Bachelor of Technology
SoE & Syllabus 2022
1ˢᵗ to 4ᵗʰ Semester

(Department of Information Technology

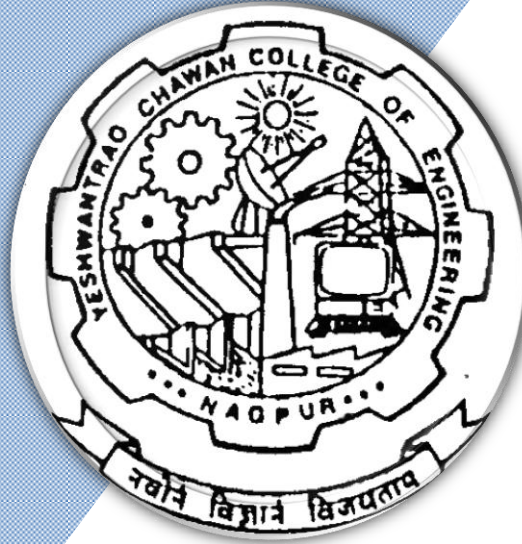# B. Tech in Computer Science and Design

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 Information Technology)
Computer Science and Design

SoE No.
22CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					FIRST SEMESTER										
1	1	BS	GE/MTH	22CSD101	Probability and Statistics	T	3	1	0	3	4	30	20	50	3 Hours
2	1	BS	GE/PHY	22CSD102	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hours
3	1	BS	GE/PHY	22CSD103	Lab.: Engineering Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22CSD104	Social Science	T	3	0	0	3	3	30	20	50	3 Hours
5	1	BES	CV/CV	22CSD105	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hours
6	1	BES	CV/CV	22CSD106	Lab.:Engineering Mechanics	P	0	0	2	2	1		60	40	
7	1	BES	IT/IT	22CSD107	Introduction to Computer Programming	T	3	0	0	3	3	30	20	50	3 Hours
8	1	BES	IT/IT	22CSD108	Lab.: Introduction to Computer Programming	P	0	0	2	2	1		60	40	
					TOTAL FIRST SEM		15	1	6	21	19				

					List of Mandatory Learning Course (MLC)										
1	1	BES	GE/CHE	GE2132	Environmental Science	A	2	0	0	2	0				
2	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	A	2	0	0	2	0				

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					SECOND SEMESTER										
1	2	BS	GE/MTH	22CSD201	Calculus, Sequences and Series	T	3	1	0	3	4	30	20	50	3 Hours
2	2	BS	GE/CHE	22CSD202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hours
3	2	BS	GE/CHE	22CSD203	Lab: Engineering Chemistry	p	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22CSD204	Technical Communication	T	3	0	0	3	3	30	20	50	3 Hours
5	2	HS	GE/HUM	22CSD205	Lab:Technical Communication	P	0	0	2	2	1		60	40	
6	2	BES	EE/EE	22CSD206	Digital Circuit Design	T	3	0	0	3	3	30	20	50	3 Hours
7	2	BES	EE/EE	22CSD207	Lab.:Digital Circuit Design	P	0	0	2	2	1		60	40	
8	2	BES	EL/EL	22CSD208	Basic Electrical Machines	T	3	0	0	3	3	30	20	50	3 Hours
9	2	BES	EL/EL	22CSD209	Lab:Basic Electrical Machines	P	0	0	2	2	1		60	40	
10	2	BES	ME/ME	22CSD210	Lab.: Engineering Design	P	0	0	4	4	2		60	40	
					TOTAL SECOND SEM		15	1	12	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	HS	GE/HUM	GE2131	Universal Human Value	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 activitied decided by course teacher, TA3 - 3 marks on class attendance

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

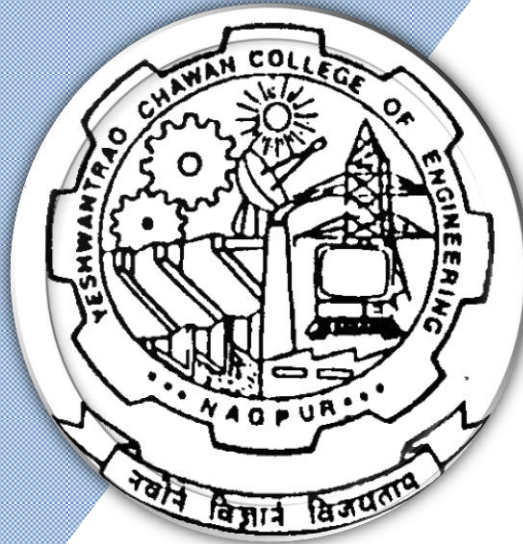| Chairperson	Dean (Acad. Matters)	June 2022	1.00	Applicable for AY 2022-23 Onwards
		Date of Release	Version	

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 Information Technology)
Computer Science and Design

SoE No.
22CSD-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	BS	GE/GE	22CSD301	Linear Algebra	T	3	1	0	4	4	30	30	40	3
2	3	PC	CSD	22CSD302	Microprocessors and Microcontrollers	T	3	0	0	3	3	30	30	40	3
3	3	PC	CSD	22CSD303	Lab:Microprocessors and Microcontrollers	P	0	0	2	2	1		60	40	
4	3	PC	CSD	22CSD304	Data Structures	T	4	0	0	4	4	30	30	40	3
5	3	PC	CSD	22CSD305	Lab:Data Structures	P	0	0	2	2	1		60	40	
6	3	PC	CSD	22CSD306	Computer System Organization	T	3	0	0	3	3	30	30	40	3
7	3	PC	CSD	22CSD307	Theoretical Foundation of Computer Sciences	T	3	0	0	3	3	30	30	40	3
8	3	PC	CSD	22CSD308	Software Lab-I	P	0	0	4	4	2		60	40	
9	3	PC	CV/CSD	22CSD309	Environmental Sustainability, Pollution and Management	**T**	3	0	0	3	3	30	20	50	3 Hrs
						TOTAL	19	1	8	28	24				

List of Mandatory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits				
1	3	HS	GE/T&P	MLC2123	YCAP3 -	**A**	2	0	0	2	0				
2	3	BES	CSD	MLC119	Technical Documentation	**A**	2	0	0	2	0				

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					FOURTH SEMESTER										
1	4	BS	GE	22CSD401	Discrete Mathematics and Graph Theory	T	3	1	0	4	4	30	30	40	3
2	4	PC	CSD	22CSD402	Operating Systems	T	3	0	0	3	3	30	30	40	3
3	4	PC	CSD	22CSD403	Lab : Operating Systems	P	0	0	2	2	1		60	40	
4	4	PC	CSD	22CSD404	Computer Networks	T	3	0	0	3	3	30	30	40	3
5	4	PC	CSD	22CSD405	Object Oriented Programming	T	3	0	0	3	3	30	30	40	3
6	4	PC	CSD	22CSD406	Lab:Object Oriented Programming	P	0	0	2	2	1		60	40	
7	4	PC	CSD	22CSD407	Design and Analysis of Algorithms	T	3	0	0	3	3	30	10	60	3
8	5	PC	CSD	22CSD409	Lab.:Design and Analysis of Algorithms	P	0	0	2	2	1		60	40	
9	4	PC	CSD	22CSD410	Software Lab-II	P	0	0	4	4	2		60	40	
						TOTAL	15	1	10	26	21				

List of Mandatory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits				
1	4	HS	GE/T&P	MLC2124	YCAP4 -	**A**	2	0	0	2	0				
2	4	BES	CSD	MLC120	Open Source Tool for Graphics	**A**	2	0	0	2	0				

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Chairperson	Dean (Acad. Matters)	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 Technology
SoE & Syllabus 2022
1st Semester

(Department of Information Technology

B. Tech in Computer Science and Design

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 Information Technology)
Computer Science and Design

SoE No.
22CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
								Contact Hours				% Weightage			
					FIRST SEMESTER										
1	1	BS	GE/MTH	22CSD101	Probability and Statistics	T	3	1	0	3	4	30	20	50	3 Hours
2	1	BS	GE/PHY	22CSD102	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hours
3	1	BS	GE/PHY	22CSD103	Lab.: Engineering Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22CSD104	Social Science	T	3	0	0	3	3	30	20	50	3 Hours
5	1	BES	CV/CV	22CSD105	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hours
6	1	BES	CV/CV	22CSD106	Lab.:Engineering Mechanics	P	0	0	2	2	1		60	40	
7	1	BES	IT/IT	22CSD107	Introduction to Computer Programming	T	3	0	0	3	3	30	20	50	3 Hours
8	1	BES	IT/IT	22CSD108	Lab.: Introduction to Computer Programming	P	0	0	2	2	1		60	40	
					TOTAL FIRST SEM		15	1	6	21	19				

List of Mandetory Learning Course (MLC)

1	1	BES	GE/CHE	GE2132	Environmental Science	A	2	0	0	2	0				
2	1	HS	GE/T&P	MLC2121	YCAP1-Get Set Go	A	2	0	0	2	0				

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
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2	2	BS	GE/CHE	22CSD202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hours
3	2	BS	GE/CHE	22CSD203	Lab: Engineering Chemistry	p	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22CSD204	Technical Communication	T	3	0	0	3	3	30	20	50	3 Hours
5	2	HS	GE/HUM	22CSD205	Lab:Technical Communication	P	0	0	2	2	1		60	40	
6	2	BES	EE/EE	22CSD206	Digital Circuit Design	T	3	0	0	3	3	30	20	50	3 Hours
7	2	BES	EE/EE	22CSD207	Lab.:Digital Circuit Design	P	0	0	2	2	1		60	40	
8	2	BES	EL/EL	22CSD208	Basic Electrical Machines	T	3	0	0	3	3	30	20	50	3 Hours
9	2	BES	EL/EL	22CSD209	Lab:Basic Electrical Machines	P	0	0	2	2	1		60	40	
10	2	BES	ME/ME	22CSD210	Lab.: Engineering Design	P	0	0	4	4	2		60	40	
					TOTAL SECOND SEM		15	1	12	27	22				

List of Mandetory Learning Course (MLC)

1	2	HS	GE/T&P	MLC2122	YCAP2 -Functional English	A	2	0	0	2	0				
2	2	HS	GE/HUM	GE2131	Universal Human Value	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 activitied decided by course teacher, TA3 - 3 marks on class attendance

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

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

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 Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

I SEMESTER
22CSD101: Probability and Statistics

Course Outcomes
Upon successful completion of the course the students will be able to
1. Identify an appropriate probability distribution for a given discrete or continuous random variable and compute probabilities.
2. Make use of probability distributions to solve real life problems.
3. Apply concepts of sampling theory to find probabilities and estimate parameters of various problems.
4. Inspect scientific data, use proper curve fitting and find correlation, regression of variables.

Unit I:Random Variables & Probability Distributions	(7 Hrs.)
Conditional probability, Baye's theorem. Random variables: Discrete and Continuous random variables, Probability function and Distribution function, Joint distributions. Independent Random variables, Conditional Distribution. **(Contemporary Issues related to Topic)**	

Unit II: Mathematical Expectation	(7 Hrs.)
Mathematical Expectation, Variance & Standard Deviation, Moments, Moment generating function, Skewness and Kurtosis. **(Contemporary Issues related to Topic)**	

Unit III: Special Probability Distributions	(6 Hrs.)
Binomial, Geometric, Poisson, Exponential, Normal distributions, Central Limit theorem. **(Contemporary Issues related to Topic)**	

Unit IV: Sampling Theory	(6 Hrs.)
Population and sample. Statistical inference. Sampling with and without replacement. Population parameters, sample statistics. Sampling distribution of means. Sampling distribution of proportions. **(Contemporary Issues related to Topic)**	

Unit V: Estimation	(7 Hrs.)
Unbiased and efficient estimates. Point estimates and interval estimates. Confidence interval for means, Confidence interval for proportions, Confidence interval for differences and sums of mean and proportions. **(Contemporary Issues related to Topic)**	

Unit VI: Curve Fitting	(6 Hrs.)
Fitting of straight line, $y = a + bx$, a parabola $y = a + bx + cx^2$, exponential curves and power curves by method of least squares; Lines of regression and correlation; Rank correlation. **(Contemporary Issues related to Topic)**	

	Total Lecture	**39 Hours**

			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)

B. Tech SoE and Syllabus 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

Textbooks:	
1.	The theory and problems of probability and Statistics, 5rd edition, M. R. Spiegel, Schaum series,McGraw Hill
2.	Basic Statistics for Business and economics , 3rd edition,E. K.Bowen, M.K Star,McGraw Hill
3.	Engineering Mathematics, 43rd edition, Dr. B. S. Grewal, Khanna Publisher
4.	Probability and Statistics, 2nd edition, Michael J. Evans and Jeffrey S.

Reference Books:	
1.	A First course in probability,Sixth Edition, Sheldon Ross, Pearson Education
2.	Fundamentals of Mathematical statistics ,3rd Edition, S. C.Gupta and V.K.Kapoor,Sultan Chand and sons
3.	Probability and Statistics for Engineering, 6th edition, Miller Freund and Johnson, Richard A. Johnson

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://youtu.be/UftY0e2ilM4
2.	https://youtu.be/bwga7Pnv30c
3.	https://youtu.be/WUCMavXbJo4

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

YCCE-CSD-2

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 Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

I SEMESTER
22CSD102: Engineering Physics

Course Outcomes :

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

1. Co-relate fundamentals of quantum mechanics to solve problems dealing with quantum particle.
2. Analyze crystal structures in terms of lattice parameters with identification of crystal planes.
3. Assess the characteristics of semiconductor materials in terms of crystal structures, charge Carriers and energy bands.
4. Illustrate working principle of lasers and optical fibres for their use in the field of industry.
5. Analyze the motion in electric and magnetic field and its applications to electron optic devices.

Unit:1 Quantum Physics	**(7 Hrs.)**
Wave-particle duality, Wave packet, Heisenberg uncertainty principle, Interpretation of wavefunction, Schrodinger's Equations, Particle in infinite and finite potential well, quantum tunneling, Introduction to Bits and Qubits. **(Contemporary Issues related to Topic)**	
Unit II: Crystallography	**(6Hrs.)**
Introduction, Unit cell characteristics: SC, BCC and FCC unit cells, Crystal planes and Miller indices, Bragg's law, Voids: Tetrahedral and octahedral. **(Contemporary Issues related to Topic)**	
Unit III: Band Theory of Solids	**(7 Hrs.)**
Formation of energy bands in solids, Classification and energy band diagrams, Structure of semiconductor with band diagram, Intrinsic and extrinsic semiconductors, Law of mass action, Carrier transport, conductivity, Hall Effect. **(Contemporary Issues related to Topic)**	
Unit IV: Lasers	**(7 Hrs.)**
Interaction of radiation with matter, Population Inversion and Optical resonance cavity, Three and four level laser, Ruby laser, He-Ne laser, diode laser, Properties and engineering applications of laser. **(Contemporary Issues related to Topic)**	
Unit V: Fundamentals of Fibre Optics	**(6 Hrs.)**
Principle, structure and classification, Acceptance angle, Numerical aperture, Losses in optical fibres, Applications as sensor. **(Contemporary Issues related to Topic)**	
Unit VI: Electron Ballistics and Optics	**(7 Hrs.)**
Motion of a charged particle in uniform electric and magnetic field, Cross field configuration; Electron refraction, Electron lens, CRO. **(Contemporary Issues related to Topic)**	
Total Lecture	**40 Hours**

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SoE No.
22CSD-101

B. Tech in Computer Science and Design

Textbooks:

1.	M. N. Avadhanulu, P. G. Kshirsagar, A Textbook of Engineering Physics, Revised 14th Edition, S. Chand & Company, 2014.
2.	John Allision, Electronic Engineering Materials and Devices, TMH edition, 10th reprint, Tata McGraw Hill.

Reference Books:

1.	John Wiley &Sons Inc, Fundamentals of Physics, 10th Edition, David Halliday, Robert Resnick and Jeryle Walker, John-Wiley India.
2.	Subramanyam, Brijlal, 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.
4.	Arthur Beiser, Concept of Modern Physics, 6th edition, Tata McGraw - Hill Education, 2002.
5.	Thyagarajan K and Ghatak A. K, LASERS: Theory and Applications, 2nd edition, Macmillan Publication.
6.	S O Pillai, Solid State Physics, 9th edition, New Edge International Publishers, 2021.
7.	P K Palanisamy, Solid state Physics, 8th Edition, SCITECH publications, 2015.
8.	C. Kittel, Solid State Physics, 8th Edition, Willey Publication.
9.	B. K. Pandey, S.Chaturvedi, Engineering Physics, 1st Edition, Cengage Learning Publications.
10.	Hitendra K Malik, A K Singh , Engineering Physics, 2nd Edition, Tata McGraw Hill Education Private Limited, 2015.

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

1	chrome-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	chrome-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.	http://nptel.iitm.ac.in- Quantum Physics
2.	http://nptel.ac.in- CRO
3.	www.digimat.in/nptel/courses/video/115102124/L36.html - LASER

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

YCCE-CSD-4

Nagar Yuwak Shikshan Sanstha's
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B. Tech SoE and Syllabus 2022
(Scheme of Examination w.e.f. 2022-23 onward)
(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

I SEMESTER
22CSD103: Lab: Engineering Physics

Course Outcomes
Upon successful completion of the course the students will be able to
1. Co-relate fundamentals of quantum mechanics to solve problems dealing with quantum particle.
2. Analyze crystal structures in terms of lattice parameters with identification of crystal planes.
3. Assess the characteristics of semiconductor materials in terms of crystal structures, charge Carriers and energy bands.
4. Illustrate working principle of lasers and optical fibres for their use in the field of industry.
5. Analyze the motion in electric and magnetic field and its applications to electron optic devices.

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

SN	Experiments based on
1	A study of cubic space lattices and atomic packing in solids.
2	Determination of Hall coefficient and density of charge carriers using Hall effect.
3	Dependence of Hall coefficient on temperature.
4	The study of V-I characteristics of a semiconductor diode (germanium and silicon) in forward and reverse bias mode.
5	Determination of Band gap in a semiconductor by four probe method.
6	Determination of Band gap in a semiconductor using reverse biased p-n diode.
7	Determination of divergence of laser beam.
8	Determination of wavelength of laser using diffraction grating.
9	Determination of Acceptance angle and numerical aperture of a given optical fiber.
10	Determination of attenuation of a given optical fibre.
11	Determination of amplitude and frequency of sinusoidal signal using C.R.O.
12	To measure the phase shift introduced by a phase shift network using Dual beam CRO.

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

YCCE-CSD-5

Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2022
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(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

I SEMESTER

22CSD104: Social Science

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Explain the basic concepts of Constitution of India
2. Describe the various Fundamental rights
3. Analyze the Impact of federalism on the State
4. Explain Industrial Law and Judiciary

Unit:1	Origin and meaning	7 Hours
Origin of history of Constitution, Meaning of the constitution law and constitutionalism, Kingship and Republic States in Ancient India **(Contemporary Issues related to Topic)**		

Unit:2	Concept of the Constitution of India	6 Hours
Preamble, The union and its territory, Citizenship **(Contemporary Issues related to Topic)**		

Unit:3	Federalism	7 Hours
Salient features of Federalism, Structures and features of Indian Federalism, Panchayat Raj System **(Contemporary Issues related to Topic)**		

Unit:4	Fundamental Rights	6 Hours
Scheme of the Fundamental rights, duties, Scheme of the Fundamental Right to Equality, The scheme of the Fundamental Duties and its legal status **(Contemporary Issues related to Topic)**		

Unit:5	Legislative Power	7 Hours
Federal structure and distribution of legislative, Financial power between the Union and the States, Parliamentary Form of Government in India – The constitution power and status of the President of India **(Contemporary Issues related to Topic)**		

Unit :6	Challenges to Indian Political Systems	6 Hours
The Executive, Directive principles of State Policy, The Union Judiciary **(Contemporary Issues related to Topic)**		

Total Lecture Hours		**39 Hours**

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B. Tech in Computer Science and Design

Textbooks	
1	"Social Science" 1st edition Dr G.N. Nimbarte Sankalp Publication, Vidhya Nagar, Nagpur

Reference Books	
1	Constitution of India,1st edition, Dr. B. R. Ambedkar Government of India, Ministry of Law and Justice
2	An Introduction to the Constitution of India, 24th edition Basu, D.D (2005) New Delhi, Prentice Hall
3	Working of a Democratic Constitution of India2nd edition G. Austin (2004) New Delhi: Oxford University Press.

MOOCs Links and additional reading, learning, video material	
1.	https://mobidrive.com/sharelink/r/4I2bDsxN9YrVI03vMZaInJ5VBpojBmR9EqKv7nin9pkN
2.	https://mobidrive.com/sharelink/r/4I2bDsxN9YrVI03vMZaInJ2sUn37wK4V3CpGhemYRKnz

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22CSD-101

B. Tech in Computer Science and Design

I SEMESTER
22CSD105: Engineering Mechanics

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Describe the fundamental concepts of statics and dynamics.
2. Apply the basic concepts of applied mechanics for solution of problems on planar force system.
3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body.
4. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

Unit I: Resultant of Plane Force System	(7 Hrs.)
Fundamental concepts, system of forces, laws of mechanics, principle of transmissibility of forces, Resolution and Resultant of a 2-Dimensional force system, Moment of force, Principle of moment, Couple, Equivalent force couple system. **(Contemporary Issues related to Topic)**	

Unit II: Equilibrium of Plane Force System and Friction	(6 Hrs.)
Equilibrium: Free body diagrams, Conditions of equilibrium, types of supports, types of beams, types of loads, Application to 2D force system. Friction: Plane friction, belt friction **(Contemporary Issues related to Topic)**	

Unit III: Spatial Force System (3D Force system)	(7 Hrs.)
Resultant: Resultant of a 3-Dimensional force system, Moment of force, Principle of moment. Equilibrium: Conditions of equilibrium, Application of equilibrium to 3D force system. **(Contemporary Issues related to Topic)**	

Unit IV: Properties of Surfaces	(6 Hrs.)
Centroid: Introduction, First Moment of Area, Problem on Centroid of composite sections. Area Moment of Inertia: Introduction, Second Moment of Area, Radius of Gyration, Transfer Theorem, Product of Inertia, Principal Moments of Inertia. **(Contemporary Issues related to Topic)**	

Unit V: Virtual Work Method and Kinetics of Particle	(7 Hrs.)
Virtual Work Method: Introduction, Principle of virtual work, Application to beam. Kinetics of Particle: D' Alembert's principle, Translation of bodies and interconnected particles. **(Contemporary Issues related to Topic)**	

Unit VI: Work Energy and Impulse Momentum Method	(6 Hrs.)
Work Energy Method: Introduction, Conservation of energy and problems on connected bodies. Impulse Momentum Method: Definitions, Principle of conservation of momentum, elastic impact of two bodies, coefficient of restitution, application of impulse momentum method. **(Contemporary Issues related to Topic)**	

	Total Lecture	**39 Hours**

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Textbooks:

1.	Nelson A., Engineering Mechanics (Statics and Dynamics), ed 2009, Tata Mc. Grew Hill Education Pvt. Ltd., New Delhi, 2009.
2.	Dubey N.H., Engineering Mechanics (Statics and Dynamics) first edition 2013, Tata Mc. Graw Hill Education Pvt. Ltd., New Delhi, 2013.
3.	Singer F.L, Engineering Mechanics (Statics and Dynamics), Harper and Rowe publication, New Delhi, 1994.

Reference Books:

1.	Timoshenko S, Young D.H and Rao J.V, Engineering Mechanics, Mc. Graw Hill Publication, New Delhi, 2007.
2.	Bhattacharyya B., Engineering Mechanics, Oxford University Press, New Delhi, 2008.
3.	Hibbeler R.C, Engineering Mechanics (Statics and Dynamics), Pearson Publication, Singapore, 2000.
4.	Shames I.H. and Rao J.V., Engineering Mechanics (Statics and Dynamics), First Edition, Pearson Publication, New Delhi, 2003.
5.	Beer F.P. and Johnston E.R; Vector Mechanics for Engineers, 9th edition Tata Mc. Graw Hill Publication, New Delhi. 2007.

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=nGfVTNfNwnk
2.	https://www.youtube.com/watch?v=6nguX-cEsvw
3.	https://nptel.ac.in/courses/112103108

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SoE No.
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B. Tech in Computer Science and Design

I SEMESTER

22CSD106: Lab.: Engineering Mechanics

Course Outcomes
Upon successful completion of the course the students will be able to
1. Describe the fundamental concepts of statics and dynamics.
2. Apply the basic concepts of applied mechanics for solution of problems on planar force system.
3. Determine the properties of surface like centroid, moment of inertia, etc. for planar surfaces and mass moment of inertia for rigid body.
4. Evaluate the dynamic variables of kinetics of particles and simple lifting machine

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

SN	Experiments based on
1	To determine support reactions of a Simply Supported Beam experimentally and analytically.
2	To determine the forces in the members of a Jib Crane Apparatus experimentally and graphically.
3	To determine the coefficient of friction between two surfaces of different material on Plane Friction Apparatus.
4	To determine the coefficient of friction of Coil Friction Apparatus.
5	To determine the forces in members of a Shear Leg Apparatus experimentally and manually.
6	To determine the mass moment of inertia of a fly wheel using Fly Wheel Apparatus
7	To determine efficiency and law of machine of Differential Axel & Wheel machine.
8	To determine efficiency and Law of machine of Single Purchase Crab machine.
9	To determine efficiency and Law of machine of Double Purchase Crab machine.
10	To find the resultant of concurrent force system using graphical method and hand calculation.
11	To find support reactions of a simply supported beam using graphical method and hand calculation.
12.	To find for a composite figure by using Mohr's circle and hand calculation, (1) Principle moment of inertia (2) Moment of inertia and product of inertia about any inclined axis.

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B. Tech in Computer Science and Design

I SEMESTER
22CSD107: Introduction to Computer Programming

Course Outcomes :

Upon successful completion of the course the students will be able to
1. Understand computer system, basics of algorithm & flowchart, and demonstrate straight line program using basic 'C' programming language constructs.
2. Implement basic Linux commands and simple programs using different constructs in C.

3. Design & Develop programs using different loop control structures, user defined functions, and Pointers.
4. Analyze and apply concepts of different dimensional Arrays as a data structure & development of programs using the same.
5. Design and develop programs using basics of Strings, Structures, union and Files in 'C' language.

Unit I: Components of Computer System	**(6 Hrs.)**
Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.). Algorithms & Conventions used in writing algorithms, Flowcharts. Overview of Programming Language, sample 'C' code, compiler, operating system, running 'C' programs, Types of programming errors. **(Contemporary Issues related to Topic)**	
Unit II: Basics of C Programming	**(8 Hrs.)**
Character set, variables, identifiers & keywords, Data types, Operators, Types of operators and expressions, sizeof() operator, constants and its types, Symbolic constant, typedef statement, Introduction to library functions, basic input/output statements, precedence of operators, write straight line programs, Decision control statements: if, if - else and nested if-else statements, else-if ladder statement, switch-case control statement, Programming Examples. **(Contemporary Issues related to Topic)**	
Unit III: Loop Structure	**(7 Hrs.)**
Loop Structures: While, do while and for loops, break and continue statement, 'goto' statement, C programs based on these loop structures. **(Contemporary Issues related to Topic)**	
Unit IV: Modular Programming	**(8 Hrs.)**
Concept of functions, Modular programming, user defined and library functions, function prototypes, formal parameters, actual parameters, return types, function call- call by value, C programs using functions, Recursive functions, comparing recursion against iteration, C programs using recursive functions, Concepts of pointer. **(Contemporary Issues related to Topic)**	
Unit V: Array	**(9 Hrs.)**
Introduction to Arrays, One dimensional array, array manipulation, insertion, deletion of an element, searching techniques- Linear and binary search, sorting techniques - Bubble, insertion and selection sort.Two dimensional array: programs for basic matrix operations-addition, multiplication and transpose, converting a matrix in upper or lower triangular matrix, Array as function arguments. **(Contemporary Issues related to Topic)**	
Unit VI: String and files	**(6 Hrs.)**
Introduction to strings, string handling functions. Introduction to structures and Union. Concepts of files, Types of files, file opening in various modes, file closing, reading and writing text files, concept of pre-processor directives and macros, Command line Argument. **(Contemporary Issues related to Topic)**	
Total Lecture	**44 Hours**

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Textbooks:	
1.	The C Programming Language. J.B.W.Kernighan & D.M.Ritchie, Prentice Hall
2.	Mastering C, K.R.Venugopal & S.R. Prasad, TMH,2007.

Reference Books:	
1.	Problem Solving And Program Design In C, Jeri. R. Hanly, Elliot B. Koffman, Pearson Education
2.	Programming with C, Byron Gottfried , Schaum;s Outline Series
3.	How to solve it by computer, R. G. Dromey, Prentice Hall India

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/27.c.pdf
2	http://103.152.199.179/YCCE/DTEL%20Material/7.Information%20Technology/DTEL%20PPTs/11.ITCP_E_SSG.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://archive.nptel.ac.in/courses/106/104/106104128/

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B. Tech in Computer Science and Design

I SEMESTER
22CSD108: Lab.: Introduction to Computer Programming

SN	Unit	Name of the Practical
1(A)		Introduction to Linux Operating system & it's different commands.
1(B)		Introduction to Vi editor, Compilation and Execution of a program in Linux.
1(C)		Introduction to Turbo C, Compilation and Execution of a program on Turbo C.
2	II	A) Write a program in c accept radius us input from keyboard and display the area and circumference of circle
	II	B) Write C program using conditional operators to display maximum number if any three number are inputted
3	II	A) Write a program which accept any character as input and check whether entered character is vowel or not.
	II	B) Write a program which accepts any year as input and check whether entered year is leap year or not and display the appropriate message.
	II	c) Write a C program to input electricity unit charge and calculate the total electricity bill according to the given condition: For first 50 units Rs. 3.50/unit For next 100 units Rs. 4.00/unit For next 100 units Rs. 5.20/unit For unit above 250 Rs. 6.50/unit An additional surcharge of 20% is added to the bill.
4	II	Write a Menu Driven C program using Switch Case to perform the following operations on a four digit positive integer number entered by the user. 1. To display the number in reverse order. 2. To display sum of the digits of the number. 3. To display a number by adding one in each digit. 4. Exit.
5	III	Write a C program to input any number and find the how many digits and also find the factorial of highest digit.
6	III	Write a C program to display sum of the following series. $\text{Sum} = 1 + \frac{X^1}{1!} + \frac{X^2}{2!} + \frac{X^3}{3!} + \ldots\ldots\ldots + \frac{X^n}{n!}$

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7	**III**	Write a C program to print following pyramid.
		
		      *
		     * *
		    * * *
		   * * * *

8	**IV**	A) Write a function which accepts a number a Check Whether a Number is Prime or not, your function returns 1 if a number is a prime number, otherwise 0.
	IV	B) C Program to Find Factorial of a Number Using Recursion.
9	**V**	Write a C program to sort an array of integers using Bubble Sort.
10	**V**	Write a C program to print the transpose of matrix.
11	**V**	A) Write a program in C to find the length of a string without using library function
12	**VI**	Define a structure called cricket that will describe the following information: player name,team name, batting average. Using cricket,declare an array player with 5 elements and write a program to read the information about all the 5 players and print a team-wise list containing names of player with their batting average.
13	**VI**	Write a C program to Copy one file to another file in C

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B. Tech in Computer Science and Design

I SEMESTER
Audit Course
GE2132: Environmental Science

Course Outcome :

Upon successful completion of the course the students will be able
1. To understand the basic concepts and problems and follow sustainable development practices
2. To enhance knowledge skills and attitude towards environment
3. To understand natural environment and its relationship with human activities.
4. To evaluate local, regional and global environmental topics related to resource use and management.

Unit I: : Introduction	(2Hrs.)

Definition, scope and importance; Need for public awareness – institutions in environment, people in environment.

Unit II: : Natural Resources	(2 Hrs.)

Renewable and non-renewable and associated problems; Role of an individual in conservation of natural resources; Equitable use of resources for sustainable lifestyles.

Unit III: Ecosystems	(4 Hrs.)

Concept of an ecosystem – understanding ecosystems, ecosystem degradation, resource utilization. Structure and functions of an ecosystem – producers, consumers and decomposers.
Energy flow in the ecosystem – water, carbon, oxygen, nitrogen and energy cycles, integration of cycles in nature.
Ecological succession; Food chains, food webs and ecological pyramids; Ecosystem types – characteristic features, structure and functions of forest, grassland, desert and aquatic ecosystems.

Unit IV: Bio-diversity	(4 Hrs.)

Introduction – biodiversity at genetic, species and ecosystem levels Bio-geographic classification of India. Value of biodiversity – Consumptive use value, productive use value, social, ethical, moral, aesthetic and optional vlue of biodiversity.
India as a mega-diversity nation; hotspots of biodiversity.Threats to bio-diversity – habitat loss, poaching of wildlife, man-wild life conflicts. Common endangered and endemic plant and animal species of India. Insitu and Exsitu conservation of biodiversity. Role of individual and institutions in prevention of pollution.Disaster management – Floods, earthquake, cyclone, landslides.

Unit V: Pollution	(4 Hrs.)

Definition; Causes, effects and control measures of air, water, soil, marine, noise and thermal pollutions and nuclear hazards. Solid waste management – Causes, effects and control measures of urban and industrial waste.

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Unit VI: Social Issues and the Environment	(4 Hrs.)

Unsustainable to sustainable development; Urban problems related to energy; Water conservation, rainwater harvesting, watershed management; Problems and concerns of resettlement and rehabilitation of affected people.

Environmental ethics – issues and possible solutions – Resource consumption patterns and need for equitable utilization; Equity disparity in Western and Eastern countries; Urban and rural equity issues; need for gender equity.

Preserving resources for future generations. Te rights of animals; Ethical basis of environment education and awareness; Conservation ethics and traditional value systems of India.

Climate change, global warming, acid rain, Ozone layer depletion, nuclear accidents and holocasts.

Wasteland Reclamation; Consumerism and Waste products.

Environment legislations – The Environment (Protection) Act; The water (Prevention and Control of Pollution) Act; The Wildlife Protection Act; Forest Conservation Act; Issues involved in enforcement of environmental legislations – environment impact assessment (EIA), Citizens actions and action groups.

Public awareness – Using an environmental calendar of activities, self-initiation.

Unit VII : Human Population and the Environment	(4Hrs.)

Global population growth, variation among nations. Population explosion; Family Welfare Programmes – methods of sterilization; Urbanization.

Environment and human health – Climate and health, infectious diseases, water-related diseases, risk due to chemicals in food, Cancer and environment.

Human rights – equity, Nutrition and health rights, Intellectual property rights (IPRS), Community Biodiverstity registers (CBRs).

Value education – environmental values, valuing nature, valuing cultures, social justice, human heritage, equitable use of resources, common property resources, ecological degradation.

 HIV / AIDS; Women and Child Welfare; Information technology in environment and human health.

	Total Lecture	**24 Hours**

Textbooks:	
1.	Perspectives in environmental studies by A. Kaushik and C. P. Kaushik.
2.	Textbook for Environmental studies by Erach Bharucha for UGC
3.	Textbook of Environmental studies by Shanta Satyanarayan, Dr. Suresh Zade, Dr. Shashikant Sitre & Dr. Pravin Meshram.
4.	Fundamental concepts in Environmental studies by Dr. D.D. Mishra. S. Chand publications

Reference Books:	
1.	Essentials of Ecology and Environmental Science by Dr. S .V .S. Rana,PHI Learning Pvt. Ltd, Delhi
2.	Environmental Chemistry by Anil Kumar De, Wiley Eastern Limited
3.	Environmental Science by T.G. Miller, Wadsworth Publishing Co, 13th edition.
4.	Ecology and Environment by P. D. Sharma, Rastogi publications

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(Department of Information Technology)

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B. Tech in Computer Science and Design

I SEMESTER
Audit Course
MLC2121: YCAP1-Get Set Go

Objective	Outcomes
Get Set Go program is designed to introduce students to the real world. It gives them the skills they need to reach their goals and live up to their full potential at college, home and work. The program was developed with feedback from students; it consists of interactive sessions that include real-life scenarios and role-playing. It can help young adults become more confident and better able to cope with the pressure and stress they face.	The students gain more confidence and skills required to deal with the challenges they will face in college and at home. Their interpersonal and intrapersonal skills are enhanced pushing them to think towards their future and aim for their goals.

Syllabus Subject: Communication Skills – 1st Year, No. of hours - 18

Unit No.	Topic	Duration
1	Topic: Build a foundation for success - Explain the Importance of Process of improvement, stating your Name with Impact, Recall and Use Names, Name Remembering Formula o LIRA o PACE – Individual Activity o BRAMMS o Chaining Method, Introduce "My Vision	2.5 Hours
2	Topic: Communication Fundamentals for Building Trust- Be a good listener, use conversation links, show genuine interest Hi-Five of Success ♣ Build on Memory Skills and Enhance Relationships ♣ PEG words ♣ Explain Permanent PEG Memory System, energize our Communications – Explain 3Vs of communication – Visual-Vocal-Verbal	3.5 Hours
	Practice Conversations, Activity – Pause-Part-Punch, Group Activity	

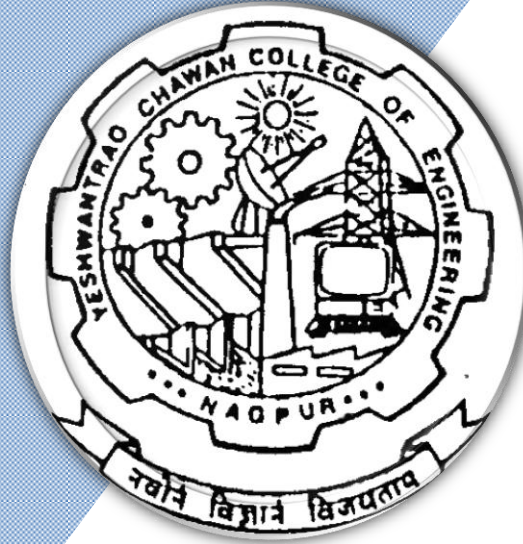|			July 2022	1.00	Applicable for
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Unit No.	Topic	Duration
3	Topic: Increase Self Confidence -• Use our experiences to communicate more confidently • Communicate with clarity and conciseness • Discover how past experiences influence behavior	2.5 Hours
4	Topic: Motivate Others and Enhance Relationships-• Learning Objectives • Explain Gain Willing Cooperation Principles • Group Presentation • Explain Demonstration of Leadership Principles • Explain "Evidence" critical in establishing credibility	4 Hours
	Individual Activity – Sharing of defining moment, Skit to demonstrate Leadership Principles, Stranded on Island	

Unit No.	Topic	Duration
5	Topic: Fundamentals of Communication (Earn the right – Excite -Eagerness) ♣ Elevator Pitch ♣ Develop more Flexibility, ♣ Recap and Summarize	3.5 Hours
6	Activities - – Individual Presentation, Flexibility Drills, Individual Presentations – My Vision Assignment	2 Hours

Reference Books:
1. How to win friends & influence people – Dale Carnegie

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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
2nd Semester

(Department of Information Technology

B. Tech in Computer Science and Design

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 Information Technology)
Computer Science and Design

SoE No.
22CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					FIRST SEMESTER										
1	1	BS	GE/MTH	22CSD101	Probability and Statistics	T	3	1	0	3	4	30	20	50	3 Hours
2	1	BS	GE/PHY	22CSD102	Engineering Physics	T	3	0	0	3	3	30	20	50	3 Hours
3	1	BS	GE/PHY	22CSD103	Lab.: Engineering Physics	P	0	0	2	2	1		60	40	
4	1	HS	GE/HUM	22CSD104	Social Science	T	3	0	0	3	3	30	20	50	3 Hours
5	1	BES	CV/CV	22CSD105	Engineering Mechanics	T	3	0	0	3	3	30	20	50	3 Hours
6	1	BES	CV/CV	22CSD106	Lab.:Engineering Mechanics	P	0	0	2	2	1		60	40	
7	1	BES	IT/IT	22CSD107	Introduction to Computer Programming	T	3	0	0	3	3	30	20	50	3 Hours
8	1	BES	IT/IT	22CSD108	Lab.: Introduction to Computer Programming	P	0	0	2	2	1		60	40	
					TOTAL FIRST SEM		15	1	6	21	19				

List of Mandetory Learning Course (MLC)

| 1 | 1 | BES | GE/CHE | GE2132 | Environmental Science | A | 2 | 0 | 0 | 2 | 0 | | | | |
| 2 | 1 | HS | GE/T&P | MLC2121 | YCAP1-Get Set Go | A | 2 | 0 | 0 | 2 | 0 | | | | |

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					SECOND SEMESTER										
1	2	BS	GE/MTH	22CSD201	Calculus, Sequences and Series	T	3	1	0	3	4	30	20	50	3 Hours
2	2	BS	GE/CHE	22CSD202	Engineering Chemistry	T	3	0	0	3	3	30	20	50	3 Hours
3	2	BS	GE/CHE	22CSD203	Lab: Engineering Chemistry	p	0	0	2	2	1		60	40	
4	2	HS	GE/HUM	22CSD204	Technical Communication	T	3	0	0	3	3	30	20	50	3 Hours
5	2	HS	GE/HUM	22CSD205	Lab:Technical Communication	P	0	0	2	2	1		60	40	
6	2	BES	EE/EE	22CSD206	Digital Circuit Design	T	3	0	0	3	3	30	20	50	3 Hours
7	2	BES	EE/EE	22CSD207	Lab.:Digital Circuit Design	P	0	0	2	2	1		60	40	
8	2	BES	EL/EL	22CSD208	Basic Electrical Machines	T	3	0	0	3	3	30	20	50	3 Hours
9	2	BES	EL/EL	22CSD209	Lab:Basic Electrical Machines	P	0	0	2	2	1		60	40	
10	2	BES	ME/ME	22CSD210	Lab.: Engineering Design	P	0	0	4	4	2		60	40	
					TOTAL SECOND SEM		15	1	12	27	22				

List of Mandetory Learning Course (MLC)

| 1 | 2 | HS | GE/T&P | MLC2122 | YCAP2 -Functional English | A | 2 | 0 | 0 | 2 | 0 | | | | |
| 2 | 2 | HS | GE/HUM | GE2131 | Universal Human Value | 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 activitied decided by course teacher, TA3 - 3 marks on class attendance

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

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Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2022
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(Department of Information Technology)

**SoE No.
22CSD-101**

B. Tech in Computer Science and Design

II SEMESTER

22CSD201: Calculus, Sequences and Series

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Apply the knowledge of differentiation, sequence and series to solve engineering problems.
2. Determine the expansion and derivatives of functions of several variables and use it to find extreme values of functions.
3. Evaluate the improper integrals, multiple integrals and apply it to compute the area and volume of various structures.
4. Solve higher order differential equations and its applications.

Unit I: Sequence and Series	(6 Hrs.)
Sequence, types of sequence, test of convergence of sequences, Cauchy sequence, infinite series, power series, Alternating series, tests of convergence and absolute convergence of series. **(Contemporary Issues related to Topic)**	

Unit II: Ordinary Differentiation	(7 Hrs.)
Successive differentiation; Leibnitz theorem, Taylor's and Maclaurin's series for functions of single variable and its applications. **(Contemporary Issues related to Topic)**	

Unit III: Partial Differentiation	(7 Hrs.)
First and higher order derivatives of Functions of several variables, Euler's theorem, Chain Rule, Jacobians, Maxima and minima and saddle point of functions of two variables. **(Contemporary Issues related to Topic)**	

Unit IV: Curve Tracing and Improper Integrals	(6 Hrs.)
Tracing of curves, Beta, Gamma functions and its applications. **(Contemporary Issues related to Topic)**	

Unit V: Multiple integrals	(7 Hrs.)
Elementary double integrals, Change of variables (simple transformations), Coordinate Transformation, Change of order of integration (Cartesian and polar), Elementary triple integrals and Applications to find area, volume. **(Contemporary Issues related to Topic)**	

Unit VI: Differential Equations	(7 Hrs.)
Higher order differential equations with constant coefficients. Cauchy's and Legendre's homogeneous differential equations, Applications of differential equations. **(Contemporary Issues related to Topic)**	

	Total Lecture	**40 Hours**

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(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

Textbooks:

1.	Erwin Kreyzig, Advance Engineering Mathematics, 6th Edition, John Wiley and Sons, INC.
2.	H.K. Dass, Engineering Mathematics, 11th revised edition, S. Chand, Delhi.
3.	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.
4.	Dr. B.S. Grewal, Higher Engineering Mathematics, 42th edition, Khanna Publishers.
5.	P.N.Wartikar and J.N.Wartikar, Applied Mathematics, 4th Edition, Vidyarthi GrihaPrakashan.

Reference Books:

1.	G B Thomas and R L Finney, Calculus and Analytical Geometry, 9th edition, Addison-Wesley, 1999.
2.	Michael Spivak and Tom Apostol, Calculus, VolI & Vol II 2nd edition, Wiley.
3.	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, 10th edition, Laxmi Prakashan.

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://nptel.ac.in/courses/111/106/111106146/
2.	https://nitkkr.ac.in/docs/5-Multiple%20Integrals%20and%20their%20Applications.pdf

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(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

II SEMESTER

22CSD202: Engineering Chemistry

Course Outcomes :
Upon successful completion of the course the students will be able to
1) Illustrate different thermodynamic functions and chemical reaction rates. (L3)
2) Apply concepts of electrochemistry for energy storage devices. (L3)
3) Develop awareness about global environmental concerns. (L2)
4) Establish insight into engineering materials. (L2)

Unit I : Energetics	(7 Hrs.)
Introduction, Internal energy, enthalpy, Gibb's free energy, Free energy change and chemical equilibrium. Spontaneous and non-spontaneous processes. I and II law of thermodynamics. Entropy and its significance. Numerical on Internal energy and enthalpy change. Thermodynamic applications to physical and chemical equilibrium. **(Contemporary Issues related to Topic)**	
Unit II: Electrochemistry	**(7 Hrs.)**
Introduction, metallic and electrolytic conductance, resistance, specific resistance, conductance, specific conductance, equivalent and molar conductance. Variation of conductance with dilution. Electrode and electrode potentials. Nernst Equation. Faraday's laws and Numerical. Industrial applications: Electroforming, Electro winning, Electrolytic refining. **(Contemporary Issues related to Topic)**	
Unit III: Energy Storage Devices Basic concepts	**(6 Hrs.)**
Primary and secondary battery. Energy density, power density, energy efficiency, cycle life, shelf life. Secondary battery: Ni-metal hydride battery, Lithium-ion battery. H2-O2 Fuel cell: Principle, working, advantages, disadvantages, applications. Differences between battery and a fuel cell. Supercapacitors: Definition, types, characteristics, and application. **(Contemporary Issues related to Topic)**	
Unit IV: Chemical Kinetics	**(6 Hrs.)**
Introduction, Rate of reaction and factors influencing rate of reaction, order & molecularity of reaction. Kinetic equations of different orders: Zero Order, First Order, Second Order and numerical. **(Contemporary Issues related to Topic)**	
Unit V: Industrial pollution, its impacts on environment and control.	**(6 Hrs.)**
Introduction: Industrial pollution and its types. Sources of pollution in electronic industries. Hazardous waste management. Battery waste management. e-waste pollution, its impact on environment , rules of regeneration of e-waste recycling and its managements as per government norms. **(Contemporary Issues related to Topic)**	
Unit VI: Advanced Materials	**(7 Hrs.)**
Nanomaterials: Definition of nanomaterials, nano scale. Carbon Nanotubes and types. Application of Nanomaterials: Applications of nanomaterials in medicine, environment, and electronics. Nanotechnology for waste reduction and improved energy efficiency. Threats of Nanomaterials. **Silicon Chips:** Introduction. Physical, chemical, electrical & mechanical properties and applications. **Polymers in electronic industries:** Piezo, pyroelectric, Ferroelectric polymers. **Smart materials:** Properties and applications of shape memory alloys, chromoactive, photoactive and magnetorheological materials. **(Contemporary Issues related to Topic)**	
	Total Lecture **39 Hours**

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(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

Textbooks:

1.	S S. Dara , A Text book of Engineering Chemistry , S.Chand & Co New Delhi. Eleventh Edition.
2.	P.C. Jain and Monica Jain , Engineering Chemistry , Dhanpat Rai & sons New Delhi , Sixteenth Edition.
3	P. W. Atkins, Physical Chemistry ,Oxford Publications,Eighth edition .
4	Erach Bharucha , Textbook for Environmental studies for UGC ,Universities press ,Third edition.

Reference Books:

1.	B.K.Sharma Krishna , Engineering Chemistry ,Prakashan media private LTD. 1st Edition, 2014.
2.	CNR Rao ,Chemistry of Advanced Materials , Willey Publications, 1993.
3.	Fred. Billmeyer Jr. ,A textbook of polymer science ,Wiley India, 2nd Edition.
4.	Robert B Leighou , Chemistry of Engineering Materials ,Hill Book Company, Inc New York
5.	William C. O'Mara, Robert B. Herring ,Handbook of Semiconductor Silicon Technology ,Noyes Publications Park Ridge, NJ, USA.1st Edition.

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.	https://www.youtube.com/watch?v=XTt3gXB0a84
2.	https://www.youtube.com/watch?v=iihYXx79QiE
3.	https://www.youtube.com/watch?v=JfJ7MlP9Dco
4.	https://www.youtube.com/watch?v=L2VSOccUrSk

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SoE No.
22CSD-101

B. Tech in Computer Science and Design

II SEMESTER

22CSD203: Lab.: Engineering Chemistry

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

1) Illustrate different thermodynamic functions and chemical reaction rates. (L3)

2) Apply concepts of electrochemistry for energy storage devices. (L3)

3) Develop awareness about global environmental concerns. (L2)

4) Establish insight into engineering materials. (L2)

Total 10 experiments are to be performed

(4 each from Phase I and Phase II and two demonstration experiments)

SN	Experiments based on
	List of Experiments-Phase I
1	Determination of total hardness of water sample.
2	Determination of alkalinity present in the water sample.
3	Estimation of Fe^{2+} ions by redox titration
4	Determination of copper by iodometric titration
5	Estimation of Nickel.
6	To determine the strength of a given potassium dichromate solution with N/20 sodium thiosulphate solution
7	Determination of COD of water sample.
8	Synthesis of polyaniline.
9	Determination of rate of the reaction of hydrolysis of ethyl acetate at room temperature and analysis of experimental data using Computational Software.
	List of Experiments-Phase II
1	Determination of viscosity of lubricating oil by Redwood Viscometer I or II
2	Determination of Cation exchange capacity of an ion exchange resin
3	Determination of molecular weight of a polymer.
4	Oil Testing for Flash Point / Cloud Point/Pour Point/Aniline Point
5	Proximate analysis of coal
6	Determination of surface tension of liquids using stalagmometer.
7	Determination of electrochemical equivalence of Copper using Faradays Law
8	To determine the heat of solution of potassium nitrate calorimetrically.
9	Determination of conductivity of water sample by conductivity meter.
10.	To verify Beer-Lambert law for KMnO4 and determine the concentration of the given solution of KMnO4

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	List of Demonstration Experiments
1	Determination of pH of water sample by pH meter
2	Synthesis of urea formaldehyde resin.
3	Determination of consistency of grease sample by using penetrometer.
4	Determination of Drop Point of grease.

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SoE No.
22CSD-101

B. Tech in Computer Science and Design

II SEMESTER
22CSD204: Technical Communication

Course Outcomes :

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

1. Apply different modes for effective communication
2. competently use the phonology of English language
3. Apply nuances of LSRW skills
4. Communicate through different channels

Unit I: Basics of Communication	(6Hrs.)

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).
(Contemporary Issues related to Topic)

Unit II: English Phonetics	(6 Hrs.)

Speech Mechanism, Organs of speech, Consonant and Vowels sounds, Word stress rules.
(Contemporary Issues related to Topic)

Unit III: Interview Skills	(5 Hrs.)

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
(Contemporary Issues related to Topic)

Unit IV: Oral Skills	(6 Hrs.)

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
(Contemporary Issues related to Topic)

Unit V: Presentation & Visual Communication	(6 Hrs.)

Presentation and audience analysis, Organizing content, Nuances of presentation, Visual Communication – Introduction & importance, Role & Psychology of color in visual communication.
(Contemporary Issues related to Topic)

Unit VI: Technical Written Communication	(6 Hrs.)

Memo, Email, Report -Types, Characteristics, prewriting aspects of report and preparing writing aspects of report), Types of paragraphs.
(Contemporary Issues related to Topic)

	Total Lecture	**35 Hours**

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22CSD-101

B. Tech in Computer Science and Design

Textbooks:	
1.	Raman & Sharma, Technical Communication, Oxford University Press.
2.	T. Balasubramaniam, Textbook of English Phonetics for Indian Students, Macmillan India Ltd.

Reference Books:	
1.	Public Speaking, Dale Carnegie, How to Develop Self – Confidence & Influence People.
2.	Asha Kaul, 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-superior-vocabulary-e157841139.html
3	https://www.pdfdrive.com/improve-your-communication-skills-present-with-confidence-write-with-style-learn-skills-of-persuasion-e156963640.html
4	https://www.pdfdrive.com/21-days-of-effective-communication-everyday-habits-and-exercises-to-improve-your-communication-skills-and-social-intelligence-e158273760.html

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SoE No.
22CSD-101

B. Tech in Computer Science and Design

II SEMESTER
22CSD205: Lab.: Technical Communication

Course Outcomes
Upon successful completion of the course the students will be able to
1.   Apply different modes for effective communication
2.   competently use the phonology of English language
3.   Apply nuances of LSRW skills
4.   Communicate through different channels

Lab I	**(2 Hrs.)**
Handson for Consonants and vowel sounds **(Contemporary Issues related to Topic)**	

Lab II	**(2 Hrs.)**
Identifying the pragmatic meaning of the text **(Contemporary Issues related to Topic)**	

Lab III	**(2 Hrs.)**
Sessions for Interview **(Contemporary Issues related to Topic)**	

Lab IV	**(2 Hrs.)**
Grooming session for effective use of body language **(Contemporary Issues related to Topic)**	

Lab V	**(2 Hrs.)**
Visual Media – preparing poster boards, advertising product **(Contemporary Issues related to Topic)**	

Lab VI	**(2 Hrs.)**
Group Discussion **(Contemporary Issues related to Topic)**	
	Total Lecture **12 Hours**

Textbooks:	
1.	Technical Communication, 3rd Edition, Raman & Sharma,Oxford University Press
2.	Textbook of English Phonetics for Indian Students,3rd Edition, T. Balasubramaniam,Macmillan India Ltd

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22CSD-101

B. Tech in Computer Science and Design

Reference Books:	
1.	How to Develop Self – Confidence & Influence People by Public Speaking,1st Edition,Dale Carnegie
2.	Communication Skills, 2nd Edition, Asha Kaul
3.	Body Language,1st Edition, Allen Peas
4.	Technical Communication, January 2003, Gerson'sGerson

MOOCs Links and additional reading, learning, video material	
1.	https://youtu.be/XoVLa6Dqd5I
2.	https://youtu.be/45uNWLmAZR8

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Nagar Yuwak Shikshan Sanstha's

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| SoE No. |
| 22CSD-101 |

B. Tech in Computer Science and Design

II SEMESTER
22CSD206: Digital Circuit Design

Course Outcomes:

Students will be able to:
1. Simplify combination logic circuits using Boolean algebra.
2. Understand and demonstrate the various codes and illustrate their addition substraction.
3. Simply and exhibit the methods to solve logical functions using K- map and Quine Mc-Cluskey methods and apply it to implement combinational logic circuits.
4. Design and analyze Synchronous and Asynchronous sequential Circuits.

Unit:1	Number system and codes	6 Hours

Binary: octal, hexadecimal and decimal Number systems and their inter conversion, BCD numbers (8421-2421), gray code, excess–3 code, ASCII codes. Binary addition and subtraction, signed and unsigned binary numbers, 1's and 2's complement representation

(Contemporary Issues related to Topic)

Unit:2	Boolean Algebra	6 Hours

Basic logic circuits: Logic gates (AND, OR, NOT, NAND, NOR, Ex-OR, Ex-NOR and their truth tables,), Universal Gates, Laws of Boolean algebra, De- Morgan's theorem.

(Contemporary Issues related to Topic)

Unit:3	Minimization Techniques	6 Hours

Min term, Max term, POS, SOP, K-Map, Simplification by Boolean theorems, don't care condition. Quine Mc-Cluskey method.

(Contemporary Issues related to Topic)

Unit:4	Combinational Logic	6 Hours

The Half adder, the full adder, subtractor circuit. Multiplxer de-multiplexer, decorder, BCD to seven segment Decorder, encoders

(Contemporary Issues related to Topic)

Unit:5	Sequential Circuits	7 Hours

Flip flop, set-reset laches, R-S flip-flop, D-flip flop, J-K Flip-flop, Master slave Flip flop, T flip-flop, excitation table of flip-flops.

(Contemporary Issues related to Topic)

Unit :6	Registers&Counters	7 Hours

Synchronous/Asynchronous counter   operation, Up/down synchronous counter, application of counter, Serial in/Serial out shift register, Serial in/Serial out shift register, Serial in/parallel out shift register, parallel in/ parallel out shift register, parallel in/Serial out shift register, Bi-directional register.

(Contemporary Issues related to Topic)

Total Lecture Hours	38 Hours

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22CSD-101

B. Tech in Computer Science and Design

Textbooks	
1	Modern Digital Electronics , RP Jain, Tata McGraw Hill, 3rd Edition
2	M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India Pvt. Ltd., 2003 Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
3	Donald P.Leach and Albert Paul Malvino, Digital Principles and Applications, 6thEdition, TMH, 2003.
4	Anandkumar- fundamental of digital circuit. 3rd edition. PHI

Reference Books	
1	Fundamentals of Logic Design, C.H.Roth, Public Work & Services, 3rd edition 2007.
2	Engg Approach to Digital Design, Fletcher, Prentice Hall of India 1993.
3	Digital Circuits & Microprocessors, Hebert Taub, Mc Graw Hill, 1988.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/yccelibrary.html

MOOCs Links and additional reading, learning, video material	
1	https://www.digimat.in/nptel/courses/video/108105132/L01.html
2	https://www.digimat.in/nptel/courses/video/108105113/L01.html
3	https://www.coursera.org/learn/digital-systems

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YCCE-CSD-12

Nagar Yuwak Shikshan Sanstha's

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(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

II SEMESTER
22CSD207: Lab.: Digital Circuit Design

Students will be able to:

1. Simplify combination logic circuits using Boolean algebra.

2. Understand and demonstrate the various codes and illustrate their addition substraction.

3. Simply and exhibit the methods to solve logical functions using K- map and Quine Mc-Cluskey methods and apply it to implement combinational logic circuits.

4. Design and analyze Synchronous and Asynchronous sequential Circuits.

Expt. No.	Name of Experiments
1.	Introduction to LogicAid software and commands. Verifications of functions using Logic Aid and comparing the results with manual results.
2.	Introduction to Bread Board and Verify Truth Tables of basic Logic gates using Bread Board.
	Virtual Lab: **An Initiative of Ministry of Human Resource Development Under the National Mission onEducation through ICT**
3.	Construction of half/ full adder using XOR and NAND gates and verification of its operation.
4.	Verify Binary to Gray and Gray to Binary conversion using NAND gates only.
5.	Implementation of 4x1 multiplexer and 1x4 demultiplexer using logic gates.
6.	Verify the truth table of RS, JK, T and D flip-flops using NAND & NOR gates.
7.	Design and verify the 4- Bit Synchronous/ Asynchronous Counter using JK Flip Flop.
	Using SPICE
8.	Introduction to SPICE Digital model and commands. Verify Truth Tables of basic Logic gates &Universal Gates **using SPICE.**
9.	Design & verify Truth Table of Half adder & Full adder circuits **using SPICE.**
10.	Design & verify Truth Table of 4:1 Multiplexer & 1: 4 Demultiplexer circuits **using SPICE.**

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Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)
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(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

II SEMESTER
22CSD208: Basic Electrical Machines

Course Outcomes:

Upon successful completion of the course the students will be able to
1. Reproduce fundamentals of dc circuits.
2. Explain, construction, working and applications of various electrical machines.
3. Analyze performance of various electrical machines.

Unit:1	D.C. Circuits	7 Hours

D.C. Circuits: Basics of electrical circuits. Equivalent resistance, Kirchhoff's Laws. Current and Voltage division rule. Mesh and Nodal analysis of dc circuits. Superposition Theorem.
A.C. Fundamentals: Values of alternating quantity. Concept of power factor, reactive power and apparent power with power triangle.
(Contemporary Issues related to Topic)

Unit:2	Single Phase Transformer	7 Hours

Working principle. EMF equation. Voltage ratio and turns ratio. Step up and step down transformers. Construction of single phase transformer. Ideal transformer. Transformer on no load with phasor diagram and equivalent circuit. Practical transformer and its equivalent circuit. Referred values. Voltage Regulation. Losses in transformer. Open circuit and Short circuit tests on transformer. Efficiency and condition for maximum efficiency. Types of transformers and their applications.
(Contemporary Issues related to Topic)

Unit:3	DC Motor	7 Hours

Principle, Torque Equation, Characteristics and applications of various types of D.C. Motors, Starting of D.C. Motors, Speed control of Series and Shunt motors, Power flow in DC machines, Losses and Efficiency in D.C. machines.
(Contemporary Issues related to Topic)

Unit:4	Three Phase Induction Motor	6 Hours

Construction. Production of rotating magnetic field. Principle of operation. Speed and slip. Frequency of rotor voltage and current.. Applications of three phase induction motor.
(Contemporary Issues related to Topic)

Unit:5	Stepper Motors	7 Hours

Principle of operation, Constructional features, Types of stepper Motors, Various modes of operation of Variable reluctance (VR) stepper motors, torque production in Variable Reluctance (VR) stepping motor, Multi stack VR stepper motor, Construction and working of Permanent Magnet (PM) stepper motor, Construction and working of Hybrid stepper motor, Torque angle characteristics of the stepper motor.
(Contemporary Issues related to Topic)

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Unit:6	Permanent Magnet Brushless DC Motors	7 Hours

Permanent Magnet Brushless DC Motors: Fundamentals of Permanent Magnets, Principle of operation, Magnetic circuit analysis, EMF and Torque equations, Characteristics and control.
Servomotors: AC Servomotors & DC Servomotors.
(Contemporary Issues related to Topic)

	Total Lecture Hours	41 Hours

Textbooks	
1	T. K. Nagsarkar and M. S. Sukhija, Basic Electrical Engineering, 1st Edition, Oxford Higher Education, 2005
2	V. N. Mittle and A. K. Mittal, Basic Electrical Engineering, 2nd Edition,2006, The McGraw Hill Companies, New Delhi
3	B.L.Theraja, Electrical Technology, S.Chand, 2005
4	T. Kenjo and S. Nugatory, Permanent Magnet and Brushless DC motors, England, Clarendon Oxford Press, 1989

Reference Books	
1	I J Nagrath and D. P.Kothari, Basic Electrical Engineering, 2nd Edition,2002, McGraw Hill, New Delhi
2	Vincent Del Toro, Electrical Engineering Fundamentals, 2nd Edition,2002, Prentice Hall India, New Delhi

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://link.springer.com/openurl?genre=book&isbn=978-3-642-25904-3
2	http://link.springer.com/openurl?genre=book&isbn=978-1-4614-0399-9

MOOCs Links and additional reading, learning, video material	
1	https://nptel.ac.in/courses/108105155
2	https://nptel.ac.in/courses/108105155
3	https://nptel.ac.in/courses/108105155

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SoE No.
22CSD-101

B. Tech in Computer Science and Design

II SEMESTER
22CSD209: Lab.: Basic Electrical Machines

After completion of the laboratory work, student will demonstrate the ability to

1. Perform laboratory experiments and demonstrate competency in collecting, interpreting, analyzing data, communicate and present effectively through laboratory journals

Expt. No.	Name of Experiments
1.	To verify Kirchhoff's voltage law and Kirchhoff's current law.
2.	To study R —L— C series circuit
3.	To verify Superposition theorem.
4.	To study R —L— C parallel circuit.
5.	To study balanced three phase star (Y} connected load.
6.	To perform O.C. and S.C. tests on a single phase transformer
7.	To study balanced three phase delta connected load
8.	To find transformation ratio, regulation and efficiency of a single phase transformer
9.	To study speed control of dc motor.
10.	To study speed control of three phase induction motor.

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22CSD-101

B. Tech in Computer Science and Design

II SEMESTER
22CSD210: Lab.: Engineering Design

Course Outcomes
Upon successful completion of the course the students will be able to
1. Identify different orthographic views using knowledge of geometrical entities.
2. Translating the geometries from 2D to 3D and vice versa.
3. Visualization of models using different rendering effects.
4. Record and Transform part and assembly motion into animation.

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

Expt. No	Name of Experiment
1	**Basic introduction to geometrical entities**
2	**Visualizing different orthographic views for the given 3-D object**
3	**Creation of 3-D to 2-D views using any CAD software**
4	**Creation of 2-D to 3-D objects using any CAD software**
5	**Modification of 3-D objects using special geometrical features**
6	**Creation of realistic representation of models using any CAD software**
7	**Evaluating true-to-life models using textures and appearance effects**
8	**Rendering of models using different environments, lighting conditions, shading effects**
9	**Capturing the motion of parts and assemblies using any CAD software**
10	**Creation of animation and exporting the file to any windows based media software**

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(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

II SEMESTER
Audit Course
MLC2122: YCAP2 -Functional English

MLC2122 YCAP-II	No of Evaluations	Result of successful completion of YCAP II shall be calculated based on the basis of evaluations.
Evaluation Scheme	EVAL-I	**To pass the exam a students must score 50% marks**
	100 marks	

Objective	Objective
The aim of this course is to get the students to a common level in spoken English. The majority of the target group is expected to know English as a foreign/official language. Thus the objective of the course is to make the students comfortable in using it as a spoken language when the situation demands	Students will heighten their awareness of correct usage of English grammar in writing and speaking.

Syllabus Subject: Functional English – 2ⁿᵈ Sem , No. of hours - 20

Unit No.	Topic	Duration
1	Introduction to Functional English - What is FE? And Areas of application. Basic Interactive sentences - Greetings & Replies, Asking for information, Telling people what you do, Asking somebody's opinion, Giving your opinion, Saying someone is correct, Saying that someone is wrong, Apologizing, Praising someone's work, Saying goodbye	2 hours
2	Introduction & Basics of Common Expressions – Offer, Request, Gratitude, Apology Modal Verbs - Words used often : Can- could, Will – would, Shall – should, Ought to-Must, May-might	2 hours
	Practice exercises, Practice Conversations, Script Activity	1.5 Hours
	Quiz on the above Topics, Exercises for Evaluation	0.5 Hours

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Nagar Yuwak Shikshan Sanstha's
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(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

Unit No.	Topic	Duration
3	**Topic: Internet & Social Media Communication** Introduction & Basics to Social Networking, Texting & Instant messaging, Blogs & Discussion Board- discussion with examples, Ethics of Social media & communication	3 Hours
	Topic: Introduction to Creative Ads Why Ads, Whats in it for me?, Characteristics of ads, Assignment	
4	**Topic: Tenses -1** Introduction & Basics, Simple Tense (Past, Present, Future), Continuous Tense (Past, Present, Future) – discussion with examples	4 Hours
	Assignment Presentation on Mad Ads, Quiz on Tenses and Social Media-Internet Communication	

Unit No.	Topic	Duration
5	**Topic: Tenses -2** Introduction & Basics, Perfect Tense (Past, Present, Future), Perfect Continuous Tense (Past, Present, Future) – discussion with examples	3.5 Hours
	Topic: Introduction to Movie Magic Learn English with films, Film Vocabulary, Describing a film, Types of Films,	
6	Topic: Written Communciation Introduction & Basics of Writing, Five methods of communication, Mind your grammar, Commonly confusing words Letters – Format, Parts of a business letter, When does communication fail?, Things to remember, Positive language not negative language, Active voice not passive voice Effective emailing -How to make an effective e-mail, Few common e-mail habits that cause problems, Parts of an e-mail, Some other important aspects	3.5 Hours
	Assessment – Letter and Email Writing, Tenses - Quiz	

Reference Books:	
1.	Soft Skills and Professional Communication, Francis Peters SJ, Mcgraw Hill Education
2.	Bringing out the best in People, Aubrey Daniels, Mcgraw Hill

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/channel/UCLsI5-B3rIr27hmKqE8hi4w
2.	https://www.youtube.com/channel/UC1Y1I4shF84scQ4HBThahcg

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Nagar Yuwak Shikshan Sanstha's
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(Department of Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

II SEMESTER
Audit Course
GE2131: Universal Human Value

Course Outcomes
Upon successful completion of the course the students will be able to 1.Experiential validation through the way to verify right or wrong. 2. Practice living in harmony with natural acceptance. 3. Realize the importance of relationships**.** 4. Recognize the importance of sustainable co-existence in existence.

Unit I: Course Introduction Need, Basic Guidelines, Content and Process for Value Education	**(4 Hrs.)**
Understanding the need, basic guidelines, content and process for Value Education Self Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations	
Unit II: Understanding Harmony in the Human Being - Harmony in Myself!	**(4 Hrs.)**
Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I'	
Unit III: Understanding Harmony in the Family	**(4 Hrs.)**
Understanding Harmony in the family – the basic unit of human interaction Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship Understanding the meaning of Vishwas; Difference between intention and competence Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship	
Unit IV: Understanding Harmony in the Society-	**(4 Hrs.)**
Difference between intention and competence, Understanding the meaning of Samman, Difference between respect and ,differentiation; the other salient values in relationship ,Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sahasttva as comprehensive Human Goals,Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhauma Vyavastha)- from family to world family! ,Practice Exercises and Case Studies will be taken up in Practice Sessions	

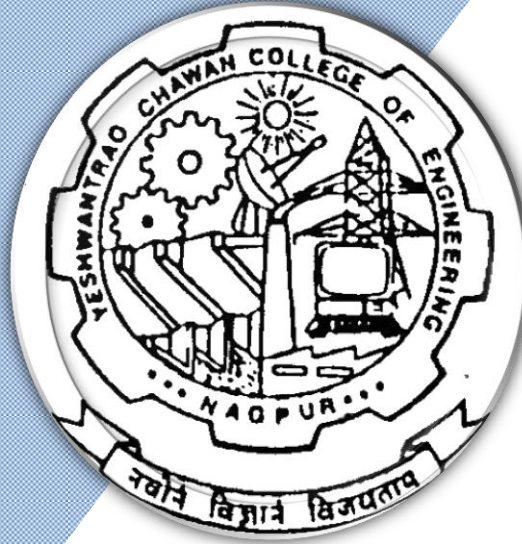|			July 2022	1.00	Applicable for AY 2022-23 Onwards
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Unit V: Understanding Harmony in the Nature -	**(4Hrs)**
Whole existence as Co-existence, Understanding the harmony in the Nature Interconnectedness and mut Practice Exercises and Case Studies will be taken up in the Practice Sessions.ual fulfillment among the four orders of nature- recyclability and self-regulation in nature, Practice Exercises and Case Studies will be taken up in the Practice Sessions.	
Unit VI :Understanding Harmony in the Existence -	**(4Hrs)**
Understanding Existence as Coexistence (Sah-astitva) of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence ,Practice Exercises and Case Studies will be taken up in the Practice Sessions.	

	Total Lecture	**24 Hours**

Textbooks:	
1.	**The primary resource material for teaching this course consists of text book** A foundation course in Human Values and professional Ethics, Excel books, 1st Edition 2011, R.R Gaur, R Sangal, G P Bagaria
2.	

Reference Books:	
1.	**The teacher's manual** A foundation course in Human Values and professional Ethics, Excel books,1st Edition 2011, R.R Gaur, R Sangal, G P Bagaria
2.	

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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 Technology
SoE & Syllabus 2022
3rd Semester

(Department of Information Technology

B. Tech in Computer Science and Design

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 Information Technology)
Computer Science and Design

SoE No.
22CSD-101

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					THIRD SEMESTER										
1	3	BS	GE/GE	22CSD301	Linear Algebra	T	3	1	0	4	4	30	30	40	3
2	3	PC	CSD	22CSD302	Microprocessors and Microcontrollers	T	3	0	0	3	3	30	30	40	3
3	3	PC	CSD	22CSD303	Lab:Microprocessors and Microcontrollers	P	0	0	2	2	1		60	40	
4	3	PC	CSD	22CSD304	Data Structures	T	4	0	0	4	4	30	30	40	3
5	3	PC	CSD	22CSD305	Lab:Data Structures	P	0	0	2	2	1		60	40	
6	3	PC	CSD	22CSD306	Computer System Organization	T	3	0	0	3	3	30	30	40	3
7	3	PC	CSD	22CSD307	Theoretical Foundation of Computer Sciences	T	3	0	0	3	3	30	30	40	3
8	3	PC	CSD	22CSD308	Software Lab-I	P	0	0	4	4	2		60	40	
9	3	PC	CV/CSD	22CSD309	Environmental Sustainability, Pollution and Management	**T**	3	0	0	3	3	30	20	50	3 Hrs
					TOTAL		19	1	8	28	24				

List of Mandatory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	3	HS	GE/T&P	MLC2123	YCAP3 -	**A**	2	0	0	2	0				
2	3	BES	CSD	MLC119	Technical Documentation	**A**	2	0	0	2	0				

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
					FOURTH SEMESTER										
1	4	BS	GE	22CSD401	Discrete Mathematics and Graph Theory	T	3	1	0	4	4	30	30	40	3
2	4	PC	CSD	22CSD402	Operating Systems	T	3	0	0	3	3	30	30	40	3
3	4	PC	CSD	22CSD403	Lab : Operating Systems	P	0	0	2	2	1		60	40	
4	4	PC	CSD	22CSD404	Computer Networks	T	3	0	0	3	3	30	30	40	3
5	4	PC	CSD	22CSD405	Object Oriented Programming	T	3	0	0	3	3	30	30	40	3
6	4	PC	CSD	22CSD406	Lab:Object Oriented Programming	P	0	0	2	2	1		60	40	
7	4	PC	CSD	22CSD407	Design and Analysis of Algorithms	T	3	0	0	3	3	30	10	60	3
8	5	PC	CSD	22CSD409	Lab.:Design and Analysis of Algorithms	P	0	0	2	2	1		60	40	
9	4	PC	CSD	22CSD410	Software Lab-II	P	0	0	4	4	2		60	40	
					TOTAL		15	1	10	26	21				

List of Mandatory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits	MSEs*	TA**	ESE	ESE Duration Hours
1	4	HS	GE/T&P	MLC2124	YCAP4 -	**A**	2	0	0	2	0				
2	4	BES	CSD	MLC120	Open Source Tool for Graphics	**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 activitied decided by course teacher, TA3 - 3 marks on class attendance

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

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(Department of Information Technology)

| SoE No. |
| 22CSD-101 |

B. Tech in Computer Science and Design

III SEMESTER

22CSD301: Linear Algebra

Course Outcomes:

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

1. Solve systems of linear equations using rank of matrix.
2. Determine eigen values and eigen vectors and solve eigen value problems.
3. Explain the concepts of vector space and subspace, span and basis.
4. Apply principles of matrix algebra to linear transformations and inner product.

Unit:1	Elementary matrix operations	6 Hours

Introduction to Matrices and Determinants, Solution of Linear Equations, Cramer's rule, Inverse of a Matrix. **Contemporary Issues related to Topic**

Unit:2	Matrix Algebra	6 Hours

Rank of a matrix, Gaussian elimination, LU Decomposition (Crout's method), Solving Systems of Linear Equations using the tools of Matrices.
Contemporary Issues related to Topic

Unit:3	Diagonalization of matrix	7 Hours

Eigen Values and Eigen vectors, Linear dependence and independence of Eigen Vectors, Orthogonal Eigen vector, Diagonalization of matrix, Cayley-Hamilton Theorem and Sylvester's Theorem.
Contemporary Issues related to Topic

Unit:4	Vector Space	7 Hours

Vector Space, Subspace, Sum of Sub space, linear combination, Linear dependence and independence, Span and basis, Spanning sets, Generators.
Contemporary Issues related to Topic

Unit:5	Linear Transformation	7 Hours

Linear transformation, Ranges and Kernel (null space) of linear transformation, Inverse of linear transformation, Algebra of linear transformation, Singular and non-singular linear transformation. .
Contemporary Issues related to Topic

Unit :6	Inner product Spaces	6 Hours

Inner product space and Norms, orthogonal vector, the Gram Schamidt orthogonalization Process , orthogonal compliment, Adjoint of Linear operator, Normal and self adjoint operator, Unitary and orthogonal operator, Bilinear and Quadratic form .
Contemporary Issues related to Topic

	Total Lecture Hours	39 Hours

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B. Tech in Computer Science and Design

Text books	
1	Erwin Kreyzig, Advance Engineering Mathematics, 9th Edition, John Wiley and Sons, INC.
2	Dr. B. S. Grewal, Higher Engineering Mathematics, 40th edition, Khanna Publisher.
3	H.K. Dass, Advanced Engineering Mathematics, 8th revised edition, S. Chand, Delhi.
4	Hoffman and Kunze, Linear Algebra, prentice Hall of India, New Delhi
5	Glbert Strang, Linear Algebra and its Applications, Nelson Engineering (2007)
6	Swapan Kumar Sarkar, A Textbook of Discrete Mathematics, S.Chand Company Limited, Delhi.
7	Seymour Lipschutz, Linear Algebra, Schaum's Solved Problem Series, McGraw-Hill Book Company.
8	Vijay M. Soni, Mathematics, B.Sc. Semester VI, Himalaya Publishing House.

Reference Books	
1	Chandrika Prasad, Mathematics for Engineers (19th edition), , John Wiley & Sons.
2	L.A. Pipes and Harville, Applied Mathematics for Engineers (3rd edition), McGraw Hill.
3	K.B.Datta, Matrix and Linear Algebra, , Prentice Hall of India.
4	N.P. Bali & Manish Goyal, A textbook of Engineering Mathematics (Reprint 2008), Laxmi Prakashan.

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://nptel.ac.in/courses/111106051
2	https://archive.nptel.ac.in/courses/111/104/111104137/
3	https://archive.nptel.ac.in/courses/111/106/111106135/

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YCCE-CSD-2

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 Information Technology)

SoE No.
22CSD-101

B. Tech in Computer Science and Design

III SEMESTER

22CSD302: Microprocessors and Microcontrollers

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Identify a detailed software & hardware structure of the Microprocessor and microcontroller
2. Determine the addressing modes and instruction sets related to programming of 8086 and 8051
3. Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller.
4. Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.

Unit I: 8086 architecture	**(6 Hrs.)**
Internal architecture & pin diagram of 8086/8088 microprocessor, Minimum & Maximum mode, even & odd memory banks, Accessing memory & I/O ports, Memory mapping in minimum mode.	
Contemporary Issues related to Topic	
Unit II : Programming with 8086/8088	**(7 Hrs.)**
Addressing Modes, Instruction set, Instruction encoding format, Timing diagram Assembler directives, 8086 programming examples, String operations, File I/O processing, Far & Near procedures, Macros	
Contemporary Issues related to Topic	
Unit III: Interfacing with 8086/8088	**(6 Hrs.)**
Memory interfacing, Intel 8255 PPI, Block diagram & interfacing with ADC DAC, Modes & initialization.	
Contemporary Issues related to Topic	
Unit IV	**(6 Hrs.)**
Overview of 8051 Microcontroller family, Introduction to MCS 51 family, Architecture, Memory organization, Internal RAM, Flag Register, Register Banks, SFRs , Functional pin description and various resources of MCS 51. Hardware Overview	
Contemporary Issues related to Topic	
Unit V	**(7 Hrs.)**
Addressing modes, Instruction set and Assembly language programming Programs using look up table, Bit manipulation, 8051 I/O programming, Delay Programs	
Contemporary Issues related to Topic	
Unit VI	**(7 Hrs.)**
I/O Interfacing such as LED, switches, 7segment display, keyboard matrix programming, 8051 programming in C: Data types and time delay, I/O programming, Logic operations, Data conversion programs, Lookup table access.	
Contemporary Issues related to Topic	
	Total Lecture 39 Hours

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Textbooks:	
1.	A.K ray and K.M.Bhurchandani Advanced microprocessors and peripherals 2nd edition 2006 TMH
2.	Muhammad Ali Mazidi The 8051 Microcontroller and Embedded systems using assembly & C 2nd edition Pearson Education Asia LPE

Reference Books:	
1.	K.Uma Rao, Andhe Pallavi The 8051 Microcontrollers, Architecture and programming and Applications Pearson,2009.
2.	Douglas V.Hall Microprocessors and Interfacing: Programming and Hardware Third edition TMH
3.	Kenneth.J.Ayala The 8051 microcontroller 3rd edition Cengage learning,2010

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
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2	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=YqrFeU90Coo
2.	https://www.youtube.com/watch?v=Si9MzFqBs8E
3.	https://www.youtube.com/watch?v=6VF2Q0pgUFI

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B. Tech in Computer Science and Design

III Semester
CSD303 : LAB. Microprocessors and Microcontrollers

Course Outcomes :

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

1. Identify a detailed software & hardware structure of the Microprocessor and microcontroller
2. Determine the addressing modes and instruction sets related to programming of 8086 and 8051
3. Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller.
4. Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.

List of Practical's

Sr. No..	Problem Statements
1	Data block transfer using 8086 microprocessor
2	Find the maximum data byte in a block using 8086 microprocessor
3	Count even numbers present in a data block using 8086 microprocessor
4	Convert packed BCD number to its equivalent Hexadecimal number using 8086 microprocessor
5	Convert gray code into binary code using 8086 microprocessor
6	Generate square waveform using DAC using 8051
7	Generate sawtooth waveform using DAC using 8051
8	To find average of numbers using 8051 microcontroller
9	Toggle LED connected to port pin of micro-controller 8051
10	Display BCD no. on seven segment display

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B. Tech in Computer Science and Design

III SEMESTER

22CSD304 : Data Structure

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Understand basic data structures like array, list, stack, queue, tree, and graph.
2. Develop knowledge of basic data structures such as arrays, linked lists
3. Apply appropriate data structures in problem solving
4. Design application by using data structures and algorithms for real world problems.

Unit I	(6 Hrs.)
Data structures basics, Mathematical /algorithmic notations & functions, Complexity of algorithms, Sub algorithms. Big oh and theta notations and omega notations, Average, best and worst case analysis String processing: storing strings, character data type, string operations, word processing, and pattern matching algorithms.	
Contemporary Issues related to Topic	

Unit II	(7 Hrs.)
Linear arrays and their representation in memory, traversing linear arrays, inserting & deleting operations, sorting Techniques, Linear search and Binary search algorithms. Multidemensional arrays, Pointer arrays. Record structures and their memory representation. Matrices and sprase matrices.	
Contemporary Issues related to Topic	

Unit III	(7 Hrs.)
Linked lists and their representation in memory, traversing a linked list, searching a linked list. Memory allocation & garbage collection. Insertion deletion opeartions on linked lists. Header linked lists, Two-way linked lists. polynomial representations and manipulations are using linked list, circular linked list, doubly linked list, Generalized list.	
Contemporary Issues related to Topic	

Unit IV	(6 Hrs.)
Stacks and their array representation. Arithmetic expressions: Polish notation. Quick sort, an application of stacks, Recursion. Tower of Hanoi problem. Implementation of recursive procedures by stacks, Queues. , Circular queues, Priority Queues, Dequeue	
Contemporary Issues related to Topic	

Unit V	(7 Hrs.)
Trees, Binary trees & and their representation in memory, Traversing binary trees. Traversal algorithms using stacks, Header nodes : threads. Threaded Binary Trees, Binary search trees, searchng, inserting and deleting in binary trees. Applications, The concept of balancing and its advantages, B-Trees, B+ Trees, AVL Trees. Heap and heapsort. General trees.	
Contemporary Issues related to Topic	

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Unit VI	(6 Hrs.)
Graphs and digraphs: Representations, Breadth and depth first searches, connected component, spanning trees, shortest path–single source & all pairs , activity networks, topological sort, Hamiltonian path. Graph theory, sequential representations of graphs, Warshalls' algorithm, Linked representation, operations & traversing the graphs. Posets & Topological sorting. hash functions	
Contemporary Issues related to Topic	
Total Lecture	**39 Hours**

Textbooks:	
1.	Brian W. Kernighan and Dennis M. Ritchie The C Programming Language Prentice Hall of India
2.	E. Balaguruswamy Programming in ANSI C Tata McGraw-Hill
3.	R. G. Dromey How to Solve it by Computer Pearson Education

Reference Books:	
1.	Robert Kruse, G. L. Tondo and B. Leung PHI-EEE Data Structures & Program Design in C
2.	Seymour Lipschutz Data Structures Tata McGraw-Hill
3.	Ellis Horowitz, Satraj Sahni and Susan Anderson-Freed Fundamentals of Data Structures in C W. H. Freeman and Company.

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MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=YqrFeU90Coo
2.	https://www.youtube.com/watch?v=Si9MzFqBs8E
3.	https://www.youtube.com/watch?v=6VF2Q0pgUFI

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B. Tech in Computer Science and Design

III SEMESTER
22CSD305 : Lab. Data Structure

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

1. Comprehend programming constructs like function, array, string, pointer, structure, file and also understand basic data structures like list, stack, queue.
2. Apply appropriate data structures in problem solving.
3. Analyze the performance of operations performed on data structures.
4. Design application by using data structures for real world problems.

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

SN	Experiments based on
1	Write a program to perform following operations on Array. a) Traverse b) Insertion c) Deletion
2	Write a program to implement Sorting and Searching Techniques.
3	Program for allocating memory dynamically for single dimensional array and sort it using quick sort and merge sort.
4	Write a program to implement following Operations in Linked List a) Traverse b) Insertion c) Deletion
5	Write an application to implement Tower of Hanoi Problem Algorithm
6	Write an application to implement Abstract data type stack.
7	Write a program to evaluate Post fix expression using stack.
8	Write a program to implement Preorder Traversal of a binary tree.
9	Program to create file for storing details of all the items needed for playing any game of your choice also perform display, insertion of new record at any location, deletion of any record.
10	Write a Program to Perform insertion or search in a specified level of a stack implemented tree-structured symbol table.

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| 22CSD-101 |

B. Tech in Computer Science and Design

III SEMESTER
22CSD306 : Computer System Organization

Course Outcomes :
Upon successful completion of the course the students will be able to
1. Students will be able to describe fundamentals of computer architecture and organization
2. Students will be able to write control sequence for instructions
3. Students will be able to identify control unit operations and understand performances issue in processor and memory.
4. Students will be able to perform arithmetic operations and describe its storage formats.
5. Students will be able to design main memory organization that uses banks for different word size operations and describe the concept of cache mapping techniques.
6. Students will be able to describe the concept of I/O organization and discuss some advanced methods for improving systems performance.

Unit I	**(7 Hrs.)**
Basic Structure of Computer Hardware and Software: Functional Units, Basic Operational Concepts, addressing methods and machine program sequencing : Memory Locations , addressing and encoding of information, Main memory operation . Instruction Format, limitations of Short word- length machines, High level language considerations	
Contemporary Issues related to Topic	

Unit II	**(8 Hrs.)**
Processing Unit: Some fundamental concepts, Single, two, three bus organization, Instruction set architecture of a CPU – registers, instruction execution cycle, RTL interpretation of instruction, Instruction sequencing, addressing modes.	
Case study – instruction sets of some common CPUs.	
Contemporary Issues related to Topic	

Unit III	**(7 Hrs.)**
Hardwired Control : Design Micro-programmed Control: Microinstructions, Grouping of control signals, Micro program sequencing, Micro Instructions with next Address field, Perfecting microinstruction, Emulation, Bit Slices.	
Case study – design of a simple hypothetical CPU	
Contemporary Issues related to Topic	

Unit IV	**(8 Hrs.)**
Arithmetic: Number Representation, Addition of Positive numbers, Logic Design for fast adders, Addition and Subtraction , Arithmetic and Branching conditions, Multiplications of positive numbers, Signed- Operand multiplication, fast Multiplication, Booth's Algorithm, Integer Division, Floating point numbers and operations.	
Contemporary Issues related to Topic	

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Unit V	(8 Hrs.)
The main Memory: some basic concepts, semiconductor RAM memories, Memory system consideration, semiconductor ROM memories, Multiple module memories and interleaving, Cache Memory, Mapping techniques, Replacement algorithms, write policies Virtual memories, memory management requirements. **Contemporary Issues related to Topic**	

Unit VI	(7 Hrs.)
Computer Peripherals: I/O Devices, I/O device interface, DMA, Interrupt handling Role of interrupts in process state transitions, I/O device interfaces – SCII, USB Introduction to Pipelining, Throughput and speedup, pipeline hazards Introduction to parallel processors. **Contemporary Issues related to Topic**	

	Total Lecture	45 Hours

Textbooks:	
1.	David A. Patterson and John L. Hennessy Computer Organization and Design: The Hardware/Software Interface 5th Edition Elsevier
2.	Carl Hamacher Computer Organization and Embedded Systems McGraw Hill Higher Education 6th Edition
3.	Carl Hamacher Computer architecture and organization McGraw Hill Higher Education 4th Edition

Reference Books:	
1.	John P. Hayes, Computer Architecture and Organization WCB/McGraw-Hill 3rd Edition
2.	by William Stallings, Computer Organization and Architecture: Designing for Performance 10th Edition Pearson Education
3.	Vincent P. Heuring and Harry F. Jordan Computer System Design and Architecture 2nd Edition Pearson Education

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MOOCs Links and additional reading, learning, video material	
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2.	https://www.youtube.com/watch?v=4nEr2Z2tItg
3.	https://www.youtube.com/watch?v=-Bwiv5EGucs

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B. Tech in Computer Science and Design

III SEMESTER
22CSD307 : Theoretical Foundation of Computer Sciences

Course Outcomes :

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

1. To apply basic properties of formal languages & to design Finite automata.
2. To analyze & formulate Regular Expression & Regular Grammar. And analyze & design Turing machine & demonstrate basic concept of Recursive Language
3. Understand Context Free Grammar & Construct CFG for the formal language
4. To apply properties of CFL & design of Push Down automata.
5. To demonstrate the understanding of key notions such as undeciadibility, post Correspondence problem & Recursive enumerable language

Unit I	(5 Hrs.)

Introduction: Alphabet, Symbols, Sets, Strings, Language, Operations, Relations, Finite Automata: Design of Finite Automata, Acceptance of strings and languages, Deterministic Finite Automation , Non-Deterministic Finite Automation, Equivalence between NFA and DFA , NFA with ε-transition, Minimization of FA.
Contemporary Issues related to Topic

Unit II	(5 Hrs.)

Regular sets, Regular expressions, Manipulation of regular expressions, Equivalence between RE and FA. Pumping Lemma for regular languages, closure properties of regular sets, properties of regular languages, Chomsky hierarchy of languages, Regular grammars, Right linear and left linear regular grammars, interconversion, Equivalence between regular grammar and FA, Interconversion between RE and RG.
Contemporary Issues related to Topic

Unit III	(7 Hrs.)

Context free grammar, Derivation trees (Parse tree), Syntax tree , Ambiguous Grammar, Context Free Language (CFL), Closure properties of CFL, Simplification of CFG, Normal Forms of grammar: Chomsky Normal Form (CNF), Greibach Normal Form (GNF), CYK algorithm.
Contemporary Issues related to Topic

Unit IV	(9 Hrs.)

Push down automata, definition and model, acceptance of CFL by empty Stack and by final state, Design of PDA for the CFL, equivalence CFG and PDA,   Inter conversion, DPDA & NDPDA.
Contemporary Issues related to Topic

Unit V	(8 Hrs.)

Turing machine, Definition, Model of TM, Design of Turing Machine, Computable functions, Recursive enumerable language, Recursive Language, Properties of Recursive enumerable language, Variants of Turing machines, non deterministic TMs and equivalence with deterministic TMs, context sensitive language (CSG), Linear bounded automata. **Contemporary Issues related to Topic**

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Unit VI	(6 Hrs.)

Undecidability: Church-Turing thesis, Undecidable Problems related to Recursive enumerable language and Turing Machine, post correspondence problem (PCP), Universal Turing Machine, The universal and diagonalization languages, reduction between languages and Rice's theorem, Recursive function: Basis functions and operations on them. Bounded minimization, unbounded minimization, preemptive recursive function and µ recursive function.

Contemporary Issues related to Topic

	Total Lecture	40 Hours

Textbooks:

1.	John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman T1: Introduction to Automata Theory, Languages and computation Pearson Education Asia 2nd edition, 2000
2.	John C. Martin T2: Introduction to languages and the Theory of Automata Tata McGraw Hill 3rd edition, 2003.

Reference books:

1.	Harry R. Lewis and Christos H. Papadimitriou R1: Elements of the Theory of Computation Pearson Education Asia
2.	Michael Sipser R2: Introduction to the Theory of Computation PWS Publishing
3.	O.G. Kakde R3: Theory of Computation USP 2008

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MOOCs Links and additional reading, learning, video material

1.	https://www.youtube.com/watch?v=xgyI7K6mkAc
2.	https://www.youtube.com/watch?v=9idnQ2C6HfA
3.	https://www.youtube.com/watch?v=G_mCqJakvYk

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III SEMESTER

22CSD308 : Software Lab

Course Outcomes
Upon successful completion of the course the students will be able to
1. Understand the basic data types, built in data structures, control statements and loops and write simple programs in Python
2. To understand the concepts of functions modules and packages and write complex programs using them.
3. To understand defining and handling Python objects and develop classes required for the given application
4. To develop a useful application in Python.

SN	Contents
1	Build-in Data types: Data type & Variables, Python numbers, Python Strings, Python built in data structures: Lists, Dictionaries, Tuples, Sets, Arrays. Datatype conversion. Statements: Assignment statement, import statement, print statement, input statement, Python Control Statements: if, if – else, elif statements, Loop statements: For, while, continue and break, try and except statement, raise, with statements, case statement.
2	The def statement, returning values, parameters, arguments, local variables, global variables and global statement, doc
3	Python Object and Classes: A simple class, defining methods, member variables, The constructor, calling methods, adding inheritance, class variables, class methods and static methods, Interfaces, New-style classes, Doc strings for classes, Private members, Python Operator Overloading, Python inheritance and polymorphism, Exception Handling, Python Modules.
4	Developing applications in Python using built in and customized modules and packages.

Sr.	Topics to be Covered	Sample Problem Statement
1.	Demonstration of Build-in Data types: Data type & Variables, Python numbers	Write a Python program to compute the roots of a quadratic equation
2.	Demonstration of Python Lists.	Write a Python program to perform following operations: Insertion of element in a given list Deletion of element from the given list
3.	Demonstration of different Statements: Assignment statement, import statement, print statement, input statement	Write a Python program to find square root of a number

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4.	Demonstration of control statements: if, if – else, elif statements	Write a Python program to enter day number (1-7) and print the corresponding day of week name using if else. (e.g 5 then Friday)
5.	Demonstration of Loop statements: For, while, break, continue	Write a Python program to print all prime numbers from 1 to 100 (using nested loops, break and continue)
6.	Demonstration of try and except statement, raise, with statements, case statement	Write a Python program which take character as input and determine about vowels and consonants using case statement.
7.	Demonstration of Python Functions: The def statement, returning values, parameters, arguments	Write a Python program using user defined function to find the sum of following series. $1/1! + 2/2! + 3/3! + \ldots\ldots 1/N!$
8.	Demonstration of Python Mathematical Function	Write a Python Program to implement some mathematical functions
9.	Demonstration of Python File Handling	Write a Python program to read data from "Input.txt" file using File Input Class and write output to "Output.txt" using File Output class.
10.	Demonstration of Python Object and Classes: A simple class, defining methods, member variables	Write a program to define a class Employee with four data members such as Emp_name, Emp_id, Salary and department_id. Define appropriate methods to initialize and display the values of data members. Also calculate Gross salary of employee based on Basic Salary, TA, DA and HRA of employee
11.	Demonstration Python inheritance	Create a class Account that stores the customer name, account, number and type of account. From this derive the classes Current-acct and Saving-acct to make them more specific to their requirement. Include necessary methods in order to achieve the following tasks: (a) Accept deposit from a customer and update the balance. (b) Display the balance (c) Compute and deposit interest. (d) Permit withdrawals (e) Check the minimum balance, impose penalty, if necessary and update the balance
12.	Demonstration of Python Exception Handling.	Write a program to implement Exception handling in Python.
13	Building Application	Develop some useful application in Python

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III SEMESTER
22CSD309 : 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, Natural Resources and Sustainable Development	6 Hours
The man-environment interaction; Environmental Ethics and emergence of environmentalism; Overview of natural resources: Definition of resource; Classification of natural resources- biotic and abiotic, water, soil and mineral resources, renewable, and non-renewable energy resources; Introduction to sustainable development: Sustainable Development Goals (SDGs)- targets and indicators, challenges and strategies for SDGs		
Unit:2	Environmental Issues, Conservation of Biodiversity and Ecosystems	6 Hours
Environmental issues and scales: Land use and Land cover change, Global change; Biodiversity and its distribution, Ecosystems and ecosystem services, Threats to biodiversity and ecosystems, National and international policies for conservation.		
Unit:3	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 human health		
Unit:4	Climate Change: Impacts, Adaptation and Mitigation	7 Hours
Understanding climate change, Impacts, vulnerability and adaptation to climate change, Mitigation of climate change		
Unit:5	Environmental Management	7 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 :6	Environmental Treaties and Legislation	6 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	**39 Hours**

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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
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

Chairperson	Dean (Acad. Matters)	Dean OBE	July 2022	1.00	Applicable for
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YCCE-CSD-16

Nagar Yuwak Shikshan Sanstha's

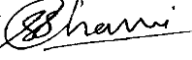# Yeshwantrao Chavan College of Engineering

(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 Information Technology)

**SoE No.
22CSD-101**

B. Tech in Computer Science and Design

Audit Course
III SEMESTER
MLC2123 : (YCAP 3)

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Nagar Yuwak Shikshan Sanstha's
Yeshwantrao Chavan College of Engineering
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SoE No.
22CSD-101

B. Tech in Computer Science and Design

Audit Course
III SEMESTER
MLC119 : Technical Documentation

Course Outcomes :
Upon successful completion of the course the students will be able to
1) Understand the use LaTeX.
2) Write mathematical documents via LaTeX.
3) Writes articles in different journal styles.
4) Draws graphs and figures in LaTeX.
5) Custimize LaTeX documents.
6) Prepare presentation using LaTeX.

Unit I:	**(4 Hrs.)**
Installation of the software LaTeX, Understanding Latex compilation Basic Syntex, Writing equations, Matrix, Tables	
Unit II :	**(3 Hrs.)**
Page Layout – Titles, Abstract Chapters, Sections, Referrences, Equation references, citation.	
Unit III:	**(4 Hrs.)**
List making environments Table of contents, Generating new commands, Figure handling numbering, List of figures, List of tables, Generating index.	
Unit IV :	**(5 Hrs.)**
Packages: Geometry, Hyperref, amsmath, amssymb, algorithms, algorithmic graphic, color, tilez listing.	
Unit V:	**(4 Hrs.)**
Classes: article, book, report, beamer, slides, IEEEtran	
Unit VI:	**(4 Hrs.)**
Applications to: Writing Resume Writing question paper Writing articles/ research papers Presentation using beamer	
Total Lecture	**24 Hours**

Textbooks/ Reference Books :	
1.	LaTeX Beginner's Guide, 2nd Edition by Stefan Kottwitz
2.	A Beginners Guide to Latex by Chetan Shirore
3.	A Guide to LATEX: Document Preparation for Beginners and Advanced Users (3rd Edition) Subsequent Edition, by Helmut Kopka

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=TWRP_94eock
2.	https://www.youtube.com/watch?v=TyTx-BuLFh0

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Bachelor of Technology
SoE & Syllabus 2022
4th Semester

(Department of Information Technology
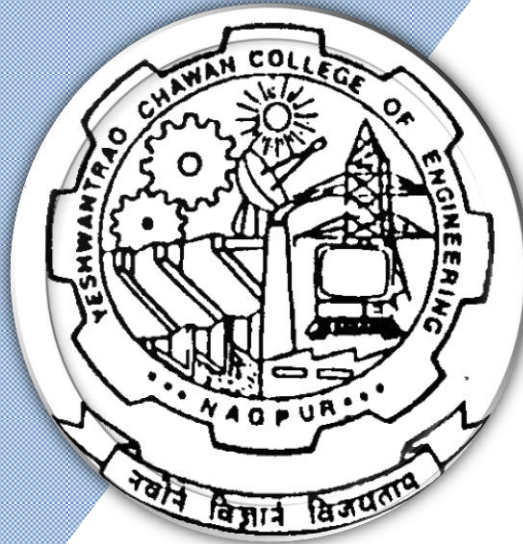
B. Tech in Computer Science and Design

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 Information Technology)
Computer Science and Design

SoE No.
22CSD-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	BS	GE/GE	22CSD301	Linear Algebra	T	3	1	0	4	4	30	30	40	3
2	3	PC	CSD	22CSD302	Microprocessors and Microcontrollers	T	3	0	0	3	3	30	30	40	3
3	3	PC	CSD	22CSD303	Lab:Microprocessors and Microcontrollers	P	0	0	2	2	1		60	40	
4	3	PC	CSD	22CSD304	Data Structures	T	4	0	0	4	4	30	30	40	3
5	3	PC	CSD	22CSD305	Lab:Data Structures	P	0	0	2	2	1		60	40	
6	3	PC	CSD	22CSD306	Computer System Organization	T	3	0	0	3	3	30	30	40	3
7	3	PC	CSD	22CSD307	Theoretical Foundation of Computer Sciences	T	3	0	0	3	3	30	30	40	3
8	3	PC	CSD	22CSD308	Software Lab-I	P	0	0	4	4	2		60	40	
9	3	PC	CV/CSD	22CSD309	Environmental Sustainability, Pollution and Management	**T**	3	0	0	3	3	30	20	50	3 Hrs
					TOTAL		19	1	8	28	24				

List of Mandatory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits				
1	3	HS	GE/T&P	MLC2123	YCAP3 -	**A**	2	0	0	2	0				
2	3	BES	CSD	MLC119	Technical Documentation	**A**	2	0	0	2	0				

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	Contact Hours				Credits	% Weightage			ESE Duration Hours
					FOURTH SEMESTER		L	T	P	Hrs		MSEs*	TA**	ESE	
1	4	BS	GE	22CSD401	Discrete Mathematics and Graph Theory	T	3	1	0	4	4	30	30	40	3
2	4	PC	CSD	22CSD402	Operating Systems	T	3	0	0	3	3	30	30	40	3
3	4	PC	CSD	22CSD403	Lab : Operating Systems	P	0	0	2	2	1		60	40	
4	4	PC	CSD	22CSD404	Computer Networks	T	3	0	0	3	3	30	30	40	3
5	4	PC	CSD	22CSD405	Object Oriented Programming	T	3	0	0	3	3	30	30	40	3
6	4	PC	CSD	22CSD406	Lab:Object Oriented Programming	P	0	0	2	2	1		60	40	
7	4	PC	CSD	22CSD407	Design and Analysis of Algorithms	T	3	0	0	3	3	30	10	60	3
8	5	PC	CSD	22CSD409	Lab.:Design and Analysis of Algorithms	P	0	0	2	2	1		60	40	
9	4	PC	CSD	22CSD410	Software Lab-II	P	0	0	4	4	2		60	40	
					TOTAL		15	1	10	26	21				

List of Mandatory Learning Course (MLC)

SN	Sem	Type	BoS/ Deptt	Sub. Code	Subject	T/P	L	T	P	Hrs	Credits				
1	4	HS	GE/T&P	MLC2124	YCAP4 -	**A**	2	0	0	2	0				
2	4	BES	CSD	MLC120	Open Source Tool for Graphics	**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 activitied decided by course teacher, TA3 - 3 marks on class attendance

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

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Yeshwantrao Chavan College of Engineering
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SoE No.
22CSD-101

B. Tech in Computer Science and Design

IV SEMESTER
22CSD401 : Discrete Mathematics and Graph Theory

Course Outcomes:
Upon successful completion of the course the students will be able to
1. Identify the importance of statements in deriving valid inferences.
2.Use relations and ordering methods to identify the relationship among the inferences.
3.Select suitable algebraic systems to find solution for real time problems.
4.Find the suitable computing methods and applying graph theory concepts to solve complex problems.

Unit:1	**Mathematical Logic and Set Theory**	**6 Hours**

Statement and Notation: Negation, Conjunction, Disjunction, Tautologies, Truth Tables, Basic Concepts of Set Theory, Inclusion & equality of set, Power Set, Ordered Pairs and n-tuples, Operations on Sets, mathematical induction. Propositions, Predicate logic.
Contemporary Issues related to Topic

Unit:2	**Relations and Functions**	**6 Hours**

Relations and Ordering, Relation Matrix and Graphs, Partition and Covering of a set, Equivalence relation, Partial order relation, Partially Ordered sets, Functions, Composition of functions, Inverse Functions, Characteristics function of a set.
Contemporary Issues related to Topic

Unit:3	**Group Theory**	**7 Hours**

Groups, Subgroups and Homomorphism, Cosets and Lagrange's theorem, Normal subgroups. Semi groups and Monoids Homomorphism of semigroups and monoids, Sub semi groups and monoids.
Contemporary Issues related to Topic

Unit:4	**Rings**	**6 Hours**

Definitions and Examples, sub ring, Integral domain, ring homomorphism, ideal of ring polynomial.
Contemporary Issues related to Topic

Unit:5	**Field and Lattices**	**7 Hours**

Definitions and Examples, Finite Field, Ordered sets, Hasse Diagrams of partially Ordered sets. Lattices, Bounded Latices, Complements Latices, Definitions and Examples of Finite Field, Ordered sets, Hasse Diagrams of partially Ordered sets. Lattices, Bounded Latices, Complements Latices.
Contemporary Issues related to Topic

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Nagar Yuwak Shikshan Sanstha's

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22CSD-101

B. Tech in Computer Science and Design

Unit :6	Graph Theory	7 Hours

Basic concepts of graph theory, Basic definitions, Paths and circuits, Reach ability and connectedness, Matrix Representation of graphs, Tree and their representation and operations, Rooted trees, Path lengths in rooted trees, Multi graphs and weighted graphs, and graph isomorphism, shortest paths in weighted graphs, Hypergraphs, transitive closure, Spanning trees, Kruskal's algorithm, Prim's algorithm.

Contemporary Issues related to Topic

	Total Lecture Hours	39 Hours

Text books	
1	J. P. Tremblay & R. Manohar, Discrete Mathematics Structure with application to Computer Science, 23rd re-print,2005,Tata McGraw-Hills Publication Company Limited, New Delhi.
2	Lipschutz Schaums's , Outline series ,Discrete Mathematics, 2nd edition, Tata McGraw-Hills Publication Company Limited, New Delhi.

Reference Books	
1	Bernard Kolman ,Robert C.Busby, Sharon Ross, Discrete Mathematical structures, 3rd edition, 2001 Prentice Hall of India, New Delhi.

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/noc22_ma10/preview
2	https://onlinecourses.nptel.ac.in/noc20_cs82/preview
3	https://nptel.ac.in/courses/111106102

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YCCE-IT-2

Yeshwantrao Chavan College of Engineering

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B. Tech SoE and Syllabus 2022
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(Department of Information Technology)

| SoE No. |
| 22CSD-101 |

B. Tech in Computer Science and Design

IV SEMESTER

22CSD402 : Operating System

Course Outcomes :
Upon successful completion of the course the students will be
1. understand the fundamental concepts in Operating Systems (OS) and understand how various hardware features support OS functionality
2. Explain various OS mechanisms and policies for managing system resources.
3. Analyze algorithms and techniques for managing various OS resources in a multiprogramming and other environments.
4. Evaluate the performance of algorithms for managing various OS resources.

Unit I: Introduction to OS	**(6 Hrs.)**
evolution of OS, basic hardware support necessary for modern operating systems, Layered Structural of OS, Services provided by OS, system calls, Dual mode of operation. Input-output Management : Basics of I/O hardware, Polling, Interrupts and DMA.	
Contemporary Issues related to Topic	
Unit II	**(7 Hrs.)**
Introduction, process control block, process states, process context switch, introduction to threads, CPU scheduling, goals of scheduling, Algorithmic evaluation of CPU scheduling algorithms.	
Contemporary Issues related to Topic	
Unit III	**(6 Hrs.)**
Process cooperation and synchronization, race condition, critical region, mutual exclusion and implementation, semaphores, classic problems of Synchronization using semaphores.	
Contemporary Issues related to Topic	
Unit IV	**(7 Hrs.)**
Access methods, Directory Structure disk space management and space allocation strategies, disk arm scheduling strategies: FCFS, SSTF, SCAN, CSACN, LOOK, CLOOK, Selecting a disk scheduling algorithm.	
Contemporary Issues related to Topic	
Unit V	**(6 Hrs.)**
Contiguous allocation, static and dynamic partitioning, and non-contiguous, paging and segmentation, translation look aside buffer (TLB) and overheads.	
Contemporary Issues related to Topic	
Unit VI	**(7 Hrs.)**
Demand paging, page replacement algorithms, thrashing, working set model. **Deadlocks**: necessary conditions, deadlock detection, deadlock avoidance, deadlock prevention, recovery from deadlock. loss A/c and Balance Sheet	
Contemporary Issues related to Topic	
Total Lecture	**39 Hours**

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B. Tech in Computer Science and Design

Textbooks:
1.	Silberchatz & galvin Operating system concepts 8th Edition
2.	William Staling Operating System 5th Edition

Reference books:
1.	A.S. Tanenbaum Modern operating systems 2nd Edition
2.	Milan MilenKovic Operating system concepts 2nd Edition

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1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material
1.	https://www.youtube.com/watch?v=YwqexcfbucE&list=PLmXKhU9FNesSFvj6gASuWmQd23Ul5omtD
2.	https://www.youtube.com/watch?v=UDPYpf-nsDY
3.	https://www.youtube.com/watch?v=KjTea8sFDiI

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Nagar Yuwak Shikshan Sanstha's

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SoE No.
22CSD-101

B. Tech in Computer Science and Design

IV SEMESTER

22CSD403 : Lab. Operating Systems

Course Outcomes
Upon successful completion of the course the students will be able to
1. Understand the advanced OS commands   2. Understand the working of processes and threads and their synchronization practically.   3. Understand various algorithms and techniques used by OS for managing resources through software simulation.

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

SN	Experiments based on
1	Study of Advanced Linux shell commands (Process management, Memory management, Networking, etc.)
2	Study of Window task manager (about its applications, processes, services, networking, performance etc.)
3	Write a program that illustrates the creation of child process using fork system call. Each child and parent Processes perform different task.
4	Write a multithreaded program to multiply two given matrices.
5	Simulate any two of the following CPU Scheduling Algorithms (One each from preemptive and non-preemptive types) :FCFS, SJF, SRTN, Round Robin, Preemptive priority, Non-preemptive priority
6	Simulate any one of the following Dynamic Memory allocation algorithms First Fit, Best Fit, Worst Fit.
7	Simulate any one of the following Page replacement algorithms:FIFO, LRU, Optimal
8	Write a program to perform Inter-Process-Communication using shared memory OR, pipes OR message queues.
9	Write a program that gives a deadlock and starvation free solution to the Dining philosophers problem using semaphores
10	Write a program to simulate Banker's Deadlock avoidance algorithm.

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SoE No.
22CSD-101

B. Tech in Computer Science and Design

IV SEMESTER
22CSD404 : Computer Networks

Course Outcomes :
Upon successful completion of the course the students will be
1. Explain the functions of the different layer of architectures and Models.
2. Demonstrate basic understanding of hardware, software and types of transmission media used in computer networks.
3. Describe the concept of various protocols used in data link layer.
4. Demonstrate the knowledge of adaptive and no adaptive routing algorithms
5. Demonstrate the concept of Quality of Service provided by the transport layer.
6. Apply basic knowledge cryptography techniques for network security.

Unit I	(6 Hrs.)

The use of computer networks, LAN"s, MAN"s, WAN"s. topologies and their characteristics, wireless networks, protocol hierarchies, design issues for layers, interfaces and services, connection oriented and connectionless services, service primitives relationship of services to protocols.The Network Core ,Packet Switching, Circuit Switching, A Network of Networks ,Delay, Loss, and Throughput in Packet-Switched Networks , Overview of Delay in Packet-Switched Networks, Queuing Delay and Packet Loss,End-to-End Delay,Throughput in Computer Networks, Protocol Layers and Their Service Models, Layered Architecture Encapsulation The OSI reference model. TCP/IP reference model, Comparison of OSI & TCP/IP reference model. **Contemporary Issues related to Topic**

Unit II	(7 Hrs.)

Physical layer: theoretical basis for data communication, Guided transmission media, wireless transmission: electromagnetic spectrum, radio transmission, infrared transmission.
 Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.
Contemporary Issues related to Topic

Unit III	(7 Hrs.)

Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction -
Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control
protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window,
Switched Local Area Networks, Link-Layer Addressing and ARP, Ethernet, Link-Layer Switches,
Virtual Local Area Networks (VLANs)
Contemporary Issues related to Topic

Unit IV	(6 Hrs.)

Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction -
Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control
protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window,
Switched Local Area Networks, Link-Layer Addressing and ARP, Ethernet, Link-Layer Switches,
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Unit V	(6 Hrs.)
Transport Layer: Connection-Oriented Transport: TCP , The TCP Connection Segment Structure , Round-Trip Time Estimation and Timeout , Reliable Data Transfer, Flow Control Connection Management , Principles of Congestion Control, The Causes and the Costs of Congestion, Approaches to Congestion Control , Network-Assisted Congestion, Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm. Performance issues: performance problems in networks, network performance measurement.	
Contemporary Issues related to Topic	
Unit VI	(7 Hrs.)
Application Layer: Principles of Network Applications , Network Application Architectures Processes Communicating 88, Transport Services Available to Applications ,Transport Services Provided by the Internet , Application-Layer Protocols, The Web and HTTP, Overview of HTTP, Non-Persistent and Persistent Connections , HTTP Message Format, User-Server Interaction: Cookies , Web Caching ,The Conditional GET, Firewalls, Network security: cryptography, introduction to symmetric and public key algorithms, digital signatures, authentication protocols, e-mail and web security.	
Contemporary Issues related to Topic	
Total Lecture	**39 Hours**

Textbooks:	
1.	Kurose & Ross computer networking a top-down approach Pearson Prentice Hall 6th Edition
2.	Andrew Tanenbaum Computer Networks Pearson Prentice Hall 5th Edition.
3.	Behrouz Forouzan Data Comminication & Networking TMH 4th Edition (2007).

Reference Books:	
1.	William Stallings Data & Computer Communication PHI 8th Edition.
2.	Douglas Comer Internetworking with TCP/IP Prentice Hall of India 5th Edition.
3.	Behrouz Forouzan TCP/IP protocol Suite TMH 4th Edition.

YCCE e- library book links [ACCESSIBLE FROM COLLEGE CAMPUS]	
1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology/39.Guide%20to%20computer%20network%20security.pdf

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=uSKdjjw5zow
2.	https://www.youtube.com/watch?v=wvPe4Zb0tUA
3.	https://www.youtube.com/watch?v=LdSAaSHfK3M

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IV SEMESTER
22CSD405 : Object Oriented Programming

Course Outcomes :
Upon successful completion of the course the students will be
1. Understand basic features of JAVA as an object oriented-programming language.
2. Write, compile, test and run simple Java programs
3. Write object based programs with object oriented features.
4. Demonstrate the ability to use simple data structures like arrays in a Java program. Use and explain the difference between a String and a StringBuffer object.
5. Demonstrate exceptions that can be recognized and handled by the Java programming language, Understand stream classes, Use it to save and read the data in a file
6. Be able Use Java programming language features to design and create Java applets.

Unit I	**(8 Hrs.)**

OOP concepts: Classes and objects, data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, procedural and object oriented programming paradigm. Java programming: History of java, comments data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow statements, jump statements, simple java stand alone programs, console input and output, formatting output, constructors ,methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection

Contemporary Issues related to Topic

Unit II	**(7 Hrs.)**

Inheritance: Inheritance hierarchies, super and subclasses, member access rules, super keyword, preventing inheritance: final classes and methods, the object class and its methods; Polymorphism: dynamic binding, method overriding, abstract classes and methods; Interface: Interfaces VS Abstract classes, defining an interface, implement interfaces, accessing implementations through interface references, extending interface; Packages: Defining, creating and accessing a package, understanding CLASSPATH, importing packages

Contemporary Issues related to Topic

Unit III	**(8 Hrs.)**

Arrays, Strings Arrays, One Dimensional Arrays, Two Dimensional Arrays, variable size arrays, Strings and String Buffer classes, Wrapper Classes,Collection Vector and Framework: Introduction to collection framework, Vectors, Array List, Linked list, Hashset, Treeset, Hashmap

Contemporary Issues related to Topic

Unit IV	**(8 Hrs.)**

Exception Handling: Benefits of exception handling, the classification of exceptions , exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, rethrowing exceptions, exception specification, built in exceptions, creating own exception sub classes. Multithreading: Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter thread communication.

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(Department of Information Technology)

	SoE No. 22CSD-101

B. Tech in Computer Science and Design

Unit V	(7 Hrs.)

Files: streams, byte streams, character stream, text input/output, binary input/output, random access file operations, file management using file class: Connecting to Database, querying a database and processing the results, updating data with JDBC.

Contemporary Issues related to Topic

Unit VI: Virtual memory	(8 Hrs.)

GUI Programming with Java: The AWT class hierarchy, introduction to swing, swings Vs AWT, hierarchy for swing components. Containers: JFrame, JApplet, JDialog, Jpanel, overview of some swing components: JButton, JLabel, JTextField, JTextArea, simple applications.Layout management: Layout manager types, border, grid and flow.Applets: Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets

Contemporary Issues related to Topic

	Total Lecture	**45 Hours**

Textbooks:	
1.	Bruce Eckel Thinking in Java Prentice Hall

Reference books:	
1.	Herbert Schildt Java2 Complete Reference McGraw-Hill
2.	E. Balagurusamy Programming with Java TATA McGraw-Hill

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1	http://103.152.199.179/YCCE/e-copies%20of%20books/7.Information%20Technology

MOOCs Links and additional reading, learning, video material	
1.	https://www.youtube.com/watch?v=O5hShUO6wxs
2.	https://www.youtube.com/watch?v=7q3zXRuctQ8&list=PLd3UqWTnYXOnT6p6dll1oiKsDu96QGANk
3.	https://www.youtube.com/watch?v=P5tFJ9umhvk

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Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

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SoE No.
22CSD-101

B. Tech in Computer Science and Design

IV SEMESTER
22CSD406 : Lab. Object Oriented Programming

Course Outcomes
Upon successful completion of the course the students will be able to
1. Design, develop, test, and debug programs using object oriented principles using java.

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

Sr. No	Experiments Base On
1.	Introduction of JAVA Programming Environment
1.	Data Types and Control Structures
2.	Class and constructor
3.	Overloading
4.	Overriding
5.	Interface
6.	Arrays and String
7.	Exception
8.	Collection
9.	Applet

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SoE No.
22CSD-101

B. Tech in Computer Science and Design

IV SEMESTER
22CSD407 : Design & Analysis of Algorithms

Course Outcomes :
Upon successful completion of the course the students will be
1. Understand asymptotic analysis of iterative and recursive algorithms, complexity of algorithms.
2. Apply important algorithmic design techniques for problem solving.
3. Analyze the performance of algorithms.
4. Synthesize and design efficient algorithms for real world problems.

Unit I:	(7 Hrs.)

Mathematical foundations, summation of arithmetic and geometric series, recurrence relations, solutions of recurrence relations using technique of characteristic equation and generating functions.
Contemporary Issues related to Topic

Unit II	(6 Hrs.)

Asymptotic notations of analysis of algorithms, analyzing control structures, worst case and average case analysis, amortized analysis, External Sorting, lower bound proof.
Contemporary Issues related to Topic

Unit III	(7 Hrs.)

Divide and conquer basic strategy, quick sort, merge sort etc. Greedy method – basic strategy, application to job sequencing with deadlines problem, minimum cost spanning trees, single source shortest path etc.
Contemporary Issues related to Topic

Unit IV	(7 Hrs.)

Dynamic Programming basic strategy, multistage graphs, all pair shortest path, optimal binary search trees, Matrix-chain Multiplication, traveling salesman problem.
Contemporary Issues related to Topic

Unit V	(7 Hrs.)

Connected components, Branch and bound, Backtracking basic strategy, 8 – Queen's problem, graph coloring, Hamiltonian cycles etc.
Contemporary Issues related to Topic

Unit VI	(7 Hrs.)

NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, Cook's Theorem, decision and optimization problems, polynomial reduction
Contemporary Issues related to Topic

	Total Lecture	**41 Hours**

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B. Tech in Computer Science and Design

Textbooks:
1.	Jon Kleinberg and Éva Tardos Algorithm Design Latest edition pearson
2.	Thomas H. Cormen, Charles E. Leiserson,Ronald L. Rivest, Clifford Stein Introduction to Algorithm 3rd Edition, 2009 MIT press
3.	Brassard, Bratley Fundamentals of Algorithms 1st edition,1995 Prentice Hall
	Steven S. Skiena The Algorithm Design Manual 2nd Edition Springer

Reference books:
1.	Michael Sipser Introduction to the Theory of Computation, 3rd Edition, 2013 Cengage Learning
2.	S. Dasgupta, C. H. Papadimitriou, and U. V. Vazirani Algorithms1^{st} Edition, 2006
3.	Donald E. Knuth The art of Computer programming Vol. 3 2nd Edition, 1998 Addison-Wesley

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2.	https://www.digimat.in/nptel/courses/video/106101060/L27.html

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B. Tech in Computer Science and Design

IV SEMESTER
22CSD408 : Lab. Design & Analysis of Algorithms

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

1. Understand different analysis method and analyze it.

2. Understand different techniques and apply it.

Practical's to be performed from the list as below

Sr. No	Experiments Base On
1.	Implement and analyze different sorting algorithms.
2	Practical Based on Amortized Analysis
3.	Practical Based on Minimum Cost Spanning Tree
4.	Practical Based on An Activity Scheduling Problem
5.	Practical Based on Single Source Shortest Path
6.	Practical Based on Dynamic Programming
7.	Practical Based on divide and conquer

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22CSD-101

B. Tech in Computer Science and Design

IV SEMESTER
22CSD409 : Lab. : Software Lab II

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

1. Understand the basic data types, built in data structures, control statements and loops and write simple programs in C#.
2. To understand the concepts of functions modules and packages and write complex programs using them.
3. To understand defining and handling C# objects and develop classes
4. To develop a useful application in C#.

Minimum Eight Practical's to be performed from the

Sr. No	Experiments Base On
1.	Implementing Edit Functionality for the Students List
2	Creating Methods, Handling Exceptions, and Monitoring Applications
3.	Extending the Class Enrolment Application Functionality
4.	Basic types and constructs of Visual C#
5.	Writing the Code for the Grades Prototype Application
6.	Creating Classes and Implementing Type-Safe Collections
7.	Adding Data Validation and Type-Safety to the Application
8.	Creating a Class Hierarchy by Using Inheritance
9.	Refactoring Common Functionality into the User Class
10.	Reading and Writing Local Data, Accessing a Database
11.	Implementation of an application for the given problem statement using Python using built in and customized modules and packages

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B. Tech in Computer Science and Design

Audit Course
IV SEMESTER
MLC124: (YCAP 4)

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B. Tech in Computer Science and Design

Audit Course
IV SEMESTER
MLC120 : Open Source Tool for Graphics

Course Outcomes :

Upon successful completion of the course the students will be able to
1. know different Open Source Tools for Graphics Design
2. understand features and usage of different Open Source Tools for Graphics Design
3. Use the tools for different graphics designing problems in real time situations.

Unit I: Canva	(4 Hrs.)
Usage, Features, Curved Text Generator, Photo Effects, Image Enhancer, Font Pairing, Colour Wheel	
Unit II : Inkscape	**(3 Hrs.)**
As drawing and painting tool, Professional vector graphics editor, Scalable Vector Graphics (SVG), Objects creation and manipulation, Fill and stroke, Rendering, Text editing and operations on path, Working with shape tools, Text tool, Object manipulation (transformations, grouping objects, layers).	
Unit III: Krita	**(4 Hrs.)**
Featured digital painting application, Illustrations, Comics, Animations, Concept art Or Storyboards, Animation with Onion Skinning, Comic book project management	
Unit IV : Blender	**(5 Hrs.)**
Open Source 3D creation suite, 3D pipeline- modelling, Sculpting, Rigging, 3D and 2D animation, Simulation, Rendering, Compositing, Motion Tracking And Video Editing.	
Unit V: Gravit Designer	**(4 Hrs.)**
Anchors, Auto-layouts, Bleed, Blending, Booleans, Effects (shadows, overlays, mirror, etc.), Fills, Frame text tool, Google Fonts, Grids, Knife tool, Layers, Path graphs, Pen shapes, SVG editing tool, Templates, Text editing, Text engine	
Unit VI: GIMP	**(4 Hrs.)**
Compatibility of the system, Painting with GIMP, Manipulation techniques, File format supported.	
	Total Lecture **24 Hours**

Textbooks/ Reference Books :	
1.	Grid systems in graphic design' by Josef Müller-Brockmann
2.	hinking with Type by Ellen Lupton,2nd Edition
3.	100 Ideas That Changed Design by Peter Fiell & Charlotte Fiell

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2.	https://www.youtube.com/watch?v=vkSOIkNWCww

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