, M. L. Zingan, Vindra Publication, 2007
7.	Monitory Economics:, 1 st Edition, M. L. Sheth, Himayalaya Publisher, 1995
8.	Economics of Development and Planning, 12 th edition, S. K. Misra and V. K. Puri, Himalaya Publishing House, 2006.

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2	https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042
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1	https://onlinecourses.nptel.ac.in/noc22_mg104/preview
2	https://nptel.ac.in/
3	https://onlinecourses.nptel.ac.in/noc20_mg31/preview
4	https://onlinecourses.nptel.ac.in/noc21_hs52/preview
5	https://onlinecourses.nptel.ac.in/noc22_hs67/preview


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Open Elective - Introduction to German Languages

GE-2317/GE23 67	Introduction to German Language			L=3	T=0	P=0	Credits =3
Evaluation Scheme	MSEs	TA	ESE	Total	ESE Duration		
	30	20	50	100	3 Hrs		

Objectives	Course Outcome: At the end of the course students will be able to:
<p>The objective of this course is to impart preliminary knowledge about the German language and civilization and is therefore of an elementary level. At the end of the course, the student is expected to acquire the following skills:</p> <p>1) Elementary communication skills, based on oral and written comprehension of common words and simple sentences in German.</p> <p>2) Simple oral and written expression.</p>	<p>a) Understand simple words and expressions spoken slowly and distinctly in German and used in day-to-day situations related to the student's immediate environment.</p> <p>b) Read and understand common words and sentences in German.</p> <p>c) Say a few words in German in conversations related to simple day-to-day situations.</p>

Unit-I : Introduction I – 6 hours


- German alphabets and Character set
- Introduction to Germany – its culture and people
- basic greetings, Self Introduction
- * Grammar- Nouns- genders, article

Unit-II : Vocabulary and Grammar II – 6 hours

- Grammar- Nouns - Plural forms
- Vocabulary- Months, weekdays and daytimes and Seasons
- Vocabulary- The number system
- * Time and date

Unit-III : Vocabulary and Grammar III – 6 hours

- Vocabulary-Family , profession
- Vocabulary- Directions , Common words
- Listening to CD – Audio 1
- - Vocabulary- House and Furniture and Draperies


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Unit-IV : Reading / Writing skills I – 7 hours

- Food and Drink and Cutlery
- Auxiliary verbs (sein , haben),
- colors
- - Regular verbs

Unit-V : Speaking/ listening skills II – 7 hours

- Listening to CDS
- WH - Questions
- Yes –No Questions
- Basic Conversations, Translation passage and spoken session


Unit-VI : Advanced Grammar and Vocabulary – 7 hours

- Vocabulary- Body parts and Clothes.
- Classroom
- Vocabulary- Vegetables and fruits
- Irregular verbs
- Modal and Imperative Verbs
- Intro. To cases
- International Exam Format

Reference Books: 1. Studio D / Netzwerk A1 - Goyal Pub.

2. Complete Training Manual for German A1

3. Towards Germany. – Sampada Apte


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Department of Applied Mathematics & Humanities

V&VI-Semester B.E. (Open Elective)

Open Elective - Introduction to Japanese Languages

GE-2322/GE2372	Introduction to Japanese Language			L=3	T=0	P=0	Credits =3
Evaluation Scheme	MSEs	TA	ESE	Total	ESE Duration		
	30	20	50	100	3 Hrs		

Objectives

The objective of this course is to impart preliminary knowledge about the Japanese language and civilization and is therefore of an elementary level. At the end of the 40 hours course, the student is expected to acquire the following skills:

- 1) Elementary communication skills, based on oral and written comprehension of common words and simple sentences in Japanese.
- 2) Simple oral and written expression.

Course Outcome: At the end of the course students will be able to:


- a) Understand simple words and expressions spoken slowly and distinctly in Japanese and used in day-to-day situations related to the student's immediate environment.
- b) Read and understand common words and sentences in Japanese.
- c) Say a few words in Japanese in conversations related to simple day-to-day situations.

Unit-I : Grammar I – 10 hours

- First Script - Hiragana
- Reading and Writing

Unit-II : Grammar II – 10 hours

- Basic Introduction
- Basic Sentences


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Unit-III : Vocabulary – 6 hours

- Numbers (1-10000)
- Days of the week
- Months of the year
- Daily Greeting

Unit-IV : Communication skills I – 6 hours

- Interrogation relating to everyday situations
- Replying to simple questions

Unit-V : Communication skills II – 4 hours


- Day to day life, eg.
- Classroom
- Friends
- Family
- School
- Vacations

Unit-VI : Civilization – 4 hours

- History
- Geography

Text book recommended:

- 1) Minna no Nihongo , by JF .
- 2) Marugoto by JF


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B. TechSoE and Syllabus 2022

(Scheme of Examination w.e.f. 2022-23 onward)

Semester VI

AIDS
2351

AIDS
2351

22ADS601	Management Studies			L= 3	T=0	P=0	Credits=3
Evaluation Scheme	MSE-I	MSE-II	TA	ESE	Total	ESE Duration	
	15	15	20	50	100	3 Hrs	

Course Outcomes:

Upon successful completion of the course the students will be able to

1. Explain the legal provision and function of management.
2. Analyze the role of Human Resource and Financial Management in the Organisation.
3. Analyze the Project life Cycles.
4. Identify tools and techniques for the marketing of goods and services.

Unit: Principles of Management **6 Hours**

Evolution of Management Thought : Scientific and Administrative Theories of Management , Definition and Concept of Management, Functions of Management : Planning, Organizing, Directing, and Controlling, Motivational Theories.

Contemporary Issues related to Topic

Unit: Legal aspects of Management **6 Hours**

The Indian Contract Act, 1872 – Formation of Valid Contract, Discharge of Contract, Quasi Contract, Indemnity and Guarantee. The Indian Partnership Act, 1932- Essentials of Partnership, The Companies Act – Nature and Definition of Company, Registration and Incorporation, Memorandum and Article of Association, Kinds of companies. **Contemporary Issues related to Topic**

Unit: Human Resource Management **6 Hours**

Human Resource Management-Meaning and Scope, Principles of HRD, Job Analysis – Job Description and Job Specification, Training and Development – Purpose and Methods, Performance Appraisal-Purpose, Procedure and Techniques, Grievance Redressal Procedure.

Contemporary Issues related to Topic

Unit: Project Management **6 Hours**

Concept, Classification and Characteristics of Project, Phases of Project, Project Proposal, Tools and Techniques of Project Management, SWOT Analysis of the Project.

Contemporary Issues related to Topic

Unit: Marketing Management **6 Hours**

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Marketing Management - Definition & scope, Selling & Modern Concepts of Marketing, Market Research, Sales Promotion, Pricing, Channels of Distribution, Market Segmentation, Marketing Mix, Positioning, Targeting

Contemporary Issues related to Topic

6 Hours

Unit :6 **Financial Management**

Definition & Functions of Finance department, Sources of finance, Types of capital, Types of Taxes, Introduction of Accountancy and its rules, Preparation of Books of Account- Journal, Posting of transaction into ledger and preparation of trial balance, Introduction of profit and loss account and balance sheet

Contemporary Issues related to Topic

36 Hours

Total Lecture Hours

Textbooks

1. Harold Koontz Ramchandra, Principles of Management, Tata McGraw hills
2. Bare Acts -- Indian Contract Act, Indian Partnership Act and Company Law
3. Dr. V.S.P.Rao - Human Resource Management - Text and Cases
4. Joseph Hegney- Fundamentals of Project Management 5th Edition
5. Ramaswamy V.S. and Namakumari S - Marketing Management: Planning, Implementation and Control (Macmillian, 3rd Edition).
6. Fabozzi - Foundations of Financial Markets and Institutions (Prentice hall, 3rd Ed.)

Reference Books

1. Foundations of Financial Markets and Institutions, 3rd Edition, Fabozzi, Prentice Hall
2. Fundamentals of Financial Instruments , 2nd Edition, Parameswaran, Wiley India
3. Marketing Management , 3rd Edition , RajanSaxena, Tata McGraw Hill
4. A Text book of Human Resource Management, C.B.Mamoria and S.V.Gankar, Parameswaran-
5. Fundamentals of Financial Instruments (Wiley India)
6. Business Law, Tulsian's Business Laws by P C Tulsian, Bharat Tulsian, Tushar Tulsian Edition 2023 S Chand Publishing
6. Principles of Management, Jayasankar, Publisher: Margham Publication,

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]

- 1 <http://link.springer.com/openurl?genre=book&isbn=978-1-4613-6193-0>
- 2 <https://onlinelibrary.wiley.com/doi/book/10.1002/9780470168042>

MOOCs Links and additional reading, learning, video material

- 1 https://onlinecourses.nptel.ac.in/noc22_mg104/preview
- 2 <https://nptel.ac.in/>

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B. Tech SoE and Syllabus 2023

(Scheme of Examination w.e.f. 2023-24 onward)

B.Tech - First Year

I/II SEMESTER

Branch: CE/ME/EL/EE/ET/CT/IT/CSE/CSEIOT/VLSI

Professional Communication

Course Outcomes :

Upon successful completion of the course the students will be able to:

1. Apply different modes for effective communication
2. Produce competently the Phonology of English language
3. Apply nuances of LSRW skills
4. Practice Communication through different channels

Unit I: Basics of Communication

(7 Hrs.)

Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Classification of Barriers (Intrapersonal, Interpersonal, Organizational).
(Contemporary Issues related to Topic)

Unit II: English Phonetics

(8 Hrs.)

Speech Mechanism, Organs of speech, Consonant and Vowels sounds symbols, word stress rules.
(Contemporary Issues related to Topic)

Unit III: Presentation & Interview Skills

(7 Hrs.)

Presentation-Nuances of presentation- Kinesics, Proxemics, Chronemics, Vocalics, Modes of Presentation, Interview-Purpose , expectations of employer and preparation for Interview, Types, Types of Questions & Answering Techniques, Telephonic Interviews – preparation and guidelines.
(Contemporary Issues related to Topic)

Unit IV: Technical Reports, Memo & E-Mail Etiquettes

(8 Hrs.)

Report -Types, Characteristics, prewriting aspects of report and preparing writing of reports
Memo- Objectives, Types, Structure and Layout
Email-Etiquette, acronyms.
(Contemporary Issues related to Topic)

Total Lecture 26 Hours

Textbooks:

1. Meenakshi Raman & Sangeeta Sharma, Technical Communication, Raman & Sharma, Oxford University Press
Orford University Press
2. T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd
- 3.

Reference Books:

1. Dale Carnegie ,How to Develop Self – Confidence & Influence People by Public Speaking
2. AshaKaul, Communication Skills
3. Allen Dear, Body Language


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(Scheme of Examination w.e.f. 2023-24 onward)

B.Tech - First Year

1.	https://dl.uswr.ac.ir/bitstream/Hannan/141245/1/9781138219120.pdf
2.	https://www.pdfdrive.com/word-power-made-easy-the-complete-handbook-for-building-a-superiorvocabulary-e157841139.html
3.	https://www.pdfdrive.com/improve-your-communication-skills-present-with-confidence-write-with-stylelearn-skills-of-persuasion-e156963640.html
4.	https://www.pdfdrive.com/21-days-of-effective-communication-everyday-habits-and-exercises-to-improveyour-communication-skills-and-social-intelligence-e158273760.html

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YeshwantraoChavan College of Engineering
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Accredited 'A++' Grade by NAAC
Hingna Road, Wanadongri, Nagpur-441110

Department of Applied Mathematics & Humanities

V&VI-Semester B.E. (Open Elective)

Open Elective - Introduction to Spanish Languages

GE- 2319/ GE2369	Introduction to Spanish Language			L=3	T=0	P=0	Credits=3
Evaluation Scheme	MSEs	TA	ESE	Total	ESE Duration		
	30	20	50	100	3 Hrs		

Objectives	Course Outcomes : Students will be able to
Learning Basic Vocabulary	Alphabets, Numbers, Days of the Week, Months of the Year, Seasons, Greetings, Professions
Building on Basic Grammar Skills	Gender of the words, Articles, Subject pronouns, Verbs, Sentence building using Verbs and nouns
Learn to build very simple Sentences	Very basic sentences like self-introduction – Name, Age, Profession etc. Ordering food at restaurants.
Describing people, house, places	Learning Adjectives, Demonstrative adjectives to describe people, house and other places.
Write about hobbies, likes and dislikes, daily routine	Learning to write about leisure activities, what are the likes and dislikes and describing daily routine activities.
Speaking, Listening and Practical Exercises	Playing Videos to practice listening skills. Conversation practice and Role play to enhance speaking skills.

Unit-I : Introduction and basic grammar - 6 hours

- Learning about Alphabets, Numbers
- Days of the week, Months of the year, Seasons
- Common expressions, Professions, Colors
- Subject Pronouns, SER verb
- Articles, Adjectives, Demonstrative Adjectives


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Unit-II : Learning to build simple sentences- 6 hours

- ESTAR verb to describe placements
- Prepositions of place
- SER ESTAR differences and application
- Using Hay for description
- Build simple sentences about yourself, your friends, classroom objects, household objects

Unit-III : Question words, Plurals, Present Tense and Present Continuous Tense of AR verbs - 7 hours

- Question words of what, who, where, which, why, when, how
- Build conversation skills by answering questions
- Making plural of sentences in masculine form
- Making plural of sentences in feminine form
- Learning conjugations of AR verbs in Present Tense
- Learning Present continuous tense of AR Verbs
- Learning to introduce oneself

Unit- IV : ER Verbs, Stem Changing Verbs and Tener - 7 hours

- Learning conjugations of ER verbs in Present Tense
- Learning Present continuous tense of ER Verbs
- Learning Food vocabulary
- Learning Basic Conversation at restaurant
- Stem changing Verbs conjugations
- Tener Verb to talk about age, describe family

Unit-V : Saber, Conocer, Time, IR Verbs, Leisure activities- 7 hours


- Saber and Conocer to talk about abilities and personal acquaintance
- Learn to say Time in Spanish and Time related expressions
- Learning conjugations of IR verbs in Present Tense
- Learning Present continuous tense of IR Verbs
- Speak about activities what you do in leisure using all groups of verbs.

Unit-VI : Obligations, Prepositions, Possessive Adjectives, Gustar, Possessive Pronouns and Daily routine with reflexive verbs - 7 hours

- Talk about what has to be or should be done
- Learn prepositions for connecting sentences
- Possessive adjectives to learn about my, your, his her, our, their.
- Learn likes and dislikes with Gustar
- Possessive pronouns to learn about mine, yours, ours.
- Reflexive verbs to Speak about daily routine.

Text Books & Reference Books:

Spanish Made Easy, Listos
Aula1, Chicoschicas


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Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)

B.Tech - First Year

I/II SEMESTER
Branch: AIML/AIDS/CSD
Technical Communication

Course Outcomes :	
Upon successful completion of the course the students will be able to:	
1. Apply different modes for effective communication 2. Produce competently the Phonology of English language 3. Apply nuances of LSRW skills 4. Practice Communication through different channels	
Unit I: Basics of Communication	(7 Hrs.)
Process of Communication, Levels of Communication, Flow of Communication, Networks of Communication, Barriers to communication- Intrapersonal, Interpersonal, Organizational. (Contemporary Issues related to Topic)	
Unit II: English Phonetics	(8 Hrs.)
Speech Mechanism, Organs of speech, Consonant and Vowels sounds symbols, word stress rules. (Contemporary Issues related to Topic)	
Unit III: Presentation & Visual Communication , Reading & Listening Skills	(7 Hrs.)
Presentation-Purpose, Analysing Audience & Locale, Organizing Contents, Nuances of presentation- Kinesics, Proxemics, Chronemics, Vocalics, Modes of Presentation, Visual Communication –Introduction & importance, Role & Psychology of color in visual communication, Listening Skills -definition types and traits (Contemporary Issues related to Topic)	
Unit IV: Research Paper & Technical Communication	(8 Hrs.)
Research Paper - Characteristics, components, Title, Abstract, Introductory Paragraph, Body of Presentation Conclusion, Acknowledgements , List of Symbols, References Memo - Objectives, Types, Structure and Layout Email-Etiquette s, acronyms (Contemporary Issues related to Topic)	
Total Lecture	30 Hours

Textbooks:


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B. Tech SoE and Syllabus 2023
(Scheme of Examination w.e.f. 2023-24 onward)

B.Tech - First Year


- | | |
|----|--|
| 2. | T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd |
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Reference Books:

- | | |
|----|---|
| 1. | Dale Carnegie ,How to Develop Self – Confidence & Influence People by Public Speaking |
| 2. | AshaKaul, Communication Skills |
| 3. | Allen Peas ,Body Language |
| 4. | Gerson's Gerson, Technical Communication |

MOOCs Links and additional reading, learning, video material

- | | |
|----|---|
| 1. | https://dl.uswr.ac.ir/bitstream/Hannan/141245/1/9781138219120.pdf |
| 2. | https://www.pdfdrive.com/word-power-made-easy-the-complete-handbook-for-building-a-superiorvocabulary-e157841139.html |
| 3. | https://www.pdfdrive.com/improve-your-communication-skills-present-with-confidence-write-with-stylelearn-skills-of-persuasion-e156963640.html |
| 4. | https://www.pdfdrive.com/21-days-of-effective-communication-everyday-habits-and-exercises-to-improveyour-communication-skills-and-social-intelligence-e158273760.html |


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Nagpur

M.B.A.



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Yeshwantrao Chavan College of Engineering
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MBA SCHEME OF EXAMINATION 2023
 Department of Management Studies and Entrepreneurship
Masters in Business Administration (MBA)

SoE No.
23MBA V 1.0

Sl. No.	Sem	Type	Course Code	Course Title	T/P	Contact Hours				Credits	% Weightage		ESE Duration Hrs.
						L	T	P	Hrs.		TA	ESE	
I SEMESTER													
1	1	CORE	23MBA101	Principles of Management	T	3	0	0	3	3	40	60	3
2	1	CORE	23MBA102	Financial Accounting	T	4	0	0	4	4	40	60	3
3	1	CORE	23MBA103	Business Statistics	T	3	0	0	3	3	40	60	3
4	1	CORE	23MBA104	Managerial Economics	T	3	0	0	3	3	40	60	3
5	1	CORE	23MBA105	Organisational Behaviour	T	3	0	0	3	3	40	60	3
6	1	CORE	23MBA106	Legal Aspects of Business	T	3	0	0	3	3	40	60	3
7	1	CORE	23MBA107	Business Ethics and CSR	T	3	0	0	3	3	40	60	3
8	1	SKILL	23MBA108	Business Communication	T	3	0	0	3	3	40	60	3
9	1	AUDIT		Professional Management Program – 1					40				
10	1	AUDIT		Digital Skills					20				
Total						25	0	0	85	25			

II SEMESTER													
1	2	CORE	23MBA201	Marketing Management	T	3	0	0	3	3	40	60	3
2	2	CORE	23MBA202	Business Research Methods	T	3	0	0	3	3	40	60	3
3	2	CORE	23MBA203	Cost & Management Accounting	T	3	0	0	3	3	40	60	3
4	2	CORE	23MBA204	Entrepreneurship Development	T	3	0	0	3	3	40	60	3
5	2	CORE	23MBA205	Operations Management	T	3	0	0	3	3	40	60	3
6	2	CORE	23MBA206	Human Resource Management	T	3	0	0	3	3	40	60	3
7	2	CORE	23MBA207	Indian Business Environment	T	3	0	0	3	3	40	60	3
8	2	CORE	23MBA208	Financial Management	T	4	0	0	4	4	40	60	3
9	2	SKILL	23MBA209	Entrepreneurship Development Lab (Evaluation of the course will be based on Business Plan submission)	P	0	0	4	4	2	40	60	
9	2	AUDIT		Professional Management Program – 2					40				
10	2	AUDIT		Employability Enhancement Programme (EEP)					40				
TOTAL						25	0	4	109	27			

III SEMESTER														
1	3	CORE	23MBA301	Strategic Management	T	3	0	0	3	3	40	60	3	
2	3	CORE	GROUP A (Select any Specialization Group of Electives from the following group)	Specialisation – I : Paper 1	T	3	0	0	3	3	40	60	3	
3	3	CORE		Specialisation – I : Paper 2	T	3	0	0	3	3	40	60	3	
4	3	CORE		Specialisation – I : Paper 3	T	3	0	0	3	3	40	60	3	
5	3	CORE		Specialisation – I : Paper 4	T	3	0	0	3	3	40	60	3	
6	3	CORE		GROUP B (Select any Specialization Group of Electives from the following group)	Specialisation – II : Paper 1	T	3	0	0	3	3	40	60	3
7	3	CORE			Specialisation – II : Paper 2	T	3	0	0	3	3	40	60	3
8	3	CORE			Specialisation – II : Paper 3	T	3	0	0	3	3	40	60	3
9	3	CORE			Specialisation – II : Paper 4	T	3	0	0	3	3	40	60	3
TOTAL						27	0	0	27	27				



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SoE No.
23MBA V 1.0

Sl. No.	Sem	Type	Course Code	Course Title	T/P	Contact Hours				Credits	% Weightage		ESE Duration Hrs.
						L	T	P	Hrs.		TA	ESE	
IV SEMESTER													
1	4	CORE	GROUP A (Select any Specialization Group of Electives from the following group)	Specialisation – I : Paper 1	T	3	0	0	3	3	40	60	3
2	4	CORE		Specialisation – I : Paper 2	T	3	0	0	3	3	40	60	3
3	4	CORE	GROUP B (Select any Specialization Group of Electives from the following group)	Specialisation – II : Paper 1	T	3	0	0	3	3	40	60	3
4	4	CORE		Specialisation – II : Paper 2	T	3	0	0	3	3	40	60	3
5	4	PROJECT (Employability)	23MBA401	CAPSTONE PROJECT (through Industry Internship Program(IIP))	P				350	12	100	100	
				Note: 1. Theory subjects in Semester IV will be conducted in online through Swayam / NPTL / MOOC/LMS 2. Students will undergo Semester Long Industry Linked Internship in Semester IV which will culminate to Capstone Project.									
						12	0	0	362	24			
Grand Total of Credits										103			

List of Electives

ELECTIVE A - FINANCIAL MANAGEMENT

1	3		23MBAF301	Insurance and Banking Management
2	3		23MBAF302	Corporate Taxation
3	3		23MBAF303	Financial Derivatives , Security Analysis And Portfolio Management
4	3		23MBAF304	Strategic Financial Management
5	4		23MBAF401	FinTech
6	4		23MBAF402	Project Planning & Financial Strategies

ELECTIVE B -HUMAN RESOURCE MANAGEMENT

1	3		23MBAHR301	Learning & Development
2	3		23MBAHR302	Human Resource Metrics and Analytics
3	3		23MBAHR303	Organizational Theory: Structure, Design
4	3		23MBAHR304	Organizational Development
5	4		23MBAHR401	Competency Mapping
6	4		23MBAHR402	Performance and Compensation Management

ELECTIVE C -MARKETING MANAGEMENT

1	3		23MBAM301	Consumer Behavior and Customer Relationship Management
2	3		23MBAM302	Brand Management
3	3		23MBAM303	Retail Management and Visual Merchandising
4	3		23MBAM304	Marketing Analytics
5	4		23MBAM401	Digital and Social Marketing
6	4		23MBAM402	Marketing of Services

ELECTIVE D- OPERATIONS & LOGISTICS MANAGEMENT

1	3		23MBAO301	Sourcing Management
2	3		23MBAO302	Project Management
3	3		23MBAO303	Service Operation Management
4	3		23MBAO304	Logistics and Supply Chain Management
5	4		23MBAO401	Total Quality Management
6	4		23MBAO402	Operation Analytics

ELECTIVE E- BUSINESS ANALYTICS

1	3		23MBABA301	Fundamentals of Business Analytics
2	3		23MBABA302	Business Intelligence (Descriptive Analytics)
3	3		23MBABA303	Advanced Analytics (Predictive Analytics)
4	3		23MBABA304	Big Data Analytics
5	4		23MBABA401	Customer and Social Media Analytics
6	4		23MBABA402	Business Analytics using R

		Aug-23	1.00	Applicable for AY 2023-24 Onwards
Chairperson	Dean (Acad. Matters)	Date of Release	Version	