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 Applied Mathematics & Humanities)

B.Tech in Engineering

(OPEN ELECTIVE)

III SEMSTER

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

IV SEMSTER
Open Elective –II (Basket)

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

III/IV SEMESTER
23OE1301/23OE2401 : Combinatorics

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Develop the generating function by using basic concepts, rules, and definitions of Algebra. 2. Apply generating function to solve various combinatorial identities. 3. Discuss the graphs of given data. 4. Use fundamental concepts of the rational, irrational numbers, continued fraction.

Unit:1	**8 Hours**
Basic counting techniques & Recurrence relations: Basic counting techniques, pigeon-hole principle, recurrence relations, generating functions. Examples using ordinary power series and exponential generating functions, general properties of such functions. Dirichlet Series as generating functions.	
Unit:2	**7 Hours**
Combinatorial Identity & Graph Theory: Proofs of the sieve formula and of various combinatorial identities. Certifying combinatorial identities. Some analytical methods and asymptotic results. Polya's counting theorem. Basics of graph theory.	
Unit:3	**8 Hours**
Finite Continued Fraction: Introduction, Definition of Finite Simple Continued Fraction, Express Rational Number in to Finite Simple Continued Fraction, Convergent of Simple Finite Simple Continued Fraction, Solution of linear Diophantine equation using S.C.F.	
Unit:4	**7 Hours**
Infinite Continued Fraction: Introduction, Definition of Infinite Continued Fraction, Periodic Continued Fraction, Procedure of finding the ICF of irrational square root, Best possible approximations, Pell's equation.	
Total Lecture Hours	**30 Hours**

Textbooks	
1	An Introduction to the Theory of Numbers, 5th edition, Niven, Zuckerman and Montgomery, Wiley Publication.
2	Elementary number theory, 6th addition, Devid M. Burton, Tata Mc Graw Hill Publishers.
Reference Books	
1	Combinatorial theory, 1979 edition, Martin Aigner, springer.
2	Discrete Mathematics and Number Theory, First Edition, Vijay Manthena & Pravin P. Bhad, Central Techno Publication.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
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://archive.nptel.ac.in/courses/106/108/106108051
2	https://onlinecourses.nptel.ac.in/noc21_ma68/preview

III /IV SEMESTER
23OE1302/23OE2402 : Fuzzy Set Theory, Arithmetic and Logic

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Determine the fuzzy set operations, fuzzy relation, compositions of fuzzy relations. 2. Apply the concepts of fuzzy number arithmetic to solve the fuzzy mathematical equations. 3. Determine the fuzzy function and their integration and differentiation. 4. Apply the concepts of fuzzy logic and fuzzy inference to the rule-based engineering problems.

Unit:1	**8 Hours**
Fuzzy Set and Fuzzy Relation: Characteristics of crisp set, Fuzzy Set and its membership grade, fuzzy complement, fuzzy union, Fuzzy intersection, fuzzy difference. Fuzzy Distance, Subset hood of Fuzzy Set. Fuzzy Relation, composition of fuzzy relation. Projection and cylindrical extension, Extension of fuzzy relation.	
Unit:2	**7 Hours**
Fuzzy Number: Definition of Fuzzy Number, Interval arithmetic's, Algebraic operation of fuzzy number, triangular fuzzy number, Trapezoidal fuzzy number.	
Unit:3	**8 Hours**
Fuzzy Functions: Function with fuzzy constraints, Fuzzifying function of crisp variable, maxima and minima of fuzzy function. Integration and Differentiation of fuzzy function.	
Unit:4	**7 Hours**
Fuzzy Logic and Fuzzy Inference: Classical logic, logic function, fuzzy logic and connectives, Linguistic variables and Hedges, Fuzzy predicate, Fuzzy modifier, Concentration and Dilation of fuzzy statements. Fuzzy Inference rules and Composition, Approximate Reasoning.	
Total Lecture Hours	**30 Hours**

Textbooks	
1	Fuzzy Logic with engineering Applications, by T.J.Ross, John Wiley and Sons, 3rd Edition.
2	Fuzzy Sets And Fuzzy Logic, by George J. Klir and Bo Yuan, Prentice Hall, 2rd Edition.
Reference Books	
1	An Introduction to fuzzy Logic Application in Intelligent system, Ronald R. Yagar and Lotfi A. Zadeh, Springer Science +Business Media LLC, 1st Edition.
2	Mathematics of Fuzzy sets and fuzzy Logic, Barnabas Bede, Springer Publication, 1st Edition.
3	First course on Fuzzy Theory and Application, Kwang H. Lee, Springer Publication ,1st Edition.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
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://onlinecourses.nptel.ac.in/noc23_ee21/course
2	https://www.youtube.com/watch?v=oWqXwCEfY78&list=PLddgOQinMGkGDxfBeOkfS3A9qHgfd_7Ih&index=1&t=709s

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III/ IV SEMESTER

23OE1303 / 23OE2403: Green Chemistry and Sustainability

Course Outcomes:
Upon successful completion of the course the students will be able to 1.Summarize Green Chemistry principles and its applications. (L3) 2.Relate use of different materials for green chemistry and its applications (L3) 3.Appraise reflections of Green Chemistry for sustainable development initiatives. (L3) 4. Illustrate waste management techniques for energy management. (L3)

Unit:1	**: Green Chemistry – Introduction and Principles**	**9 Hours**
Introduction to Green Chemistry. What is Green Chemistry? Pollution prevention Act of 1990. Emergence and need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry. Twelve basic principles of green chemistry.		
Unit:2	**Materials for Green Chemistry and Technology**	**6 Hours**
Green Synthesis: Importance, Methods and Applications. Catalysis, environmental friendly catalysts, Biocatalysis. Biodegradable polymers. Alternative Solvents. Supercritical fluids (SCFs): examples and properties. Extraction with SCFs.		
Unit:3	Green Chemistry & Sustainable development:	**7 Hours**
E-waste. Green chemistry in battery Technology. Biodiesel. Biogas production by anaerobic digestion. Alcohol production from biomass. Goals of sustainability. Measures for Sustainability: Water, Power, Paper, and Raw material conservation. Best practices in Green Chemistry for sustainable development with suitable examples.		
Unit:4	Waste management and Waste to Energy Conversion	**8 Hours**
Waste Characterization, ignitability, corrosivity, reactivity, and toxicity. Biomedical waste. Hazardous waste management. ETP and STP. Six-R concept. Key elements of energy management systems and numericals. Use of clean technology. Life cycle assessment. Green supply chain.		
	Total Lecture Hours	**30 Hours**

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Text books	
1	Engineering Chemistry, Shikha Agarwal, Cambridge University Press
2	Green Chemistry an Introductory Text, M. Lancaster, Royal Society of Chemistry, Cambridge
3	Applied Chemistry, A.V. Bharati and Walekar, Tech Max Publications, Pune.:
4	Text Book of Engineering Chemistry, S.S. Dara, S. Chand and Company Ltd. New Delhi.
Reference Books	
1	Green Chemistry and Environment , V.K. Ahluwalia
2	Green Chemistry Fundamentals and Applications,Editors: Suresh C. Ameta, PhD**,**Rakshit Ameta, PhD
3	Green Chemistry and Engineering A Pathway to Sustainability, Anne E. Marteel-Parrish, Martin A. Abraham, Wiley, 2013
4	Green Chemistry and Applications, Adali Facio, Aide Sáenz-Galindo, Raul Rodriguez-Herrera, CRC Press, 2020
5	Green Chemistry and Catalysis, R. A. Sheldon,Isabella Arends, Ulf Hanefeld, Wiley, 2007
6	Real World Cases in Green Chemistry, M.C.Cann and M.E.Connelly. American Chemical Society: Washington DC 2000
7	Industrial Water Reuse and Waste Water Minimization, James. G. Mann and Y.A Liu. McGraw Hill, 1999
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	
2	
MOOCs Links and additional reading, learning, video material	
1	https://www.youtube.com/watch?v=GS3awC0BVLE
2	https://www.youtube.com/watch?v=EdGRDlycCkw&t=1722s
3	https://www.youtube.com/watch?v=-418uPYlNRQ&t=1086s
4	https://www.youtube.com/watch?v=o_DMkYEMKZ4

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III/IV SEMESTER

23OE1304/23OE2404: Hydrogen fuel

Course Outcomes:
Upon successful completion of the course the students will be able to 1. **Summarize** the basic properties of hydrogen. (L2) 2. **Explain** various methods of production, storage, and transportation of hydrogen. (L2) 3. **Describe** applications, hazards, and safety awareness of hydrogen. (L2)

Unit:1	**Introduction to Hydrogen**	**7 Hours**
Introduction, properties: phase diagram, diffusivity, density energy content, flammability, explosive range, ignition energy, auto ignition temperature, flame speed. Global status of supply and demand, Sources and colors of hydrogen-Green, Blue, Brown, Grey, Black.		
Unit:2	**Methods of Production**	**8 Hours**
Production from Fossil fuel: Natural gas - Steam reforming (steam methane reforming – SMR). Partial oxidation (POX). Autothermal reforming (ATR), Coal. Hydrogen from splitting of water: Water electrolysis, Alkaline electrolysis, Polymer electrolyte membrane (PEM) electrolysis, High-temperature electrolysis, Photo-electrolysis (photolysis)		
Unit:3	**Storage and Transportation**	**8 Hours**
Overview – Storages, Challenges of Hydrogen Storages. Physical Based: Pressurized Storages, Liquid storages, Cryo compressed storages, Material Based: Metal hydride storages, Liquid Organic Hydrogen Carrier - LOHC Adsorptive storages. Transportation: Overview, Pipelines, Ships, Trucks		
Unit:4	**Applications and Safety Aspects**	**7 Hours**
Use of hydrogen: Internal combustion engines, fuel cells, hydrogen sensing Properties of hydrogen associated with hazards, classification of hydrogen hazards, compressed and liquid hydrogen related hazards, Regulation, codes and standards.		
	Total Lecture Hours	**30 Hours**

Textbooks	
1	Gupta, R. B., Hydrogen Fuel: Production, Transport and Storage, CRC Press, Taylor & Francis Group, 2009.
2	AgataGodula-Jopek, Hydrogen Production by Electrolysis, Wiley-VCH, Germany, 2015
3	Tzimas, E., Filiou, C., Peteves, S.D., &Veyret, J.B. "Hydrogen storage: state-of-the-art and future perspective. Netherlands": European Communities, 2003.
4	Michael Hirscher, "Handbook of Hydrogen Storage", Wiley-VCH, 2010. Instructor bio

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Reference Books	
1	Hydrogen Technologies Safety Guide -C. Rivkin, R. Burgess, and W. Buttner, National Renewable Energy Laboratory **https://www.nrel.gov/docs/fy15osti/60948.pdf**
2	https://www.cesa.org/wp-content/uploads/CESA-Lipman-H2-prod-storage-050311.pdf.
3	Harnessing GREEN HYDROGEN OPPORTUNITIES FOR DEEP DECARBONISATION IN INDIA https://www.niti.gov.in/sites/default/files/2022-06/Harnessing_Green_Hydrogen_V21_DIGITAL_29062022.pdf.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/SERIES%20WISE%20BOOKS/CHEMISTRY/
MOOCs Links and additional reading, learning, video material	
1	Global Hydrogen Review 2021, IEA (2021), Paris, https://www.iea.org/reports/global-hydrogen-review-2021
2	https://youtu.be/anDF-nUHZW4
3	https://www.udemy.com/course/green-hydrogen-the-fuel-of-the-future/

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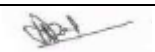
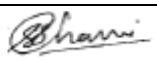
III / IV SEMESTER

23OE1305/23OE2405: Electronic Materials and Applications

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Examine polarization processes, dielectrics materials and their applications in devices. 2. Analyze optical processes associated with luminescent materials for applications in optical devices. 3. Illustrate the methods of synthesis of nanomaterials and their applications in product development.

Unit:1	**Dielectrics**	**8 Hours**
Dielectric parameters, Mechanisms of polarization, Lorentz field, Claussius- Mosetti equation, Dielectric in ac field, Frequency and temperature dependence of polarization, Dielectric materials and applications.		
Unit:2	**Active Dielectrics**	**7 Hours**
Ferroelectricity Origin of ferroelectricity; Important characteristics of ferroelectrics: Normal and relaxor ferroelectrics; Applications of ferroelectricity, Piezoelectricity: Phenomenon, Origin, Piezoelectricity in Quartz; Piezoelectric materials and applications. Pyroelectricity, Phenomenon, Origin, Pyroelectric materials and applications.		
Unit:3	**Optical Materials**	**8 Hours**
Refractive index and relative dielectric constant, Optical absorption, Luminescence: LCD, LED materials and applications, Solar cell.		
Unit:4	**Nanomaterials**	**7 Hours**
Introduction to Nanoscience, Synthesis of nanomaterials: Top down and Bottom – up process, Different types of nano structures (1-D, 2-D and 3-D), Properties of nano materials and comparison with bulk material, Nanostructured materials (Structure, Properties and uses): Graphene.		
	Total Lecture Hours	**30 Hours**

Text books	
1	Solid State Physics: S.O.Pillai, New Age International Publishers.
2	Applied Physics: P. K. Palanisamy, Scitech Publication (India Pvt Ltd , Chennai) 600017
3	Principles of electronic materials and devices : S.O.Kasap
Reference Books	
1	Engineering Physics: Pandey and Chaturvedi, Ceanage Publication.
2	Engineering Physics: Malik and Singh, McGraw Hill Publication

			July,2023	1.00	Applicable for AY 2023-24 Onwards
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3	Applied Physics: T Bhima Sankaran and Prasad, BS publications
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1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Dekker%20-%20Solid%20State%20Physics.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/workbook%20nanoscience.pdf
3	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Sengupta-Introduction%20to%20Nano%20Basics%20to%20Nanoscience%20and%20Nanotechnology.pdf
4	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Wiiliam%20and%20David-Materials%20Science.pdf
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/content/mp4/113/104/113104090/MP4/mod01lec01.mp4
2	https://archive.nptel.ac.in/content/mp4/113/104/113104090/MP4/mod06lec28.mp4
3	https://archive.nptel.ac.in/content/storage2/108/102/108102169/MP4/mod09lec28.mp4
4	https://archive.nptel.ac.in/content/mp4/118/104/118104008/MP4/mod01lec11.mp4

NAME	Designation & Affiliation	Signature
Dr. G. P. Singh	Professor, Head of the Department of Mathematics, VNIT, Nagpur	
Dr. Anupama Kumar	Professor, Head of the department of Chemistry, VNIT, Nagpur	
Dr. Vijay Tangde,	Assistant Professor, Department of Chemistry, RTM Nagpur University, Nagpur	
Dr. S. S. Bagchi	Dy. Dy. General Manager, Head of Department Chemistry, Reliance Power, Butibori, Nagpur	
Dr. M. P. Gandhi	Chairman BOS General Engineering YCCE, Nagpur	
Dr. H. V. Ganvir	Head of the Department of Applied Physics, YCCE, Nagpur	

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III / IV SEMESTER

23OE1306/23OE2406 : Laser Technology and Applications

Course Outcomes:
Upon successful completion of the course the students will be able to 1. Explain the fundamentals of Lasers. 2. Associate the laser rate equations for optimum output power with working of optical resonators for different cavity modes. 3. Discuss the laser beam characteristics with various kinds of lasers. 4. Outline the general applications of lasers and safety measures.

Unit:1	**Laser Fundamentals**	**7 Hours**
Introduction, Population & Thermal Equilibrium, Interaction of light with matter, Einstein's coefficient, Metastable state, Population Inversion, Active Medium, Pumping methods and pumping scheme,		
Unit:2	**Laser Rate Equations and Resonant Cavities**	**8 Hours**
Laser rate equations : Laser power around threshold, Optical resonator, Types of End mirrors, Longitudinal & Transverse modes & mode selection, Quality Factor, Q-switching, cavity dumping		
Unit:3	**Laser Characteristics & Types**	**8 Hours**
Intensity, Monochromaticity, Directionality, Divergence, Coherence, Types of coherence, Solid state Laser, Gas Laser, Dye Laser.		
Unit:4	**Laser : Applications, Hazards and Safety Measures**	**7 Hours**
General Applications of Lasers including Industry, Medicine, Entertainment, Lasers in nuclear energy, Optical communication, Holography, Classification of lasers : output power and radiation intensity, Maximum Permissible Exposure (MPE) , Types of hazards, hazards to eyes and skin, , safety measures		
Total Lecture Hours		**30 Hours**

Text books	
1.	K. Thyagrajan, A K Ghatak, Lasers: Theory & Applications, Revised 9th Edition , McMillan Publishing Corporation,2019
2.	Subramanyam, Brijla, M N Avadhanulu, Text Book of Optics, S. Chand & Company, 2006
3.	M N Avadhanulu, An Introduction to Lasers: Theory & Applications, First Edition 2001, S. Chand & Company Pvt. Ltd, 2017

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Reference Books	
1	W. T. Silfvast, Laser Fundamentals, Cambridge University Press, 2004
2	Ajoy Ghatak, Introduction to Modern optics, 4th Edition, Tata McGraw Hill Education pvt.ltd., 2009
3	K R Nambiar, Laser Principles, Types & Applications:, New Age International, 2004
4	J. Verdeyen, Laser Electronics, Prentice Hall, 1995
6	Reddy J.F., 'High Power Laser Applications', Academic Press, 1977.
YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/Eisberg%20&%20Resnick%20-%20Quantum%20Physics.pdf
2	http://103.152.199.179/YCCE/Suported%20file/Supprted%20file/e-copies%20of%20books/Applied%20Sciences%20&%20Humanities/Physics/2016_Book_ThePhysicsOfSemiconductors.pdf
MOOCs Links and additional reading, learning, video material	
1	https://archive.nptel.ac.in/courses/115/102/115102124/
2	https://onlinecourses.nptel.ac.in/noc21_ph01/preview
3	https://onlinecourses.nptel.ac.in/noc22_me92/preview

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Dr. G. P. Singh	Professor, Head of the Department of Mathematics, VNIT, Nagpur	
Dr. Anupama Kumar	Professor, Head of the department of Chemistry, VNIT, Nagpur	
Dr. Vijay Tangde,	Assistant Professor, Department of Chemistry, RTM Nagpur University, Nagpur	
Dr. S. S. Bagchi	Dy. Dy. General Manager, Head of Department Chemistry, Reliance Power, Butibori, Nagpur	
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III/IV SEMESTER

23OE1307 / 23OE2407: Finance and 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 product from waste or scrap material.

Unit I:	**8 Hrs.**
Business Finance: 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:	**7 Hrs.**
Concept of Cost: 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:	**7 Hrs.**
Cost ascertainment and cost reduction: 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:	**8 Hrs.**
Costing System: 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.	
Total Lecture	**30 Hours**

Textbooks:	
1.	Principles and Practice of Cost Accounting, Fifth edition, N.K.Prasad , Pearson Education.
2.	Management Accountancy, Third edition2010, 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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YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/10.1002/9781118785317.weom100204
2	https://onlinelibrary.wiley.com/doi/10.1002/9780470404324.hof002055

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/TgF2XvjquUU
2.	https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_pg/392
3.	https://iimbx.iimb.ac.in/catalog/accounting-for-decision-making/

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III/IV SEMESTER

23OE1308/23OE2408 : Operation Research Techniques

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Applying basic operations research techniques to formulate given situation as LPP and solving by graphical & simplex method. 2. Solving Transportation and Assignment Models and analyzing the concept of dynamic programming to solve problems ofdiscreet and continuous variables. 3. Analyze projects for minimum total cost and smooth level ofresources. 4. Review of different replacement policies and its application in operation research and analysis of the application of simulation and waiting line model.

Unit I:	**8 Hrs.**
Introduction to OR & Basic OR Models, Definition Characteristics and limitations of OR. Linear programming solutions (LPP) by graphical methods and simplex method. Sensitivity analysis	
Unit II:	**7 Hrs.**
Assignment Model and Transportation Model.	
Unit III:	**7 Hrs.**
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.	
Unit IV:	**8 Hrs.**
Project Management: Network Scheduling byCPM & PERT, Cost considerations in PERT and CPM	
Total Lecture	**30 Hours**

Textbooks:	
1.	Operations Research - An Introduction, Hamdy A. Taha, Prentice Hall of India Pvt.Ltd., New Delhi.
2.	Operations Research, Prem Kumar Gupta& D.S. Hira, . Chand& Co
3.	Operations Research: Theory and Applications, J.K. Sharma, Mac Millan
4.	Introductory Operations Research, S.C. Sharma, Discovery Publishing House.

Reference Books:	
1.	Optimization Theoryand Application, S.S. Rao, Halsted Press
2.	Introduction to Operation Research:Computer Oriented Algorithmic approach, Billy E. Gillet,

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	Tata McGraw Hill Publishing Co. Ltd. New Delhi.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/10.1002/9780470400531.eorms0565
2	https://onlinelibrary.wiley.com/doi/10.1002/9780470400531.eorms0190

MOOCs Links and additional reading, learning, video material	
1.	https://ugcmoocs.inflibnet.ac.in/index.php/courses/view_ug/275
2.	https://onlinecourses.swayam2.ac.in/cec20_ma10/preview
3.	https://onlinecourses.nptel.ac.in/noc19_ma29/preview

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III/IV SEMESTER

23OE1309/ 23OE2409: 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 Economic feasibility of the project 3. Design and analyze the project and prepare project report. 4. Evaluate the project on Economic, Social and Environmental aspects.

Unit I:	**8 Hrs.**
Project Identification considering objectives 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.	
Unit II:	**7 Hrs.**
Technical feasibility: Process selection, Level of automation, plant capacity, acquiring technology, Appropriate technology plant location, Equipment selection & procurement, Govt. policies. Value analysis and project evaluation.	
Unit III:	**7 Hrs.**
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.	
Unit IV:	**8 Hrs.**
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.	
Total Lecture	**30 Hours**

Textbooks:	
1.	Project Management – David I Cleland- Mc Graw hill International, 1999.
2.	Project Management- Harry, Maylor- Pearson Publications
3.	Gopalakrishnan, Project Management, TMH, 2007
4.	H.R. Machiraju, Introduction to Project Finance, Vikas Publications, 2005.

Reference books:	
1.	Narendra Singh, Project Management Control, 4th Revised Edition, Himalaya Publishing House, 2007.

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2.	Prasanna Chandra, "Project Management", TMH, 2007
3.	Chowdry, Project Management, TMH, 2007 •
4.	Clifford F. Gray, Erik W. Larson, "Project Management the Managerial Process, 3rd Edition, McGrawhill,2007

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/10.1002/9780470172346.ch4
2	https://onlinelibrary.wiley.com/doi/10.1002/9781118835531.ch4

MOOCs Links and additional reading, learning, video material	
1.	https://www.my-mooc.com/en/mooc/project-management-101
2.	https://www.my-mooc.com/en/mooc/best-practices-project-management-ritx-pm9002x-0
3.	https://www.my-mooc.com/en/mooc/results-based-project-management-witsx-rbme101x

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III/IV SEMESTER

23OE1310/23OE2410 : 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 I:	**8 Hrs.**
Principles of Quality Management, Pioneers of TQM, Quality costs, Quality system Customer Orientation, Benchmarking, Re-engineering	
Unit II:	**7 Hrs.**
Leadership, Organizational Structure, Team Building, Information Systems and Documentation – Quality Auditing, ISO 9000 - QS 9000.QMS, Quality awards.	
Unit III:	**7 Hrs.**
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 IV:	**8 Hrs.**
Methods and Philosophy of Statistical Process Control, Control Charts for Variables and Attributes	
Total Lecture	**30 Hours**

Textbooks:	
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
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 Douglus C. Montgomery2nd Edition, John Wiley and Sons, 1991.
3.	Statistical Quality Control 1984 Grant E.L and Leavenworth, McGraw-Hill, 1984.

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2	https://onlinelibrary.wiley.com/doi/10.1002/0471028959.sof359

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/NWsw9tKhRg8
2.	https://youtu.be/q_tx4hZox8Y
3.	https://youtu.be/SoUjQpIO3YY

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III/IV SEMESTER

23OE1311 /23OE2411 : Value Engineering

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Explain the various typs of Values and functions. 2. Evaluate the product life cycle. 3. Analyze the project selection and estimate life cycle costs. 4. Evaluate and improve value of product/system by designing and critically analyzing the VE job plans and othe VE/VA techniques.

Unit I:	**8 Hrs.**
Introduction to Value Engineering (V.E.) and Value Analysis, Quantitative definition of Value, Use Value and Prestige Value, Estimation of product quality/performance, Types of Functions	
Unit II:	**7 Hrs.**
Life Cycle of a Product, Product life cycle Management, Methodology of V.E.,	
Unit III:	**7 Hrs.**
Relationship between Use Functions and Esteem Functions in product design, Functional Cost and Functional Worth, Effect of value improvement on profitability, Aims of VE systematic Approach	
Unit IV:	**8 Hrs.**
Introduction to V.E. Job plan / Functional Approach to Value Improvement, Various phases and techniques of the job plan.	
Total Lecture	**30 Hours**

Textbooks:	
1.	Value Engineering, 1962, L.D.Miles ,Materials Management International,
2.	Getting more at less cost , 1995, Jagannathan Tata McGraw-Hill Publishing Company Limited,
3.	Value Engineering Tufly

Reference Books:	
1.	Value Engineering, 3rd edition, Donald Parker
2.	Value Engineering, 4th edition 1984, Zimmerman City of Tulsa, 1984

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1	https://onlinelibrary.wiley.com/doi/10.1002/9781118785317.weom100175
2	https://onlinelibrary.wiley.com/doi/10.1002/9781118785317.weom120144

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MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc19_me51/preview
2.	https://nptel.ac.in/courses/112107282
3.	https://youtu.be/3OIHp3AySSo

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III/IV SEMESTER

23OE1312 / 23OE2412: Maintenance Management

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Apply and Demonstrate the maintenance function, , classification and condition monitoring of mechanical systems 2. Analysed the failure of a machine and plan the maintenance program for equipments. 3. Calculate repair and maintenance cost and evaluate maintenance performance 4. Interpret maintenance needs of mechanical devices and assistance of CAMS.

Unit I:	**8 Hrs.**
Introduction: 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 II:	**7 Hrs.**
Types of Maintenance: Maintenance strategies / systems–type – basis for selection. Breakdown maintenance, corrective maintenance. Preventive maintenance, Predictive maintenance. Reliability cantered 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 III:	**7 Hrs.**
Condition Based Maintenance: 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 IV:	**8 Hrs.**
Failure analysis: 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.	
Total Lecture	**30 Hours**

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Textbooks:	
1.	Industrial Maintenance management by S.K.Shrivastava, S.Chand Publication
2.	Maintenance engineering, handbooks 2008, Mobley and Higgins, Mc-graw Hill

Reference Books:	
1.	Guide to Complete Maintenance,
2.	Guide to Complete Maintenance ,1988, Rolston, D.W Heintzelment
3.	Introduction to reliability and maintainability Engineering, Thomos Ebelling, Mc-graw Hill
4.	Advanced operations management , R.P.Mohanty and S.G.Deshmukh, Pearson Education

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1	http://www.books24x7.com/
2	http://www.books24x7.com/
3	http://www.books24x7.com/
4	http://www.books24x7.com/

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/a7DLBejKrRo

III/IV SEMESTER
23OE1313 /23OE2413: Industrial Safety

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Student will be able to understand the risk management 2. Student will be able to handle the accidental situation in plant 3. Student will be able to understand the operations of different type of safety instruments. 4. Student will be able to arrange the training for employees on Safety..

Unit I:	**8 Hrs.**
Introduction: Introduction to occupational safety & health, need for occupational safety, Safety Organization, Safety Policy, Safety Committee, Safety Officer, Medical Officer, Labour welfare Officer, Safety manual, Disaster management plan, Government & other autonomous occupational safety & health organizations. Introduction to OHSAS 18000.	
Unit II:	**7 Hrs.**
Occupational Accidents: Accident, causes of accident, cost of accident, unsafe conditions, unsafe actions, unsafe personal factors, Accident causations models, accident reporting, accident investigation & analysis, Application of remedial measures, result monitoring, Personal Protective Equipments(ppe), Types of ppe, legal provisions of accident reporting, safety performance measurement, Frequency Rate, Severity Rate, Incidence Rate, Introduction to IS:3786.	
Unit III:	**7 Hrs.**
Risk Identification & Risk management: Plant safety inspection, Job safety analysis, Hazards identification & Risk analysis (HIRA), Fault tree analysis (FTA), Hazards & operability Study (HAZOP), Failure mode & Effect analysis(FMEA), Failure mode, criticality & effect analysis (FMCEA), Safety audits, Safety Integrity Level (SIL), Level of Protection Analysis (LOPA**).**	
Unit IV:	**8 Hrs.**
Safety & The Law: Introduction to various Laws & Rules pertaining to Safety, Health & Welfare of Indian work-force. Provisions of Factories Acts' 1948 pertaining to Safety only.	
Total Lecture	**30 Hours**

Textbooks:	
1.	Industrial Safety 3rd edition, Roland Patton Blake, Prentice-Hall, 1963
2.	Industrial Safety, 1977 ,Jack W. Boley, Gulf Publishing Company,Book Division,

Reference Books:	
1.	Accident Prevention Manual for Industrial Operations", N.S.C.Chicago, 13th Edition 2009.
2.	Blake R.B., "Industrial Safety" Prentice Hall, Inc., New Jersey,. 3rd Edition 2000.
3.	E.J. McCornick, and M. S Sanders, Human Factors in Engineering and Design, Tata McGraw-Hill, 1992.
4.	Encyclopedia of "Occupational Health and Safety", Vol.I and II, published by International Labour Office, Geneva, 1985

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2	https://onlinelibrary.wiley.com/doi/10.5694/j.1326-5377.1960.tb86951.x
3	https://onlinelibrary.wiley.com/doi/10.1901/jaba.1980.13-287
4	https://onlinelibrary.wiley.com/doi/10.1002/1348-9585.12024

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/jFDWlKayrTc
2.	https://youtu.be/v-eltsixu4I
3.	https://youtu.be/91YpCY-1Fy0

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III/IV SEMESTER

23OE1314 / 23OE2414: Industry 4.0

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Articulate the recent manufacturing trends related to Industry 4.0 and its implementation 2. Interpret concepts and basic framework necessary for smart manufacturing 3. Develop understanding about harnessing smartness into manufacturing processes from the data 4. 4. Able to find the applications of all the areas in day to day life.

Unit I:	**8 Hrs.**
Concept, Globalization and emerging issues, The Fourth Revolution, Comparison of Industry 4.0 Factory and Today's Factory, Trends of Industrial Big Data and Predictive Analytics for Smart Business Transformation, Future of Works and Skills for Workers in the Industry 4.0 Era. LEAN manufacturing, Smart and connected business perspectives, Smart factories.	
Unit II:	**7 Hrs.**
Internet of Things (IoT) & Industrial Internet of Things (IIoT) & Internet of Services, Programable Logic Controller (PLC) and its Programming software, Communication of different devices with PLC, Smart Manufacturing, Smart Devices and Products, Smart Logistics, Smart Cities, Predictive Analytics..	
Unit III:	**7 Hrs.**
Cyber physical Systems, key components, ISA-95 architecture, CPS-5C architecture, Industrial Processes, Industrial Internet Systems. Robotic Automation and Collaborative Robots, Support System for Industry 4.0, CNC and FMS system integration. Augmented Reality and Virtual Reality, Artificial Intelligence, Big Data and Advanced Analysis and Concept of Digit Twin.	
Unit IV:	**8 Hrs.**
Protocols – MQTT, OPC UA, EtherNet/IP, Profinet, Ether CAT, etc; MQTT – History, MQTT broker, Message types, Quality of Service (QoS), Application; OPC UA – History, Specification, Client, Server. Data Modelling, IoT platforms – Thing, basic functionalities, Abstract definition of Thing, Networks, etc; IoT Gateway, Machine interfaces Cloud-based Mosquitto brokers.	
Total Lecture	**30 Hours**

Textbooks:	
1.	A. McEwen and H. Cassimally, Designing the Internet of Things, 1st edition, Wiley, 2013, ISBN-10: 111843062X.
2.	N. Vengurlekar and P. Bagal, Database Cloud Storage: The Essential Guide to Oracle Automatic Storage Management, 1st edition, McGraw-Hill Education, 2013, ISBN-10: 0071790152.
3.	M. Kuniavsky, Smart Things: Ubiquitous Computing User Experience Design, 1st edition, Morgan Kaufmann, 2010, ISBN-10: 0123748992.

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4.	Cloud Based Cyber-Physical Systems in Manufacturing, 2019, Wang L, and Vincent W X, Springer.
5.	Digital Twin Driven Smart Manufacturing, 2019, Tao F, Zhang M, and Nee A Y C, Academic Press.

Reference Books:	
1.	Industrial Internet of Things – Cyber manufacturing Systems, 2017, Jeschke S, Brecher C, Song H, and Rawat D B,, Springer
2.	Designing the Internet of Things, 2013,1st edition, A. McEwen and H. Cassimally, Wiley

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2	https://link.springer.com/search?query=INDUSTRY+4.0&facet-content-type=Book
3	https://www.profibus.com/pi-organization/about-pi/organization-communitu/
4	https://www.ethercat.org/default.htm

MOOCs Links and additional reading, learning, video material	
1.	https://nptel.ac.in/courses/106105195
2.	https://onlinecourses.nptel.ac.in/noc23_me71/preview

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III/IV SEMESTER

23OE1315/23OE2415 : Operations Management

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Provide conceptual understanding of Management Concepts. 2. Familiarize the students with the contemporary issues in Management. 3. Understand and appreciate the human behavior in organizations.

Unit I:	**8 Hrs.**
Introduction to Operations Management: Scope, Importance, Functions and Challenges of Operations Management. Differences between Manufacturing and Services. Planning premise, Make to stock, Make to order and Assemble to order. Capacity definitions, capacity expansion decisions and equipment selection decisions. Modern tools and recent trends in Operations management	
Unit II:	**7 Hrs.**
Facilities Plan and Production Planning: Plant location, factors affecting Plant location. Types of Production systems, mass production, job-based production, batch production and assembly line production systems. Types of manufacturing layouts, product layout, process layout, group layout, fixed position layout. Types of service layouts. MPS (Master Production Schedule), MRP (Material Requirement Planning) and aggregate planning. Introduction to PERT/CPM, Network rules and network diagrams and calculation of critical path (with numerical); Introduction to Maintenance Management & Maintenance Types.	
Unit III:	**7 Hrs.**
Materials Management: Role of materials management, Purchase process and management, concepts of lead time, re-order level, purchase requisitions and purchase orders, Vendor selection and rating (with numerical), Stores procedure and management. Inventory Management: Concepts of Inventory management, Inventory costs, EOQ model, Inventory management tools, ABC analysis, FSN, HML, VDE, GOLF etc.	
Unit IV:	**8 Hrs.**
Quality and Productivity Management: Concepts of Quality, Dimensions of quality, cost of quality, Product quality and service quality. Introduction to quality systems, concept of TQM, ISO, QFD, SPC, KAIZEN, SIX-SIGMA, 5S. Concepts of productivity, tools of increasing productivity, labour and machine productivity. Introduction to work-study, work measurement, method study and time study.	
Total Lecture	**30 Hours**

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Textbooks:	
1.	Operations Management, Theory and Practice, B.Mahadevan , 2nd Edition, Pearson
2.	Production and Operations Management, K Aswaathappa & K. Shridhara Bhat, Himalaya Publication House

Reference Books:	
1.	Production and Operations Management, R. Panneerselvam, 3rd Edition, Eastern Economy Edition publication

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1	https://onlinelibrary.wiley.com/doi/10.1002/qre.1936
2	https://onlinelibrary.wiley.com/doi/10.1049/iet-cps.2017.0079
3	https://onlinelibrary.wiley.com/doi/10.1002/0470036427.ch9
4	https://onlinelibrary.wiley.com/doi/10.1002/int.4550030403

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/Hcjoh92gr1A
2.	https://youtu.be/EmGz8POpzN8

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III/IV SEMESTER

23OE1316 / 23OE2416: Materials Management

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Understand the importance of material management in industries. 2. Understand the purchasing store management aspects of good in industries 3. Understand vendor management and supplier selection methods. 4. Understand inventory management in industries. 5. Understand the application of materials management concept in different industries.

Unit I:	**8 Hrs.**
Introduction to Material Management of material resource, Importance, Definition, Scope, Objective of materials management, integrated materials management approach, Activities of materials management, Materials management and production control, Costs involved in the management of materials.	
Unit II:	**7 Hrs.**
Purchasing : Importance of good system, its Functions, Organization for purchasing, duties of purchase manager, Method of purchasing, Centralized Vs. Decentralized purchasing, make or buy decision, Purchasing procedure: steps in purchasing, purchase requisition, placement of purchase order, follow up, receipt of materials, Negotiation in purchasing, Purchasing of Capital equipment. Incoming material Quality Control	
Unit III:	**7 Hrs.**
Store Management : Objectives of storekeeping, Functions of storekeeper, store location, layout of stores, designing a store building, method of storing, method of achieving First-in-First Out, Bin Cards, return and issue of material, indent on stores, stores accounting.	
Unit IV:	**8 Hrs.**
Inventory Models: Deterministic models, Inventory models for shortages, inventory models with price breaks, multi-item Deterministic models, stochastic inventory models, Selective inventory models.	
	Total Lecture **30 Hours**

Textbooks:	
1.	Materials Management A supply chain perspective A.K. Chitale, R.C. Gupta, PHI Publication, 3rd edition
Reference Books:	
1.	Introduction to material management, Stephen Chapman, Pearson India
2.	Introduction to materials management, J. R. Tony Arnold, Stephen Chapman, Loyd Clive,

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2	https://onlinelibrary.wiley.com/doi/10.1002/9781118528372.ch11
3	https://onlinelibrary.wiley.com/doi/book/10.1002/9781119198208
4	https://onlinelibrary.wiley.com/doi/10.1002/9780470172490.ch1

MOOCs Links and additional reading, learning, video material	
1.	https://onlinecourses.nptel.ac.in/noc24_mm42/preview

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III/IV SEMESTER

23OE1317/ 23OE2417: Hospitality Management

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Basic functions Hospitality industry. 2. The functional areas of hotel. 3. Learn the effective usage of equipment. 4. Basics functional areas of Food and Beverage service. 5. To learn the different types of service procedures.

Unit I:	**8 Hrs.**
Hospitality Industry : Management of Hotel, scientific management and operations of hospitality services, scope and functioning of a hotel, The guest in a hotel, Computerized Hotel Management system , English-French terms in Hospitality , Management of Tourism, recreation, clubs, gaming and entertainment.	
Unit II:	**7 Hrs.**
Departments in a hotel : Departmental structure, front office operations, guest services, housekeeping , linen and uniforms, kitchen and its operations, restaurant operations, Bar operations, Stewarding, sales and marketing, maintenance, administration and HRD, accounting and finance control.	
Unit III:	**7 Hrs.**
Minor operating departments: Laundry, facilities, Banquet functions, conferences and catering services management, outdoor catering and mobile catering, exhibitions and other income sources, Purchase and store.	
Unit IV:	**8 Hrs.**
Security and safety systems: security and safety, security measures for cash and credit, pilferage and theft, maintenance of building, machineries and equipments, prevention against accidents and fire, staff training for safety preventions.	
Total Lecture	**30 Hours**

Textbooks:	
1.	Hospitality Management, Jagmohan Negi, Gaurav Manoher, University Science
2.	Press Introduction to Hospitality, John Walker, 6th Ed, Prentice Hall
3.	Food and Beverage Service by Lillicrap, ELBS, 3015.
4.	Food and Beverage Service Training Manual by Sudeer Andrews, 3014.

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Reference Books:	
1.	Hotel Management & their Technolohgy, Dinesh Tomar, Neha Publishers and distributors
2.	Introduction to Management in the hospitality industry, Clayton Barrows, Power and Reynolds, John Willy & Sons Publication
3.	Food and Beverage Service by Singaravelan, Oxford, 3014.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/10.1002/%28SICI%291099-1603%28199706%293%3A2%3C165%3A%3AAID-PTH87%3E3.0.CO%3B2-I
2	https://onlinelibrary.wiley.com/doi/10.1002/job.4030160611
3	https://onlinelibrary.wiley.com/doi/10.1002/job.4030160711
4	https://onlinelibrary.wiley.com/doi/10.1002/jtr.535

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/k014Qu-U-kM
2.	https://youtu.be/jijb9grFcMM

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III/IV SEMESTER

23OE1318/ 23OE2418: Human Resource Management & Organizational Behaviour

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. To understand and appreciate the importance of the human resources vis-a-vis other resources of the organization. 2. To familiarize the students with methods and techniques of HRM. 3. To equip them with the application of the HRM tools in real world business situations.

Unit I:	**8 Hrs.**
Introduction to Human Resource Management and Concepts: Introduction, Nature, Scope, Objectives, Importance and functions, Evolution, Difference between Personnel Management and Human Resource Management, Roles and Qualities of HR Manager Job Analysis and Design- Job Analysis – Meaning, Uses, Process and methods of collecting data for job analysis, Job Description, Job Specifications & Role Analysis, Factors affecting Job Design, Techniques of Job Design, Cases and Exercises in understanding Job Analysis.	
Unit II:	**7 Hrs.**
Important Concepts in Managing Human Resource:HRP- concept; Recruitment and Selection—Meaning, Sources and Process; Employee Training- concept, importance, objectives, types, steps in Training process; Performance Appraisal- concept, objectives, Importance, Methods; Compensation Management- Concept and components.	
Unit III:	**7 Hrs.**
Introduction to Organizational Behaviour and Concepts: OB- Definitions, goals, key elements; Foundations of OB, Contributing Disciplines to OB and Importance; Foundation of Individual Behaviour- factors affecting individual behaviour (biographical, psychological, organizational and Environmental); Perception- concept, Factors influencing perception; perception errors- stereotyping, halo effect, pigeonholing, self-fulfilling prophecy. Foundation of Group Behaviour- definition, Nature and types of groups, Teams-definition, types, importance of Teambuilding, stages in team development Leadership: Basic qualities of leadership, Leadership Styles Leadership theories- Trait, Managerial Grid, Path-goal theory	
Unit IV:	**8 Hrs.**
Important Concepts of Organizational Behaviour: Motivation- Meaning, Importance, challenges, Theories- Maslow, Herzberg, Conflict- Meaning, Sources, Levels of conflict, Conflict management. Organizational Change- Nature, Internal and External Factors responsible for change, The Domino effect, Force field analysis, Change process, Resistance to change and managing resistance to change.	
	Total Lecture **30 Hours**

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Textbooks:	
1.	Personnel and human Resource management - Text & cases, P Subba Rao, Publication - Himalaya Publishing House
2.	Human resource Management –Garry Dessler & Biju Varkkey- Pearson
3.	Human Resource Management- Text & Cases, K.Aswathapa, Publication- Tata McGraw Hill
4.	Organisation Behaviour, Luthans 8th Tata McGraw Hill
5.	Organizational Behaviour, K.Aswathapa, Himalya Publishing House
6.	Organisation Behaviour, Robbins, 9th Pearson Education Asia

Reference Books:	
1.	Venkata Ratnam C. S. & Srivatsava B. K.,PERSONNEL MANAGEMENT AND HUMAN RESOURCES, Tata Mc-Graw Hill, NewDelhi,,
2.	Aswathappa, HUMAN RESOURCE MANGEMENT, Tata McGraw Hill, NewDelhi, 2010 Garry Dessler & Varkkey, HUMAN RESOURCE MANAGEMENT, Pearson, New Delhi, 2009
3.	HUMAN RESOURCE MANAGEMENT, Cengage Learning, NewDelhi, 2007 Pravin Durai, HUMAN RESOURCE MANGEMENT, Pearson, New Delhi,2010
4.	Snell, Bohlander & Vohra, HUMAN RESOURCES MANAGEMENT, Cengage, NewDelhi, 2010

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	https://onlinelibrary.wiley.com/doi/10.1002/cjas.17
2	https://onlinelibrary.wiley.com/doi/10.1002/cjas.1385
3	https://onlinelibrary.wiley.com/doi/10.1111/j.1936-4490.1997.tb00130.x
4	https://onlinelibrary.wiley.com/doi/10.1111/j.1467-6486.1987.tb00460.x

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/w_wIMveGlrI
2.	https://archive.nptel.ac.in/courses/110/105/110105069/

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III/IV SEMESTER

23OE1319/ 23OE2419: Agri-Business Management

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. The concept of Agro input Management 2. The concept of Liver stock Management 3. The concept of Agricultural Economics 4. Understanding of Rural Leadership

Unit I:	**8 Hrs.**
Agro input Management : Concept of Agricultural Inputs, types and importance of agro inputs , demand and supply scenario of agro inputs, role of fertilizers, agro-chemicals and seeds in agro production, status and structure of fertilizer industry, seed industry and agro-chemical industry, Role of trade fairs like Agro Vision	
Unit II:	**7 Hrs.**
Livestock management : Present status of livestock products industry in India: dairy, meat, poultry, hatchery, skin, hides, wool and livestock, demand-supply scenario for livestock products in domestic and global markets, Role of management in feed manufacturing industry, organizing and planning feed manufacturing unit , storage, transportation and marketing of livestock	
Unit III:	**7 Hrs.**
Management of floriculture, Biotech and food : present status and advances in floriculture and flower, landscaping, fruit production, food processing industry , Agricultural needs & application of biotechnology for agricultural uses and benefits	
Unit IV:	**8 Hrs.**
Rural market segmentation, rural communications (Case study of ITC‟s E- Chaupal Initiative), Role of Government in the Development of Agricultural Marketing, Agricultural Credit, Crop Insurance and Commodity Markets (COSAMB, NAFED, NCDC, PDS, FCI, DMI, NIAM and SHGs).	
Total Lecture	**30 Hours**

Textbooks:	
1.	Agri Business Management/Himanshu. Jaipur, Ritu
2.	Encyclopaedia of Agricultural Marketing : Marketing of Farm Inputs Seed, Fertilizer and Irrigation, Vo. IX/Jagdish Prasad
3.	Livestock Economy of India/P.C. Bansil and S.P. Malhotra
4.	Food Processing and Preservation/Neelam Khetarpaul
5.	Fruit Production : Problems and Solutions/R.R. Sharma
6.	Emerging Trends in Post-Harvest Processing and Utilization of Plant Foods/Neelam Khetarpaul, R.B. Grewal, Sudesh Jood and Umaid Singh
7.	Rural Marketing / Pradeep Kashyap / Pearson Education

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Reference Books:	
1.	Livestock Feeding Strategies for Dry Regions/edited by P.S. Pathak and S.S. Kundu
2.	Trends in Livestock Research/S.K. Kaushish

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1	https://onlinelibrary.wiley.com/doi/10.1002/9781118937495.ch10
2	https://onlinelibrary.wiley.com/doi/10.2134/asaspecpub12.c5
3	https://onlinelibrary.wiley.com/doi/10.1002/bse.480
4	https://onlinelibrary.wiley.com/doi/10.1002/9781119072737.ch7

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/HBHtZNtXRFc

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III/IV SEMESTER

23OE1320/ 23OE2420: Rural Marketing

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. To create awareness about the applicability of the concepts, techniques and processes of marketing in rural context 2. To familiarize with the special problems related to sales in rural markets, 3. To help understand the working of rural marketing institutions.

Unit I:	**8 Hrs.**
Rural Economy - Rural - Urban disparities-policy interventions required - Rural face to Reforms - The D evelopment exercises in the last few decades.	
Unit II:	**7 Hrs.**
Rural Marketing - Concept and Scope - Nature of rural markets - attractiveness of rural markets - Rural Vs Urban Marketing - Characteristics of Rural consumers - Buying decision process - Rural Marketing Information System - Potential and size of the Rural Markets.	
Unit III:	**7 Hrs.**
Selection of Markets - Product Strategy - Product mix Decisions - Competitive product strategies for rural markets.	
Unit IV:	**8 Hrs.**
Pricing strategy - pricing policies - innovative pricing methods for rural markets - promotion strategy - appropriate media - Designing right promotion mix - promotional campaigns.	
Total Lecture	**30 Hours**

Textbooks:	
1.	Mishra and Puri Development Issues of Indian Economy Himalaya Publishing House
2.	Dantwala M.L Indian Agriculture Since Independence Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi – 110 001 1990
3.	Habeeb U.R., Rahman K.S. Rural Marketing in Indai HPH- Mumbai 400 004 --- 2003
4.	Singh S Rural Marketing Management I/e Vikaj Publishing House New Delhi

Reference Books:	
1.	Kashyp Pradeep, Rant Siddhartha The Rural Marketing, Biztantra, Mumbai. 2005
2.	Dogra Balram Ghuman Karmider Rural Marketing concepts and practices Tata Mc Graw HILL Education Ltd. New Delhi 2011

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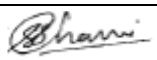
1	https://onlinelibrary.wiley.com/doi/10.1111/j.0435-3684.1998.00030.x
2	https://onlinelibrary.wiley.com/doi/10.1111/1467-7660.00186
3	https://onlinelibrary.wiley.com/doi/10.1111/j.1440-1584.2007.00928.x
4	https://onlinelibrary.wiley.com/doi/10.1111/j.1365-2710.2009.01110.x

			July,2023	1.00	Applicable for AY 2023-24 Onwards
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III/IV SEMESTER

23OE1321/ 23OE2421: Marketing Management

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. Familiarize with the basic concepts, and techniques of marketing management 2. Understand the behavior of consumers 3. Create awareness of marketing mix elements, 4. Analyse and solve marketing problems in the complex and fast changing business environment.

Unit I:	**8 Hrs.**
Introduction to Marketing and Marketing Management, Marketing Concepts - Marketing Process Marketing mix - Marketing environment. - Consumer Markets and buying behaviour - Market segmentation and targeting and positioning.	
Unit II:	**7 Hrs.**
Product Decisions - concept of a Product - Product mix decisions - Brand Decision - New Product Development – Sources of New Product idea - Steps in Product Development - Product Life Cycle strategies- Stages in Product Life Cycle,	
Unit III:	**7 Hrs.**
Price Decisions - Pricing objectives - Pricing polices and constraints - Different pricing method - New product pricing, Product Mix pricing strategies and Price adjustment strategy.	
Unit IV:	**8 Hrs.**
Channel Decision - Nature of Marketing Channels –. Types of Channel flows - Channel functions - Functions of Distribution Channel – Structure and Design of Marketing Channels -Channel co-operation, conflict and competition – Retailers and wholesalers.	
Total Lecture	**30 Hours**

Textbooks:	
1.	K.S. Chandrasekar, MARKETING MANAGEMENT TEXT AND CASES, Tata McGraw-Hill Publication, New Delhi.2010
2.	Govindarajan, MARKETING MANAGEMENT CONCEPTS, CASES, CHHALLENGES AND TRENDS, Prentice Hall of India, New DelhI. 2009
3.	Philip Kotler, MARKETING MANAGEMENT- ANALYSIS PLANNING AND CONTROL, Prentice Hall of India, New Delhi,

Reference Books:	
1.	Ramaswamy. V S & Namakumari. S, MARKETING MANAGEMENT-PLANNING IMPLEMENTATION AND CONTROL, Macmillan Business Books, New Delihi, 2002,
2.	Paneer Selvam R., Production and Operations Management, Prentice Hall of India. 2. Sang M Lee and Marc J Schniederjans, Operation Management, All India Publishers
3.	Paneer Selvam R., Production and Operations Management, Prentice Hall of India. 2. Sang M Lee and Marc J Schniederjans, Operation Management, All India Publishers

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1	https://onlinelibrary.wiley.com/doi/10.1002/9781118785317.weom090521
2	https://onlinelibrary.wiley.com/doi/10.1002/9781119197973.ch3
3	https://onlinelibrary.wiley.com/doi/10.1002/9781119208723.ch7
4	https://onlinelibrary.wiley.com/doi/10.1002/tie.5060130206

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/Hd0dUfUDCiQ
2.	https://youtu.be/4GO357Ab1s4

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III/IV SEMESTER

23OE1322/ 23OE2422: Health Care Management

Course Outcomes :
Upon successful completion of the course the students will be able to: 1. To familiarize with the healthcare environment. 2. To understand the concepts of management with relevance to hospitals 3. To understand the necessity of architecture and planning in Hospitals. 4. To get familiarized with the designing and maintenance of hospital systems 5. To get acquainted with the legal provision and issues related to health care.

Unit I:	**8 Hrs.**
Hospital Management: Issues and Challenges of Hospital Management, Government- Health Care Interface; Hospital Functions; Hospital Organization, Classification of Hospitals; Components of a Hospital System; Changing Role of Hospital Administration; Need for Managerial and Functional Specialists, Decision making in Hospitals, Hospital Communication System, Networking Technology and Information Technology in Hospitals, Hospital Information System, Computerized Hospital Information Systems..	
Unit II:	**7 Hrs.**
Health systems Management : Health systems: Characteristics, Planning methodologies, Goals and functions. Foundations of health service management, Health Systems research: Uses and applications, Health Manpower policy, Management of Costs; Health care Budgeting; Project Management in Health care.	
Unit III:	**7 Hrs.**
Community Health, Epidemiology & Population Management : Meaning and scope of epidemiology, Health statistics and health indicators, Morbidity, Mortality, Health Information System, Primary health care and community participation. Models and factors associated with health and diseases, Clinical care, aspects of community health, Drugs, Alcoholism etc., Preventive and promotive health care, Population policy, Planning and management of population	
Unit IV:	**8 Hrs.**
Healthcare and Social Policy: Health Policy formulation, National health policy, International Perspective on health policy; Health policy for the Disadvantaged, Health Care Planning, Management of Health Care Systems, Dimensions of Health Care Management., Emergency and Disaster Planning; Safety Management; Patients and Personnel Safety, Fire Safety, General Sanitation., Hazardous Waste Management; Solid & Liquid Waste Handling, collection & Disposal; Legal and Social Aspects of Waste Management : Trends and Practices.	
	Total Lecture **30 Hours**

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Textbooks:	
1.	Chatterice, Meera, "Implementing Health Policy". 1988, Manohar, New Delhi,
2.	Goyal, R.C Handbook of Hospital Personnel Management, PHI, New Delhi, 1993
3.	Alderson, M."An Introduction to Epidemiology". 2nd,ed. 1983. MacMillan, London.
4.	Jolly, K G. "Family Planning in India 1969-84: A District Level Study", 1986. Hindustan, Delhi.
5.	Abelln, T Brzenskl, Z J and Carstalrs, V D. "Measurement in Health Promotion and Protection", 1987, WHO, Copenhagen.
6.	Wortman P M. ad "Methods for Evaluating Health Services". 1981. Sage, London.
7.	Lele, R D Computers in Medicine, Tata McGraw Hill Publishing Co. Ltd, New Delhi. 1988.

Reference Books:	
1.	Hospital Information Systems - The Next Generation, Velde, Rudi Van de Springer Verlag, 1992
2.	Health Information In India, Central Bureau of Health Intelligence, Ministry of Health & Family Welfare, Govt. Of India, New Delhi

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1	https://onlinelibrary.wiley.com/doi/10.1002/chp.85
2	https://onlinelibrary.wiley.com/doi/10.1002/%28SICI%291099-1751%28199810/12%2913%3A4%3C307%3A%3AAID-HPM525%3E3.0.CO%3B2-V
3	https://onlinelibrary.wiley.com/doi/10.1016/S0001-2092%2806%2960454-7
4	https://onlinelibrary.wiley.com/doi/10.1002/jmv.25787