JAIDEV EDUCATION SOCIETY'S
J D COLLEGE OF ENGINEERING AND MANAGEMENT
KATOL ROAD, NAGPUR
Website: www.jdcoem.ac.in E-mail: info@jdcoem.ac.in
An Autonomous Institute, with NAAC "A" Grade
Basic Science and Humanities Department
2022-23 (Odd Sem)

VISION	MISSION
To lay a robust foundation for the institute to reach its zenith.	The department is making its paramount efforts, 1. Achieving academic excellence through rigorous teaching, learning and evaluation practices. 2. To develop an ability to apply knowledge of basic science and mathematics to excel in the field of engineering. 3. To provide salutary environment for the betterment of faculty and students.

Teaching Plan

Course: B. Tech. All Branches	Year/Semester : First Year/Sem I	
Name of the Teacher :Mrs.P.M.Parkhi	Subject Code : MA1T001	
Subject : Statistics and Difference Calculus	Section :ME/Civil/EE/ETC	
Periods per Week (each 60 min)	Lecture	3
	Tutorial	1
	Practical	-

Course Objective	Course Outcomes
1. To understand the application and importance of Mathematics in engineering and in real life. 2. To know and apply the concept of ordinary derivative, partial derivatives and their applications to Maxima/ Minima.	At the end of the course students will be able to 1. Describe rank, Bernoulli's theorem, Taylor's and McLaren's theorems for functions of two variables, – Euler's Theorem for functions containing two and three variables, Cauchy's equation, Lagrange's theorem. 2. Illustrate the examples of first and higher order ordinary differential equation, Taylor's and

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3. To understand Computation of Jacobin of functions of several variables and their applications to engineering problems	McLaren's series, matrices, total derivative. 3. Apply the matrix technique (Linear algebra) to find solutions of system of linear equations, ordinary and partial differential equation to mechanical and electrical systems arising in many engineering problem. 4. Analyze questions related to exact differential equation, Jacobin of function of several variable, consistency of equations, change of variable and their applications. 5. Interpret rank of matrices, solution of first and higher order differential equations with constant and variable coefficients, homogeneous functions and Jacobin. 6. Design a method or modal on matrices, ordinary differential equation and partial differential equation and their applications.

Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no)	Reference Book (Page no)	URL's (NPTEL/Online Material/PPT/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapping
UNIT-I - Linear Algebra- Matrices										
1	1	1.1	Introduction of Determinants: Definitions, properties of determinant, finding determinant	Day 1	T1/475	R1/913-917	https://nptel.ac.in/courses/111/108/111108098/# (32.20 min)(0:00-20:00)	P1	**Students should be able to** understand the concept of Determinant	CO2
2	2	1.2	Introduction of Matrices: Definition, properties, history, applications	Day2	T2/711	R1/969-970	https://nptel.ac.in/courses/111/105/111105121/ (28.17 min)(10:00-15:14)	P2	Understand the concept of Matrices	CO2
3	3	1.3	Inverse of Matrix by adjoint method:	Day 3	T1/49	R1/971-972	https://www.youtube.com/watch?v=Rcic2	P2	Find inverse of matrix by adjoint method	CO3

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			Meaning of inverse, adjoint method, examples		2		zJpSVs (6.11 min)			
4	4	1.4	Inverse by partitioning method: Partition of matrix, condition for partitioning, partitioning method	Day 4	T1/486-487	R1/918-920	https://www.youtube.com/watch?v=g8HevtIgG2A (11.45 min)	P3	Find inverse of matrix by adjoint method	CO3
5	5	1.5	Examples of inverse of matrix by partition method	Day 5	T2/723-726		https://www.youtube.com/watch?v=g8HevtIgG2A (11.45 min)	P3	Solve inverse of matrix	CO3
6	6	1.6	solution of system of linear equations: Classification , method to find the solution of linear equations, examples	Day 6	T2/727-729		https://nptel.ac.in/courses/111/105/111105121/ (28.17 min)(0:00-15:00)	P3	Classify linear and nonlinear equations Solve system of linear equations	CO4
7	7	1.7	Rank of Matrix: Definition, meaning, reduction method	Day 7	T1 and T2/497 and 730-732	R1/966-969	https://nptel.ac.in/courses/111/105/111105121/ (28.17 min)(10:00 - 25:00)	P3	Understand rank of matrix	CO2
8	8	1.8	examples of Rank of Matrix	Day 8	T1 and T2/497 and 730-732		https://nptel.ac.in/courses/111/105/111105121/ (28.17 min)	P3/C5	Evaluate rank of matrix	CO5

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9	9	1.9	Consistency of linear system of equation: Definition, method to find solution, examples	Day 9	T1 and T2/497 and 730-732		https://nptel.ac.in/courses/111/105/111105121/ (28.17 min)	P3	to apply reduction method to system of equations	CO3
UNIT : II Ordinary Differential Equations of First Order and First Degree and Their Applications										
10	10	2.1	Linear Equation: Definition, Integrating factor, method, examples	Day 10	T1/135	R1/22-24	https://nptel.ac.in/courses/111/107/111107111/ (35.38 min)	P5	Recall linear equation Solve linear equation	CO1, CO3
11	11	2.2	Bernoulli's equation: Integrating factor method	Day 11	T2/476-478	R1/22-26	https://nptel.ac.in/courses/111106100 (24.30 min)	P5	Identify Bernoulli's equation	CO3
12	12	2.3	Solve Problems of Bernoulli's equation	Day 12	T2/476-478	R1/22-26	https://nptel.ac.in/courses/111106100 (24.30 min)	P5	Evaluate Bernoulli's equation	CO5
13	13	2.4	Exact differential equation: definition, necessary condition, integrating factor	Day 13	T1/149	R1/27-30	https://nptel.ac.in/courses/111106100 (24.30 min)(0:00 to 15:00)	P6	Identify exact differential equation	CO3
14	14	2.5	problems Exact differential equation	Day 14	T1/149	R1/27-30	https://nptel.ac.in/courses/111106100 (24.30 min)	P6	Determine solution of exact differential equation	CO3
15	15	2.6	equations reducible to exact equations: Case I, Case II, Case III, case IV, case V	Day 15	T2/478-484	R1/31-32	https://nptel.ac.in/courses/111106100/8 (24.30 min)	P6	Distinguish between the cases and evaluate accordingly	CO3

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16	16	2.7	Application to orthogonal trajectory: Center of mass, gravity	Day 16	T1/166-168	R1/53-55	https://www.youtube.com/watch?v=FMLTSDqwEIU (8.36 min)	P7	Explain orthogonal trajectory	CO2
17	17	2.8	Examples on orthogonal trajectory	Day 17	T1/166-168	R1/55-57	https://www.youtube.com/watch?v=3sRj23qOdKU (0.58 min)	P7	Apply the knowledge of differential equation to orthogonal trajectory	CO3
18	18	2.9	Application to physical and electrical systems: Eclectic circuit, Kirchhoff's law, Newton's law of cooling	Day 18	T2/504-510	R1/46-52	https://www.youtube.com/watch?v=e7p_VNRSSc4 (7.16 min)	P7/C1	Apply the knowledge of differential equation to physical and electrical system	CO3
UNIT: III LINEAR DIFFERENTIAL EQUATIONS WITH CONSTANT COEFFICIENTS										
19	19	3.1	Introductory remark: Definition, degree, order	Day 19	T1/168-169	R1/73-74	https://nptel.ac.in/courses/111107098/3 (28.17 min)(0:00-21:00)	P8	Find order and degree of given equation	CO3
20	20	3.2	Complementary function, Particular integral	Day 20	T1/170	R1/75-76	https://nptel.ac.in/courses/111107098/4 (28.17 min) https://nptel.ac.in/courses/111107098/6 (28.17 min)	P8	Define C.F. and P.I.	CO1
21	21	3.3	Rules for finding	Day 21	T2/51	R1/73-74	https://nptel.ac.in/co	P8	Classify the cases of	CO4

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			complementary function: Case I to Case IV		2-520		urses/111107098/14 (28.17 min)		C.F	
22	22	3.4	Rules for finding particular integral	Day 22	T2/521-531	R1/75-76	https://nptel.ac.in/courses/111107098/15 (28.17 min)(0:00-10:00)	P8	Classify the cases of P.I.	CO2
23	23	3.5	Examples Solve Rules for finding particular integral	Day 23	T2/521-531	R1/75-76	https://nptel.ac.in/courses/111107098/15 (28.17 min)	P8	Illustrate the examples	CO2
24	24	3.6	Method of variation of parameter: integrating factor	Day 24	T1/186	R1/82-84	https://nptel.ac.in/courses/111107098/11 (28.17 min)(05:00-15:00)	P9/C2	Explain method of variation of parameter	CO2
25	25	3.7	Solve problems Method of variation of parameter	Day 25	T1/186	R1/82-84	https://nptel.ac.in/courses/111107098/11 (28.17 min)	P9	Find the complete solution of a differential equation with constant coefficients by variation of parameters	CO3
26	26	3.8	Legendre's linear equations : Standard form of equation,method	Day 26	T3/205-206		https://www.youtube.com/watch?v=MFswwWZpyio (5.00 min)	P9	Explain Legendre's equation	CO2

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27	27	3.9	Examples on Legendre's linear equations	Day 27	T4/4.45-4.47		https://www.youtube.com/watch?v=CVij36N7q4A (18.06 min)	P9/C3	Illustrate examples on Legendre's linear equation	CO3
UNIT-IV PARTIAL DIFFERENTIATION EQUATION										
28	28	4.1	Partial derivatives of first orders: Definition, examples	Day 28	T1/851	R1/589	https://youtu.be/AWVCi5kgovM (58.37 min)(0:00 - 12:10)	P10	Understand the Partial derivatives of first orders	CO2
29	29	4.2	Partial derivatives of Higher orders: definition, examples	Day 29	T2/435	R1/589	https://youtu.be/FU-7xJLpoWg (42.24 min)(0:00-13:00)	P10	Understand the Partial derivatives of Higher orders	CO2
30	30	4.3	Examples of Partial derivatives of first and higher orders	Day 30	T2/436-444	R1/589-590	https://youtu.be/FU-7xJLpoWg (42.24 min)(13:00-42.24)	P10/C2	solve examples on partial derivatives	CO3
31	31	4.4	Introduction of Homogeneous functions	Day 31	T2/439-443	R1/589-590	https://youtu.be/uSvaMdZjgd8 (7.58 min)		Understand the concept of Homogeneous functions	CO2
32	32	4.5	Homogeneous functions – Euler's Theorem for functions containing two and three variables	Day 32	T1/861-863	R1/589-590	https://youtu.be/RK5zs0OzS4M (12.38 min)	P11	Identify homogeneous function	CO3

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33	33	4.6	Total derivatives	Day 33	T1/861-863	R1/591-593	https://youtu.be/Kdd9h1lFTA8 (14.46 min)	P11/C3	Understand Total derivatives	CO2
34	34	4.7	Examples on Total derivatives	Day 34	T2/449-453	R1/609-613	https://youtu.be/jAUGXLWOyKM (7.45 min)	P11/C4	Simplify examples on total derivatives	CO4
35	35	4.8	Change of variables	Day 35	T2/449-453	R1/609-613	https://youtu.be/wtY5fx6VMGQ (26.58 min)	P11	Understand Change of variables	CO2
36	36	4.9	Examples on Change of variables	Day 36	T2/449-455	R1/609-613	https://youtu.be/wtY5fx6VMGQ (26.58 min)	P11	solve Change of variables	CO3
UNIT: V Applications of Partial differentiation										
37	37	5.1	Introduction of Jacobins: definition, basic concept,formula	Day 37	T1/372-401	R1/500	https://www.youtube.com/watch?v=1M4RzBUS73k (4.30 min)	P10	understand Jacobins	CO2
38	38	5.2	Properties of Jacobins: three portieres, meaning, use in examples	Day 38	T2/351-362	R1/510	https://youtu.be/Z_NUUsbybZU (15.22 min)	P10	Identify properties of Jacobins	CO3
39	39	5.3	Introduction of Taylor's theorems (without proofs) for	Day 39	T4/8.2	R1/510	https://youtu.be/wMd4YRyBmjA (50.12 min)(0:00-	P10	Understand Taylor's theorems for functions of two	CO2

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			functions of two variables: statement, history, meaning				25:00)		variables	
40	40	5.4	McLaurin's theorems (without proofs) for functions of two variables: statement,meaning, history	Day 40	T4/8.4	R1/510	https://youtu.be/wMd4YRyBmjA (50.12 min)(25:00-50:12)	P11	Understand McLaren's theorems for functions of two variables and solving problems	CO2
41	41	5.5	Solving Problems of Taylor's and McLaurin's theorems (without proofs) for functions of two variables	Day 41	T4/8.6	R1/511-512	https://youtu.be/4Z0DjTdVXxg (11.47 min)	P11/C4	Apply Taylor's and McLaren's theorem for solving examples	CO3
42	42	5.6	Introduction of Maxima and minima of functions of two variables: maxima, minima, physical interpretation	Day 42	T4/8.10	R1/512-515	https://youtu.be/Em5EUstK8Rw (27.27 min)	P11	understand Maxima and minima of a function	CO2
43	43	5.7	Solving ProblemsMaxima and minima of functions of two variables	Day 43	T3/414-421		https://youtu.be/NpR91wexqHA (24.59 min)	P11	Find Maxima and minima function	CO3
44	44	5.8	Introduction of Lagrange's method of undetermined multipliers.: Multi[tiers, Lagrange's	Day 44	T3/421-423		https://youtu.be/xjUcaH6dCN0 (50.2 min)(0:00-15:00)	P11	Understand concept of Lagrange's method of undetermined multipliers	CO2

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			multipliers,formul a, method							
45	45	5.9	Solving Problems Lagrange's method of undetermined multipliers	Day 45	T3/42 1-423		https://youtu.be/xjUc aH6dCN0 (15:00-50.2) (50.2 min)	P11	Illustrate Lagrange's method of undetermined multipliers and solve problems.	CO3

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 45

Total number of lectures as per planned: - 45

Tutorial Plan			
Week	Topic	No. Of Problems	Mapped With CO
1	Inverse of Matrix by adjoint method	02	II
2	Solutions of system of linear equations	03	III
3	first order ordinary differential equation	04	II
4	Equations reducible to exact equations	04	IV
5	Variation of parameter	03	II
6	Partial derivatives of first and higher orders	03	II
7	Taylor's and McLaurin's theorems for functions of two variables	03	I

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8	Change of variable	05	IV
9	Jacobin of function of several variable	02	IV
10	Total derivative	04	II
11	Lagrange's theorem	03	I

Assignment Plan

Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1	Rank of Matrix			V
2	Application to physical and electrical system			III

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	Application of matrices in Engineering problem		I,III
2	Lagrange's Method of Multiplier		I, II, III

Text Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Advance Engineering mathematics,	H.K.Das	S.chand publication	19th edition
T2	Higher Engineering Mathematics	Dr.B.S.Grewal,	Khanna publication	40th edition
T3	Advance Engineering mathematics	Erwin Kreyszing	Wiley Publication,	8th edition
T4	Engineering Mathematics I	Dr.N.S.Mujumdar	Niral Publication	1th edition

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Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
R1	Advance Engineering mathematics	Peter V. O'Neil	Thomson publication	Sixth edition

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Intel	www.intel.in	It is the world's largest and highest valued semiconductor chip manufacturer based on revenue, and is the inventor of the x86 series of microprocessors, the processors found in most personal computers (PCs).
C2	Kotak Mahindra bank Ltd.	www.kotak.com	It is bank in India. Kotak Mahindra Bank offers high interest rate savings account, low interest rate personal loan and credit cards with attractive offers. The business analyst uses the differential equation.
C3	NASA	www.nasa.gov	The National Aeronautics and Space Administration is an independent agency of the U.S. Federal Government responsible for the civilian space program, as well as aeronautics and space research. They use mathematics like differentiation and integration in many of their projects.
C4	National Commodity and Derivatives Exchange (NCDEX)	www.ncdex.com	A commodity market is a market that trades in the primary economic sector rather than manufactured products, such as cocoa, fruit and sugar. Hard commodities are mined, such as gold and oil. Work in derivatives pricing in the energy and commodity markets at India.
C5	Global logic	www.globallogic.com	Global Logic is a Digital Product Engineering Services company that was founded in 2000 and is headquartered in San Jose, California. This IT company also uses matrices as data structures to track user

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			information, perform search queries, and manage databases.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume /Page no/Year
P1	On the Dual Real Value nature of Complex Number	P.Harsha	International Journal if Scientific an Engineering Research volume3	ISSN2229-5518	December2012
P2	DE-MOIVRE'S FORMULA FOR MATRICES OF QUATERNIONS	MEHDI JAFARI1,∗ , HAMID MORTAZAASL2 and YUSUF YAYLI3	JP Journal of Algebra, Number Theory and Applications		May 11, 2011 Volume 21, Number 1
P3	Some New Wilker-Type Inequalities for Circular and Hyperbolic Function	Ferhan Atici	Abstract and Applied Analysis Hindawi	Article ID 485842	11 May 2009
P4	Convergent solutions of ordinary linear homogeneous differential equations in the neighborhood of an irregular singular point	H. L. Turrittin	Acta Mathematica	ISSN: 0001-5962 (Print) 1871-2509 (Online)	December 1955, Volume 93, Issue 1, p p 27–66
P5	First order ordinary differential equations with several periodic solutions	Jean Mawhin	Zeitschrift für angewandte Mathematik und Physik	ISSN: 0044-2275 (Print) 1420-9039 (Online)	March 1987, Volume 38, Issue 2, p p 257–265
P6	Exact solutions for nonlinear partial fractional differential equations	Khaled A. Gepreel[1]	Chinese Physics B	doi:10.1088/issn.1674-1056	Volume 21, Number 11

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P7	Some Differential Properties of the Orthogonal Trajectories of a Congruence of Curves, with an Application to Curl and Divergence of Vectors	Reginald A. P. Rogers	Proceedings of the Royal Irish Academy. Section A: Mathematical and Physical Sciences	**ISSN:** 00358975	Vol. 29 (1911/1912), pp. 92-117
P8	Hypoelliptic second order differential equations	Lars Hörmander	Acta Mathematica	ISSN: 0001-5962 (Print) 1871-2509 (Online)	December 1967, Volume 119, Issue 1, pp 147–171
P9	The Legendre wavelet method for solving fractional differential equations	Mujeeb ur Rehma	Communications in Nonlinear Science and Numerical Simulation By Elsevier	ISSN:**1007-5704**	Volume 16, Issue 11, November 2011, Pages 4163-4173
P10	Fourier series expansion of the transfer equation in the atmosphere-ocean system	J.L. Deuzé	Elsevier/Journal of Quantitative Spectroscopy and Radiative Transfer	ISSN: 0022-4073	Volume 41, Issue 6, June 1989, Pages 483-494
P11	On the Convergence Rate of Generalized Fourier Expansions	K. O. MEAD	*IMA Journal of Applied Mathematics*	Online ISSN 1464-3634 Print ISSN 0272-4960	Volume 12, Issue 3, 1 December 1973, Pages 247–259

Ms.P.M.Parkhi
Subject Teacher

Dr.U.V.Rathod
Academic Incharge

Dr. A.N.Gupta
Head of Department,FY

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Education to Eternity	JAIDEV EDUCATION SOCIETY'S **J D COLLEGE OF ENGINEERING AND MANAGEMENT, KATOL ROAD, NAGPUR** Affiliated to Dr. BabasahebAmbedkar Technological University, Lonere An Autonomous Institute, with NAAC "A" Grade Basic Science and Humanities Department 2022-23 (Even Sem)	।।ज्ञानम् सर्वार्थ साधनम्।।

VISION	MISSION
To lay a robust foundation for the institute to reach its zenith.	The department is making its paramount efforts, 1. Achieving academic excellence through rigorous teaching, learning and evaluation practices. 2. To develop an ability to apply knowledge of basic science and mathematics to excel in the field of engineering. 3. To provide salutary environment for the betterment of faculty and students.

Teaching Plan

Course : B. Tech in Civil Engineering	**Year/Semester :II**nd Semester (1st Year)	
Name of the Teacher : Dr. U.V.Rathod	**Subject Code :**CE2T005	
Subject : Engg. Physics	**Section :Civil (B)**	
Periods per Week (each 60 min):	**Lecture**	**3**
	Tutorial	**1**
	Practical	**2**

Course Objective

1. To provide a firm grounding in the basic physics principles and concept to resolve many Engineering and technological problems.
2. To understand and study the Physics principles behind the developments of Engineering materials.
3. To provide problem solving experience and learning of concepts through it in engineering physics, in both the classroom and the laboratory learning environment.

Course Outcomes

Students should be able to:

CO1. Describe the concept of LASER, optical fiber, types of semiconductors, PN junction diode characteristics, transistor action, wave optics, electron Ballistics, quantum mechanics, various crystal structure parameters &X-rays.

CO2.Elaborate the types of LASER, optical fiber, Semiconductors, crystalstucture, formation of Newton's ring, fringes in wedge shape thin film, effect of electric and magnetic field on motion of charge particle and significance of quantum mechanics. .

CO3. Apply the concept of three and four level in LASER production, TIR in Optical fibre, classify the type of material based on current conduction, Bragg's law and X-ray diffraction, of Interference for advanced application , illustrate the wave particle dualism of matter waves, motion and charged particle in E and B.

CO4. Analyze the behavior of PN junction diode in FB and RB, compare the different types of LASER and optical fiber, correlate the motion of charged particles in uniform electric and magnetic fields for e/m determination, the formation of fringes in thin film, behavior of wave function and the types of crystal.

CO5. Justify physical significance of wave function, HUP, Schroedinger's wave equations, application of Hall effect, LASER & Optical Fibre, Wave Optics, Electron Ballistics and interpret the various crystal structure.

CO6. Design devices by using the concept of Laser, optical fibre, Electron ballistics, Semiconductor crystals structure, wave optics and quantum mechanics.

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Affiliated to Dr. BabasahebAmbedkar Technological University, Lonere

An Autonomous Institute, with NAAC "A" Grade

Basic Science and Humanities Department

2022-23 (Even Sem)

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Sr. No	Lec No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/PPt/ Video)	Applications (R&D/ Industry)	Learning Outcomes	CO mapping
Unit 1 – LASER & Optical Fibre									
1	1	1	Introduction, Interaction of Radiation with Matter	Day 1	T1 (Pg : 393)	https://nptel.ac.in/courses/104/104/104104085/ https://www.youtube.com/watch?v=yQ0lMSNuj_o	P3	Students learn the basic of quantum mechanics	CO1,CO2, CO3,CO4
2	2	2	Metastable State, Population Inversion and & Thermal Equilibrium	Day 2	T1 (Pg : 393)	https://nptel.ac.in/courses/104/104/104104085/ https://www.youtube.com/watch?v=xsq9Yqwrh2w	P3	Students understand the essential requirement for laser formation	CO1,CO2, CO3,CO4
3	3	3	Pumping, Three and four level LASER, Optical resonance cavity, Ruby LASER	Day 3	T1 (Pg : 399)	https://www.youtube.com/watch?v=xsq9Yqwrh2w	P3	Students learn the working of	CO1,CO2,CO3,CO4,CO6
4	4	4	He-Ne LASER, Properties of LASER, Engineering applications of laser.	Day 4	T1 (Pg : 403,413)	https://www.youtube.com/watch?v=RyY4PEpV2RQ	P3/C1	Students understand the He-Ne Laser & learn use of Laser beam in various	CO1,CO2,CO3,CO4,CO6

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								field	
5	5	5	Propagation by total internal reflection, structure and classification (based on material, refractive index and number of modes), Modes of propagation in fiber	Day 5	T1 (Pg : 690-692)	https://www.youtube.com/watch?v=4i7maoqVcaY	P5	Student understand principle of optical fiber	CO1,CO2, CO3,CO4
6	6	6	Acceptance angle derivation , Numerical aperture	Day 6	T1 (Pg : 695)	https://www.youtube.com/watch?v=gIGOXNlvMsg	P5	Student will solve the problem of Numerical aperture of optical fiber	CO1,CO2, CO3,CO4,CO5
7	7	7	Attenuation and dispersion, Applications of Optical fibres	Day 7	T1 (Pg:701-705)	https://www.youtube.com/watch?v=4i7maoqVcaY https://www.youtube.com/watch?v=gIGOXNlvMsg	P5/C2	Student will know about the application of Optical Fiber	CO1,CO2, CO3,CO4,CO5,CO6
Unit 2 – Semiconductor Physics									
8	8	8	Band-theory based classification of solids into insulators, semiconductors and conductors	Day 8	T1 (Pg : 498-502)	https://nptel.ac.in/courses/115102025/	P1	Student learn the concept of conductors, semiconductors and Insulators	CO1,CO2, CO3,CO4
9	9	9	Fermi-Dirac distribution Function, Intrinsic semiconductors , Fermi-	Day 9	T1 (Pg : 498-502) (Pg : 511-515)	https://nptel.ac.in/courses/115102025/	P2	Students learned the Fermi-Dirac Function &	CO1,CO2, CO3,CO4

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			energy, Typical energy band diagram of an intrinsic semi-conductor			https://www.youtube.com/watch?v=hF7N4Q0O6bg		Fermi Level in semiconductors	
10	10	10	Typical energy band diagram of an Extrinsic semiconductors	Day 10	T1 (Pg : 511-515)	https://www.khanacademy.org/...semiconductors/...band-theory-of-sol		Student understand doping methods in semiconductors	CO1,CO2, CO3,CO4
11	11	11	Current conduction in semiconductors, PN-junction diode;	Day 11	T1 (Pg : 556-570)	https://nptel.ac.in/courses/108/108/108108122/		Students learn about the current conduction in semiconductors	CO1,CO2, CO3,CO4
12	12	12	Unbiased, Forward baised& Reverse biased mode with energy band diagram	Day 12	T1 (Pg : 556-570)	https://nptel.ac.in/courses/108/108/108108122/	P2	Students understand about the connection of PN to the battery	CO1,CO2, CO3,CO4
13	13	13	Diode rectifier equation, Bipolar Transistor and its configuration	Day 13	T1 (Pg : 581-595)	https://nptel.ac.in/courses/108/108/108108112/	P1	Students will understand the application of diode, the working of Bipolar Transistor	CO1,CO2, CO3,CO4
14	14	14	Hall effect, Hall coefficient & Hall Angle , Application of Hall effect	Day 14	T1 (Pg : 557-559)	https://www.youtube.com/watch?v=f9vuSRLw8CA	P2	Students understand Hall effect and solve the problems for Hall Coefficient	CO1,CO2, CO3,CO4,CO5,CO6
Unit-3: Wave Optics									
15	15	15	Introduction thin film, Conditionof optical path	Day 15	T1 (Pg : 140-141)	https://nptel.ac.in/courses/122107	P4/C3	Student Learnt about Concept of	C-1,2,3,4

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			difference for Refelected light			035/11 https://nptel.ac.in/courses/122107035/12		thin films and interference	
16	16	16	Interference in Wedge shape thin film,	Day 16	T1 (Pg : 150-153)	https://nptel.ac.in/courses/122107035/11 https://nptel.ac.in/courses/122107035/12		Students get the details about interference in a wedge	CO1,CO2, CO3,CO4,CO5,CO6
17	17	17	Expression for fringe width, wedge angle.	Day 17	T1 (Pg : 150-153)	https://nptel.ac.in/courses/122107035/11 https://nptel.ac.in/courses/122107035/12		Students get the details about interference in a wedge	CO1,CO2, CO3,CO4,CO5,CO6
18	18	18	Newton's rings Experimeny	Day 18	T1 (Pg : 146-149)	https://www.youtube.com/watch?v=WrXQV7xTktE		Students understand interference application	CO1,CO2, CO3,CO4
19	19	19	Newton's Ring Application, Numerical	Day 19	T1 (Pg : 146-149)	https://www.youtube.com/watch?v=WrXQV7xTktE		Students understand interference application	CO1,CO2, CO3,CO4
20	20	20	Anti-reflection coating,	Day 20	T1 (Pg : 158-159)	https://www.youtube.com/watch?v=WrXQV7xTktE		Student will get the information about application of thin films as anti-reflection	CO2, CO3,CO4,CO5,CO6

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								coating	
21	21	21	Advanced applications of interference in thin film. Numerical	Day 21	T1 (Pg : 158-159)	https://byjus.com/jee/thin-film-interference/	C3	Student will learn about the use of antireflection coating in modern technology.	CO1,CO2, CO3,CO4
Unit-4: Electron Ballistics and Quantum Mechanics:									
22	22	22	Motion of a charged particle in uniform electric field	Day 22	T-(43-50)	https://www.youtube.com/watch?v=y-3Ow_-JpbI https://slideplayer.com/slide/259297/	https://www.intechopen.com/books/electric-field/the-application-of-electric-fields-in-biology-and-medicine	Students will able to analyze the behavior of charged particles in Electric field.	CO4
23	23	23	Motion of a charged particle in uniform magnetic field	Day 23	T-1(51-55)	https://www.youtube.com/watch?v=3s7ywSIDPzE https://www.toppr.com/guides/physics/moving-charges-and-magnetism/motion-combined-electric-magnetic-fields/ http://web.mst.edu/~vojtat/class_2135/lectures/lecture14/lecture14_part_5_moving_charged_particle_in_a_magnetic_field.ppt	http://www.themagnetguide.com/industrial-applications.html	Students will able to analyze the behavior of charged particles in magnetic field.	CO4,CO5
24	24	24	Cross field configuration	Day 24	T-1(56-58)	https://www.toppr.com/guides/physics/moving-charges-and-magnetism/motion-combined-electric-magnetic-fields/ https://www.youtube.com/watch?		Compare the effects of electric and magnetic fields on charged particle	CO2

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						v=p4im1GRDAWQ http://www.physics.usyd.edu.au/teach_res/hsp/eq/eq17.pdf			
25	25	25	Measurement of 'e/m' by Thomson's method	Day 25	T-1(58-60)	https://www.youtube.com/watch?v=8EAiQFShT-ghttps://slideplayer.com/slide/4279547/		Understand the effects of electric and magnetic fields on a charged particle and measure the charge-to-mass ratio (e/m) of the electron.	CO3,CO4
26	26	26	Bainbridge mass spectrograph	Day 26	T-1(98-99)	https://www.youtube.com/watch?v=CxNnOf3POoAhttps://www.brainkart.com/article/Bainbridge-mass-spectrometer---Determination-of-isotopic-masses-of-nuclei_2956/	http://www.usp.br/massa/2014/qfl2144/pdf/MassSpectrometry.pdf	Evidence the application of cross field configuration Correlate the particle and wave properties of a particle at microlevel.	CO2,CO3,CO4
27	27	27	Wave-particle duality, Wave packet, Heisenberg's uncertainty principle	Day 27	T-1(356, 361-363) T-1(364-365)	https://www.youtube.com/watch?v=rCY65z8IWqAhttps://www.youtube.com/watch?v=-bLJSMErMb8 http://www.gc11.ac.in/wp-content/uploads/2017/02/Atomic-Structure-1.ppt	https://www.britannica.com/science/quantum-mechanics-physics/Applications-of-quantum-mechanics	Determine the position & momentum of microparticle Explain /analyze the motion of particle	CO3, CO4, CO5

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28	28	28	Schröedinger's time dependent and independent wave equations, Physical significance of wave function	Day 28	T-1(369-371) T-1(363-364)	https://www.youtube.com/watch?v=m1Pd7hA1D0g https://www.google.com/search?biw=1366&bih=652&sxsrf=ACYBGNRXfvdz12BbHWx8G7VOsg0S2UXC4g%3A15679 https://www.khanacademy.org/science/physics/quantum-physics/atoms-and-electrons/v/quantum-wavefunction http://web.iitd.ac.in/~sdeep/Quantum_lecture_CML_2.ppt	P9, P11	.	CO2,CO3,CO4,CO5
Unit 5: Crystal Structure, X-rays									
29	29	29	Unit cell, Bravais lattice, cubic system	Day 29	T-1(472-473, 478)	https://www.youtube.com/watch?v=BjVTdZ_htu8 https://www.slideshare.net/RageshNath/bravais-lattices	https://www.slideshare.net/AsadRiaz31/crystal-structures-industrial-material	Understand the basics of Solid structure.	CO1,CO2,CO3
30	30	30	Number of atoms per unit cell, coordination number, atomic radius, packing density	Day 30	T-1(479-480)	https://www.youtube.com/watch?v=_h-Xv9nsJLc http://people.virginia.edu/~rej/class209/Chapter3cor3.ppt		Calculate the characteristics of unit cell	CO3,CO4,CO5
31	31	31	Relation between lattice constant and density	Day 31	T-1(480-484)	https://www.coursera.org/lecture/material-behavior/3-9-calculating-density-wc14T https://link.aps.org/pdf/10.1103/PhysRev.58.81			CO5,CO6
32	32	32	lattice planes and Miller	Day 32	T-1(494-	https://www.youtube.com/watch?		Designate the	CO6

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			indices		495)	v=3S6q7ntO7sIhttp://home.iitk.ac.in/~anandh/Ebook/Chapter_3b_Miller_Indices.ppt		series of planes	
33	33	33	Interplaner spacing for cubic system	Day 33	T-1(495-496)	https://www.youtube.com/watch?v=xIuuTSJ5Dws https://www.slideshare.net/HotLookingCoolGuy/crystral-structure		Investigate the interplanar spacing	CO4,CO5
34	34	34	Bragg's law of X-ray diffraction	Day 34	T-1(497)	https://www.youtube.com/watch?v=zpRBpSMqJXc https://www.youtube.com/watch?v=FRDvRhCvuHg		Evaluate the lattice parameters	CO5
35	35	35	Line and Continuous Spectrum of X-ray, Applications of X-ray.	Day 35	T-1(472-473, 478)	https://www.youtube.com/watch?v=BjVTdZ_htu8 https://www.slideshare.net/RageshNath/bravais-lattices	https://www.slideshare.net/AsadRiaz31/crystal-structures-industrial-material	Understand the basics of Solid structure.	CO1,CO2,CO3

***T=Text Book; R= Reference Book; C= Company name; R= Research Paper**

Total number of lectures as per syllabus: - 35 **Total number of lectures as per planned: -35**

Tutorial Plan

Week	Topic	No. Of Problems	Mapped With CO
1	Numerical on numerical aperture of Optical Fiber	05	1,2,3,4,5
2	Numerical on Hall effect	05	1,2,3,4,5
3	Numerical on motion of electron in electric and magnetic field	05	1,2,3,4,5
4	Numerical on Thin film interference	05	1,2,3,4,5

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5	Numerical on Newton's Rings	05	1,2,3,4,5

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	Use of Semiconductor diodes in Solar Cells		CO1,CO2,CO3,CO4,CO5,CO6
2	Application of Electromagnetic waves		CO1,CO2,CO3,CO4,CO5,CO6

Assignment Plan

Assignment No.	Topic	Given Date	Submission Date
1	Questions given on Unit 1 (Laser and Optical Fiber) Questions on Unit 2 – Semiconductor Physics Questions on Unit-3: Wave Optics	25/01/2023	31/01/2023

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Engineering Physics	M.N. Avadhanulu and P.G. Kshirsagar.	S.Chand and Company LTD.	2002
T2	Engineering Physics	R.K. Gaur and S. L. Gupta.	DhanpatRai Publications Pvt. Ltd.-New Delhi.	2005
T3	Engineering Physics	Dr. L. N. Singh.	Synergy Knowledgeware-Mumbai.	2003
T4	Optics Pvt. Ltd.	AjoyGhatak	MacGraw Hill Education (India)	1998

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T5	Solid State Physics	A.J. Dekker	McMillan India Limited	2001

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Quarton Inc	https://www.quarton.com	QuartonInc, established in 1989, is a premier producer of high quality laser diode and specialized laser application products. Quarton Inc. designs, develops and markets products to meet the laser needs of a broad customer base. From laser module, laser pointer, professional laser wireless presenter, to advanced laser sight and tactical light, Quarton Inc. offers laser diode modules and products made with the best materials and consistent quality control.
C2	Industrial Fiber Optics	https://i-fiberoptics.com/index.php	Industrial Fiber Optics is a world leader in manufacturing polymer and large-core silica optical fiber cable assemblies.
C3	Thin Film Industries, Inc.	https://www.thinfilmindustries.com	It is a world leader in the design, manufacture, and marketing of a broad portfolio of high performance analog, mixed-signal, and digital signal processing (DSP) integrated circuits (ICs) used in virtually all types of electronic equipment.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Effect of band gap on power conversion efficiency of single-junction semiconductor photovoltaic cells under white light phosphor-based LED illumination	GrażynaJarosz | RafałMarczyński | RyszardSignerski	Materials Science in Semiconductor Processing	https://doi.org/10.1016/j.mssp.2019.104812	Volume 107, 1 March 2020, 104812
P2	Semiconductors: Materials, Physics, and Devices	Jiangwei Liu, HongyangZhao,JinlongLiu,AurélienMaréchal, and Wei Wang	Active and Passive Electronic Components	https://doi.org/10.1155/2016/4523960	Volume 2016 |Article ID 4523960
P3	Laser Technology 2016: Progress and Applications of Lasers	J.K. JabczynskiRyszard S Romaniuk	The International Society for Optics and Photonics	DOI: 10.1117/12.2265113	December 2016

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	during 2000-15				
P5	A Review of the Development in the Field of Fiber Optic Communication Systems	PrachiSharmaMandeep Singh	International Journal of Emerging Technology and Advanced Engineering	ww.ijetae.com	Volume 3, Issue 5 May 2013

Dr. U.V.Rathod
Subject Teacher

Dr. U. V. Rathod
Academic In-charge

Dr. Amit Gupta
HOD (BSHD)

Principal
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Department of Civil Engineering
"Building Better Development"
Session 2022-23

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Teaching Plan

Course	**:** B. Tech in Civil Engineering	**Year/Semester**	**:** 5th Semester (3rd Year)
Name of the Teacher	**:** Prof. Gaurav H. Rangari	**Subject Code**	**:** CE5T004
Subject	**:** TRANSPORTATION ENGINEERING	**Section**	**:** A
Periods per Week (each 60 min)		**Lecture**	**3**
		Tutorial	**-**
		Practical	**2**

Course Objective	Course Outcomes
1. To remember the modes of transportation and IRC: 37-2012 & IRC: 58-2011and types of transportation system and pavements. 2. To understand the traffic engineering rules in design of pavements and required type of pavement design. 3. To understand an appropriate geometric design of pavement to avoid accidents. 4. To know the mode of transportation by considering various aspects associated with traffic safety measures.	1. Remember the components governing the different modes of transportation. 2. Describe the types of transportation system and its geometric elements. 3. Apply traffic regulation rules corresponding to relationship between speed, flow and density. 4. Discover an appropriate geometric design to avoid accidents. 5. Design mode of transportation by considering various aspects associated with traffic safety measures. 6. Recommend required type of pavement design by using IRC: 37-2012 & IRC: 58-2011.

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapping
Unit I –Introduction									
1	1	1.01	Importance of various modes of transportation	Day 1	T1 (Pg. 02)	**Video:**https://nptel.ac.in/courses/105/105/105105107/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students should get the knowledge of Importance of various modes of transportation	CO1
2	2	1.02	Highway Engineering, Road Classification	Day 2	T1 (Pg. 21)	**Video:**https://nptel.ac.in/courses/105/105/105105107/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should get the knowledge about the Highway Engineering.	CO1

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3	3	1.03	Developments in Road Construction, Highway Planning	Day 3	T1 (Pg. 15, 35)	**Video:**https://nptel.ac.in/courses/105/105/105105107/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Student should get the knowledge of different type of Developments in Road Construction.	CO1
4	4	1.04	Alignment and Surveys	Day 4	T1 (Pg. 51, 55)	**Video:**https://nptel.ac.in/courses/105/105/105105107/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to know about Alignment and Surveys.	CO1
Sr. No	**Lec. No**	**Topic Code**	**Contents to be Covered**	**Planned Teaching Dates**	**Text Books (Page no) Reference Book (Page no)**	**URL's (NPTEL/OnlineMaterial/PPt/Video)**	**Applications (R&D/ Industry)**	**Learning Outcomes**	**CO Mapping**
Unit II – Geometric Design									

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5	5	2.01	Geometric Design- Cross section elements	Day 5	T1 (Pg. 73)	**Video:**https://nptel.ac.in/courses/105/105/105105107/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to draw Cross section elements of roads.	CO2
6	6	2.02	Sight distances, Horizontal alignment	Day 6	T1 (Pg. 86, 103)	**Video:**https://nptel.ac.in/courses/105/105/105105107/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to recognize and calculate the Sight distances and Horizontal alignment	CO2
7	7	2.03	Vertical alignment, Intersections	Day 7	T1 (Pg. 139)	**Video:**https://nptel.ac.in/courses/105/105/105105107/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to draw Vertical alignment, Intersections	CO2
8	8	2.04	Construction of Pavements	Day 8	T1 (Pg. 330)	**Video:**https://nptel.ac.in/courses/105/105/105105107/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to construct the Pavements	CO2,3

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9	9	2.05	Construction and Maintenance of Drainage	Day 9	T1 (Pg. 518)	**Video:**https://www.youtube.com/watch?v=yRq_qeIso84 **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to Construct and Maintain the Drainage	CO3,4
10	10	2.06	Road Arboriculture	Day 10	T1 (Pg. 525)	**Video:**https://www.youtube.com/watch?v=HvfKkk8MTEY **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to understand the concept of Road Arboriculture	CO4
Sr. No	**Lec. No**	**Topic Code**	**Contents to be Covered**	**Planned Teaching Dates**	**Text Books (Page no) Reference Book (Page no)**	**URL's (NPTEL/OnlineMaterial/PPt/Video)**	**Applications (R&D/ Industry)**	**Learning Outcomes**	**CO Mapping**
Unit III – Highway Materials									

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11	11	3.01	Soil – relevant properties Various tests	Day 11	T5 (Pg. 13)	**Video:**https://www.youtube.com/watch?v=C3vIVtg6920 **Notes:**https://nptel.ac.in/courses/105/101/105101087/	-	Students Should able to perform Various tests on relevant properties of Soil	CO1
12	12	3.02	Aggregates – strength, hardness, toughness, soundness, durability, shape, specific gravity, water absorption	Day 12	T5 (Pg. 69)	**Video:**https://www.youtube.com/watch?v=PkPF_qq1k-k **Notes:**https://nptel.ac.in/courses/105/101/105101087/	-	Students Should able to perform strength, hardness, toughness, soundness, test on Aggregates	CO1
13	13	3.03	Bituminous materials – Bitumen, Tar, and Asphalt – various properties	Day 13	T1 (Pg. 301-326)	**Video:**https://www.youtube.com/watch?v=k1Dxy8Vftho **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to remember various properties of Bituminous materials such as Bitumen, Tar, and Asphalt	CO1,4

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapping
14	14	3.04	Design of Bituminous paving mixes-Marshall stability test	Day 14	T1 (Pg. 301-326)	**Video:**https://www.youtube.com/watch?v=S0L0sNBF33w **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to Design the Bituminous paving mixes-Marshall stability test	CO4
Unit IV – Traffic Engineering									
15	15	4.01	Traffic Characteristics, Speed, Journey Time and Delays, Vehicle Volume Counts, Origin and Destination Studies.	Day 15	T1 (Pg. 159)	**Video:**https://www.youtube.com/watch?v=0yzgMc110po **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to understand Traffic Characteristics, Speed, Journey Time and Delays, Vehicle Volume Counts, Origin and Destination Studies.	CO3,4
16	16	4.02	Analysis and Interpretation of Survey Data, Traffic Operations.	Day 16	T1 (Pg. 159)	**Video:**https://www.youtube.com/watch?v=0yzgMc110po **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to Analyze and Interpret the Survey Data, Traffic Operations.	CO4,5

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17	17	4.03	Design of Signals and Rotary intersections, Parking Space Design.	Day 17	T1 (Pg. 159)	**Video:**https://www.youtube.com/watch?v=uCPlvu-bzDw **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to understand the Design of Signals and Rotary intersections, Parking Space Design.	CO5,6
18	18	4.04	Highway Lighting, Planning and Administration, Road Markings, Signs.	Day 18	T1 (Pg. 257)	**Video:**https://www.youtube.com/watch?v=lYeGTPHO_No **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to understand the Highway Lighting, Planning and Administration, Road Markings, Signs.	CO4,5
19	19	4.05	Road Accidents and Safety: Classification, Causes, Mitigation and Control Measures, Aspects of Safety in Usage of Roads.	Day 19	T1 (Pg. 257)	**Video:**https://nptel.ac.in/courses/105/105/105105107/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to remember the Classification, Causes, Mitigation and Control Measures, Aspects of Safety in Usage of Roads.	CO4,5
20	20	4.06	Type and Design of anti-crash barriers, Introduction to Intelligent Transport Systems (ITS)	Day 20	T1 (Pg. 257)	**Video:**https://www.youtube.com/watch?v=4ej1XkAvzhc **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to understand the Type and Design of anti-crash barriers, Introduction to Intelligent Transport Systems (ITS)	CO4,5
Sr. No	**Lec. No**	**Topic Code**	**Contents to be Covered**	**Planned Teaching Dates**	**Text Books (Page no) Reference Book (Page no)**	**URL's (NPTEL/OnlineMaterial/PPt/Video)**	**Applications (R&D/ Industry)**	**Learning Outcomes**	**CO Mapping**

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Unit V – Other Modes of Transport									
27	27	5.01	Introduction to Railways, Airways, Waterways	Day 27	T3 (Pg. 21)	**Video:**https://nptel.ac.in/courses/105/107/105107123/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should have the knowledge of Railways, Airways, Waterways	CO2,4
28	28	5.02	Pipeline Transportation	Day 28	T3 (Pg. 156)	**Video:**https://nptel.ac.in/courses/105/107/105107123/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should have the knowledge of Pipeline Transportation	CO4
29	29	5.03	Classification, Requirements	Day 29	T3 (Pg. 160)	**Video:**https://nptel.ac.in/courses/105/107/105107123/ **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to Classify transportation and its Requirements	CO4
30	30	5.04	Comparative Studies	Day 30	T3 (Pg. 175)		C1-C4	Students Should able to do the Comparative Studies.	CO5

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

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Education to Eternity

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Total number of lectures as per syllabus: - 30

Total number of lectures as per planned: - 30

Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1.	Highway Planning and Design of Geometric Parameters	01/11/2022	14/11/2022	II, III, IV
2.	Traffic Engineering Design	10/11/2022	16/11/2022	IV, V

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's not covered in TP**
1.	Utilization of waste material in Road Construction	24/11/2022	I, II, III, IV
2.	Application of GIS in Civil Engineering	29/11/2022	III, V

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Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Highway Engineering	Khanna and Justo	Nemchand& Bros., Roorkee	2009
T2	Highway Engineering	S. K. Khanna		2002
T3	Transportation Engineering	N. L. Arora		
T4	Highway Engineering	Bindra and Arora	Standard Publishers	
T5	Soil Mechanics and Foundation Engineering	Dr. K R. Arora	Standard Publishers	
R1	Traffic and Highway Engineering"	N.J. Garber and L.A. Hoel	West Publishing Company, New York	
R2	Geometric Design of Modern Highways	J.H. Jones	E & FN SPON Ltd., London.	
R3	Surface Transportation (Railways and Highways)	R. Agor	Khanna Publishers, N. Delhi ISBN NO: 978-81-7409-273-1	

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	JMC Projects (India) Ltd., Mumbai	https://www.jmcprojects.com/	JMC includes the constructions of highways, expressways, bridges, flyovers, townships, tall buildings, hospitals, industrial units, power plants etc.
C2	IRB Infrastructure Developers Ltd., Mumbai	https://www.irb.co.in/	Incorporated in the year 1998, IRB Infrastructure Developers Ltd is India's leading and one of the largest Infrastructure Developing Company in BOT Space, committed to the Roads & Highway sector.

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C3	Sadbhav Engineering, Ahmedabad	https://www.sadbhaveng.com/	Founded in 1988 by Mr.Vishnubhai Patel, Sadbhav Engineering Limited (SEL) today is considered among the few elite infrastructure companies in the country. Businesses: Roads and Highways, Mining, Irrigation
C4	Adhunik Infrastructures (P) Ltd., Kolkata	http://www.adhunikinfra.com/	Adhunik Infrastructures has successfully completed over 50 projects across different sectors chiefly construction of roads and bridges, highways,
			sewerage and drainage systems, high rise buildings and horticultural parks and has a proven track record of consistently delivering excellence while meeting tight schedules.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Research on Improvement of Red Clay in a Highway Engineering	Jianbao Fu	IOP Conference Series: Materials Science and Engineering	10.1088/1757-899X/780/4/042039	
P2	An experimental method to design porous asphalts to account for surface requirements	Filippo G. Pratico, Paolo G. Briante, Giuseppe Colicchio, Rosario Fedele	Journal of Traffic and Transportation Engineering	10.1016/j.jtte.2019.05.006	online 21 July 2020.
P3	Wander 2D: a flexible pavement design framework for autonomous and connected trucks	**Osman Erman Gungor**, Imad L. Al-Qadi	International Journal of Pavement Engineering	10.1080/10298436.2020.1735636	12 Mar 2020

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P4	Optimized network traffic engineering using segment routing	Randeep Bhatia; Fang Hao; Murali Kodialam; T.V. Lakshman	IEEE Conference on Computer Communications (INFOCOM)	10.1109/INFOCOM.2015.7218434	24 August 2015
P5	New and emerging data forms in transportation planning and policy: Opportunities and challenges for "Track and Trace" data	GillianHarrisonSusan M.Grant-MullerFrances C.Hodgson	Elsevier	10.1016/j.trc.2020.102672	August 2020

Subject Teacher **Academic In/charge** **HOD, (CE)**

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TEACHING PLAN

Course	**:** B. Tech in Civil Engineering	**Year/Semester**	**:** 6th Semester (3rd Year)
Name of the Teacher	**:** Prof. Shital A. Navghare	**Subject Code**	**:** CE6T001
Subject	**:** Design of Steel Structures	**Section**	**:** A
Periods per Week (each 60 min)		**Lecture**	**2**
		Tutorial	**1**
		Practical	**2**

Course Objective	Course Outcomes
1. Understand the behaviour and general design of Structural steel components. 2. Know the Fundamental design philosophies of steel structures. 3. Know the codal provision for design of steel structure.	Students should be able to, 1. Understand the fundamentals of steel structures, fasteners and connections, concept of balanced section, under reinforced and over reinforced section. 2. Explain Plastic theory, Plastic hinge concept, Plastic collapse load, Types of tension members, behavior of tension members. 3. Apply knowledge of Welding, Types and Properties of Welds, Types of joints, Weld symbols, Weld specifications, Effective areas of welds, Design of welds. 4. Analyse the tension and compression members, Elastic buckling of slender compression members, Sections used for compression members. 5. Solve numerical on simple slab base and gusseted bases Beam types, simple and built-up beams in bending (without vertical stiffeners). 6. Build steel structure elements with Limit State Method of design, by using Codes, Specifications and section classification.

SN	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Days	Text Books (Page no)	Reference Book (Page no)	URL's (NPTEL/Online Material/pptx/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapped
Unit I										
01	01	1.1	Steel as a Structural Material, Various Grades of Structural Steel, Properties,	Day 01	T1, T2	R1	https://nptel.ac.in/courses/105105162	C1	Student will able to know the principles of surveying, its	CO1, CO2,
02	02	1.2	Various Rolled Steel Sections (Including Cold Formed Sections, Structural Pipe (Tube)Sections) and Their Properties.	Day 02	T1, T2	R1	https://nptel.ac.in/courses/105105162	C2	Student will able to remember Various Rolled Steel Sections.	CO1, CO2, CO3,
03	03	1.3	Design Considerations, Limit State Method of Design.	Day 03	T1, T2	R1	https://nptel.ac.in/courses/105105162	C2	Student will able to remember the design consideration.	CO1, CO2, CO3,
04	04	1.4	Failure Criteria for Steel. Introduction To I.S. 800, 808, 816, 875 Etc.	Day 04	T1, T2	R1	https://nptel.ac.in/courses/105105162	C2	Student will able to understand the failure criteria.	CO1, CO4, CO5,
Unit II										
05	05	2.1	Introduction to Plastic Analysis, Shape Factor.	Day 05	T1, T2	R1	https://nptel.ac.in/courses/105105162	C1	Student will able to understand Plastic theory.	CO1, CO4, CO5,
06	06	2.2	Plastic hinge formation Collapse mechanism for beams.	Day 06			https://nptel.ac.in/courses/105105162	C1	Student will bale to understand hinge Collapse mechanism.	CO1, CO5, CO6
07	07	2.3	Design of axially loaded members: Tension Members.	Day 07			https://nptel.ac.in/courses/105105162	C1	Student will able to design the tension members.	CO4, CO5, CO6
08	08	2.3	Design of axially loaded members: Tension Members.	Day 08				C1		
09	09	2.4	Design of axially loaded members: Compression Members.	Day 09			https://nptel.ac.in/courses/105105162	C1	Student will able to know design the compression members.	CO3, CO4, CO5, CO6
10	10	2.4	Design of axially loaded members: Compression Members.	Day 10						

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11	11	2.5	Design of roof truss, Load assessment for DL, LL and WL.	Day 11	T1, T2	R1	https://nptel.ac.in/courses/105105162	C2	Student will able to design roof truss.	CO3, CO4, CO5, CO6
12	12	2.6	Design of roof truss, Load assessment for DL, LL and WL.	Day 12			https://nptel.ac.in/courses/105105162	C1		
Unit III										
13	13	3.1	Structural Fasteners: Behavior of bolted and welded connections (Types, Designations, Properties, Permissible Stresses),	Day 13	T1, T2	R1	https://nptel.ac.in/courses/105105162	C2	Student will able to know the structural behavior of connection.	CO1, CO2, CO3, CO4.
14	14	3.1, 3.2	Failure of bolted and welded joints. Strength of bolt and strength of weld, Efficiency of joints.	Day 14			https://nptel.ac.in/courses/105105162	C1	Student will able to analyze the failure of joints.	CO1, CO2, CO3, CO4
15	15	3.3	Design of bolted and welded connections	Day 15			https://nptel.ac.in/courses/105105162	C1	Student will bale to design the bolted and welded connection.	CO3, CO4, CO5, CO6
16	16	3.3	Design of bolted and welded connections	Day 16						
17	17	3.4	Moment resistant bolted and welded connection. (Bending and Torsion)	Day 17	T1, T2	R1	https://nptel.ac.in/courses/105105162	C2	Student will able to evaluate bending moment and torsion.	CO3, CO4, CO5, CO6
18	18	3.5	Moment resistant bolted and welded connection. (Bending and Torsion)	Day 18			https://nptel.ac.in/courses/105105162	C2		
19	19	3.6	Design of connection: Beam to beam, beam to column.	Day 19			https://nptel.ac.in/courses/105105162	C2	Student will able to design the beam to beam and beam to column	CO3, CO4, CO5, CO6
20	20	3.6	Design of connection: Beam to beam, beam to column.	Day 20			https://nptel.ac.in/courses/105105162	C2		

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Unit IV										
21	21	4.1	Design of simple beams: Laterally restrained and un-restrained, (symmetrical as well as unsymmetrical section).	Day 21	T1, T2	R1	https://nptel.ac.in/courses/105105162	C1	Student will able to design the Laterally restrained and un-restrained beams.	CO1, CO2, CO3, CO4,
22	22	4.2	Design of simple beams: Laterally restrained and un-restrained, (symmetrical as well as unsymmetrical section).	Day 22			https://nptel.ac.in/courses/105105162	C1		CO5, CO6
23	23	4.3	Design of built-up beams: Laterally restrained and un-restrained, (symmetrical as well as unsymmetrical section).	Day 23			https://nptel.ac.in/courses/105105162	C1	Student will able to design of built-up beams.	CO1, CO2, CO3, CO4, CO5, CO6
24	24	4.3	Design of built-up beams: Laterally restrained and un-restrained, (symmetrical as well as unsymmetrical section).	Day 24			https://nptel.ac.in/courses/105105162	C1		
25	25	4.3	Design of built-up beams: Laterally restrained and un-restrained, (symmetrical as well as unsymmetrical section).	Day 25			https://nptel.ac.in/courses/105105162	C1		
26	26	4.4	Design of built-up beams: Laterally restrained and un-restrained, (symmetrical as well as unsymmetrical section).	Day 26	T1, T2	R1	https://nptel.ac.in/courses/105105162	C1		
27	27	4.5	Curtailment of flange plates. (Design of welded plate girder.)	Day 27			https://nptel.ac.in/courses/105105162	C2	Student will able to design the plate girder.	CO3, CO4, CO5, CO6
28	28	4.6	Curtailment of flange plates. (Design of welded plate girder.)	Day 28				C2,		

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	Unit V									
29	29	5.1	Design of single rolled steel section column subjected to axial load and uniaxial moment including column base.	Day 29	T1, T2	R1	https://nptel.ac.in/courses/105105162	C1	Student will able to design column subjected to axial load and uniaxial moment including column base.	CO1, CO2, CO3, CO4, CO5, CO6
30	30	5.2	Design of single rolled steel section column subjected to axial load and uniaxial moment including column base.	Day 30						
31	31	5.3	Design of axially loaded built up columns: Laced and Battened.	Day 31	T1, T2	R1	https://nptel.ac.in/courses/105105162	C1	Student will able to design of axially loaded built up columns.	CO1, CO2, CO3, CO4,
32	32	5.4	Design of axially loaded built up columns: Laced and Battened.	Day 32						
33	33	5.4	Design of Column Bases: slab base and gusseted base subjected to axial load and uniaxial moment.	Day 33	T1, T2	R1	https://nptel.ac.in/courses/105105162	C1,	Student will able to design Column Bases.	CO1, CO2, CO3, CO4, CO5, CO6
34	34	5.5	Design of Column Bases: slab base and gusseted base subjected to axial load and uniaxial moment.	Day 34						
35	35	5.6	Design of Column Bases: slab base and gusseted base subjected to axial load and uniaxial moment.	Day 35						
36	36	5.6	Design of Column Bases: slab base and gusseted base subjected to axial load and uniaxial moment.	Day 36						

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*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 42 Total number of lectures as per planned: - 42

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Tutorial Plan			
Week	**Topic**	**No. Of Problems**	**Mapped With CO**
1	Design of Welded and bolted connection.	02	VI
2	Analysis of tension member and compression member.	04	IV
3	Design of tension member and compression member.	04	VI
4	Design of axially and uni-axially loaded column.	02	VI
5	Design of built-up beam	02	VI
6	Design of slab base.	02	VI

Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	Design of Built-up column (Channel Section placed back-to-back)			I, II, III, IV, V, VI
2	Design of Built-up column (Channel Section placed face to face)			I, II, III, IV, V, VI

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's not covered in TP**
1	Pre-Engineered Buildings.	16/03/2022	CO1, CO2, CO4

Text Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Limit State Design of Steel Structures	S. K. Duggal	Tata McGraw Hill	
T2	Design of Steel Structures	Dr. Subramanian Narayanan	Oxford Publication	

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Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
R1	Design of steel structures	E.H. Gaylord, C.N. Gaylord & J.E. Stallmeyer	McGraw Hill.	

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Delta Steel Structures Pvt Ltd	https://www.deltasteel.in	Established in 2007. Delta Steel Structures is a leading manufacturer of Pre-Engineered Steel Buildings in India, Design fabricate and deliver world class steel buildings on time and on budget. design and fabrication quality management system is certified to the ISO 9001 standard
C2	Aps Engineering Service	http://apsbuildingsolution.com	provides a wide range of steel structural services virtually in every type of industry across the world in Steel structure design Engineering, Steel Structure TEKLA detailing Engineering, Steel structure and PEB Turnkey, Man power supply in all discipline.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Thermal response of C45 steel in high and very high cycle fatigue.	Nicolas Ranc,	Elsevier Ltd	10.1016/j.proeng.2015.12.668	Volume 133, 2015, Pages 265-271
P2	Radio-wave shielding behavior of steel structures	Murat Ozturk & D. D. L. Chung	Journal Of Electromagnetic Waves and Applications	10.1080/09205071.2021.1891975	02 Mar 2021

Subject Teacher **Academic In/charge** **HOD, (CE)**

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VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

Teaching Plan

Semester/ Branch: - IV Sem/ CSE **Subject code:- CS4T004**

Subject Name: - Computer Network **Subject In-charge: Prof. Anuja Ghasad**

==========

Course	**:** B. Tech in Computer Science & Engineering	**Year/Semester**	**:** 4th Semester (Second Year)
Name of the Teacher	**:** Prof. Anuja Ghasad	**Subject Code**	**:** CS4T004
Subject	**:** Computer Networks	**Section**	**:** CSE
Periods per Week (each 60 min)		**Lecture**	**3**
		Tutorial	**-**
		Practical	**-**

Course Objective	Course Outcomes
1. To understand the Basics of computer networking knowledge as well as the existing connectivity technologies. 2. To be aware of the various types of key issues for the realization of the LAN/WAN/MAN network 3. To learn the 7-layer OSI network model (each layer and its responsibilities) and understand the TCP/IP suite of protocols and the networked applications supported by it. 4. To establish a solid knowledge of the layered approach that makes design, implementation, and operation of extensive networks possible 5. To acquire the knowledge of the basic protocols involved in wired/wireless communication process.	Students will be able to: 1. To Defining, using and implementing Computer Networks and the basic components of a Network system, explain the importance of data communications, how communication works in data networks. 2. To Evaluate data communication link considering elementary concepts of data link layer protocols for error detection and correction. 3. To Apply various network layer techniques for designing subnets and supernets and analyse packet flow on basis of routing protocols. 4. To Estimate the congestion control mechanism to improve quality of service of networking application. 5. To Analyze the features and operations of various application layer protocols such as Http, DNS, Telnet, FTP and SMTP.

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Affiliated to DBATU, RTMNU & MSBTE Mumbai
Department of Computer Science & Engineering
"A Place to Learn, A Chance to Grow"
Session 2022-23

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To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/Online Material/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO mapping
Unit I									
1	1	1	**Data and Signal:** Define data, signal.	Day 1	T3 (Pg : 82-57)	https://www.youtube.com/watch?v=6dFnpz_AEyA&list=PL9567DFCA3A66F299 NPTEL Lecture 1 by Prof.S.C.Dutta Roy (IIT Delhi) Introduction to signals	R1-R3/ C1-C10	Able to understand basics of Signal	CO1
2	2	2	Time domain and frequency domain representation of signal,	Day 2	T1 (Pg : 85-90)	https://www.youtube.com/watch?v=6dFnpz_AEyA&list=PL9567DFCA3A66F299 NPTEL Lecture 1 by Prof.S.C.Dutta Roy (IIT Delhi) Introduction to signals	R1-R3/ C1-C10	Able to understand Time Domain concept of Signal	CO1
3	3	3	Bandwidth of a signal and medium,	Day 3	T1 (Pg : 85-90)	https://www.youtube.com/watch?v=6dFnpz_AEyA&list=PL9567DFCA3A66F299 NPTEL Lecture 1 by Prof.S.C.Dutta Roy (IIT Delhi) Sampling	R1-R3/ C1-C10	Able to understand sampling of signal	CO1
4	4	4	Sources of impairment, Attenuation,	Day 4		https://www.youtube.com/watch?v=6dFnpz_AEyA&list=PL9567DFCA3A66F299 NPTEL Lecture 1 by Prof.S.C.Dutta Roy (IIT Delhi) Types of Signals	R1-R3/ C1-C10	Able to understand types of signals	CO1

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5	5	5	distortion, noise,	Day 5		https://www.youtube.com/watch?v=6dFnpz_AEyA&list=PL9567DFCA3A66F299 NPTEL Lecture 3 by Prof.S.C.Dutta Roy (IIT Delhi) Frequency Domain Representation	R1-R3/ C1-C10	Able to understand concepts Frequency Domain	CO1
6	6	6	Data rate Limits and Nyquist bit rate,	Day 6		https://www.youtube.com/watch?v=WRgJKeGIz6A Prof.A.Pal (IIT Kharakpur) Lecture 04	R1-R3/ C1-C10	Able to understand Attenuation, distortion and noise	CO1
7	7	7	FDM and TDM,	Day 7	T2 (Pg : 137-138)	https://www.youtube.com/watch?v=L5jJIN8Z4lo Prof.A.Pal (IIT Kharakpur) Lecture 11	R1-R3/ C1-C10	Able to understand the FDM	CO1
8	8	8	synchronous and asynchronous TDM.	Day 8	T2 (Pg : 140-143)	https://www.youtube.com/watch?v=L5jJIN8Z4lo Prof. A.Pal (IIT Kharakpur) Lecture 11		Able to understand the TDM	CO1
Unit II									
9	9	9	Introduction of LAN; MAN; WAN; PAN, Ad-hoc Network, Network Architectures	Day 9	T2 (Pg : 14 –25)	https://www.youtube.com/watch?v=QhKIaK4ReUA Prof.A.Pal (IIT Kharakpur) Lecture 28	R1-R3/ C1-C10	Able to understand the Network architecture	CO2
10	10	10	Client-Server; Peer to Peer	Day 10	T2 (Pg : 3-9)	https://www.youtube.com/watch?v=vlBT50zjxQU Prof.Y.N.Singh(IIT Kanpur) Lecture 01	R1-R3/ C1-C10	Able to understand the Network architecture	CO2

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11	11	11	OSI Model	Day 11	T2 (Pg : 37-41)	https://www.youtube.com/watch?v=8BK70UDgyrc&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=5 Prof. Soumya Kanti Ghosh(IIT Kanpur)Lecture 04	R1-R3/ C1-C10	Able to understand OSI Model	CO2
12	12	12	TCP/IP Model	Day 12	T2 (Pg : 41 – 45)	https://www.youtube.com/watch?v=zzXs0EnCin0&list=PLA959674DF91F95E4&index=5 Prof. Indranil Sengupta Lecture 03	R1-R3/ C1-C10	Able to understand TCP/IP Model	CO2
13	13	13	Network Topologies	Day 13		https://www.youtube.com/watch?v=NSHj9BLnhj0 Prof.Sujoy Gupta Lecture 02	R1-R3/ C1-C10	Able to understand the Network Topologies	CO2
14	14	14	Data Link layer issues, Service provided to Network Layer	Day 14	T2 (Pg : 184)	https://www.youtube.com/watch?v=rGWPOm3ectk&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=47 Prof. Soumya Kanti Ghosh(IIT Kanpur)Lecture 46	R1-R3/ C1-C10	Able to understand the Services of Data link Layer	CO2
15	15	15	Framing, Error Control, Flow Control	Day 15	T2 (Pg : 187-192)	https://www.youtube.com/watch?v=9MrRZGKsCWs Prof.A.Pal Lecture 16		Able to understand the Framing	CO2
16	16	16	Error Detection and Correction, Data Link Control, Multiple Access.	Day 16	T2 (Pg : 192-196)	https://www.youtube.com/watch?v=JmJWpX2ECfI Prof.Indranil Sengupta Lecture 06		Able to understand the Error Detection	CO2

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Unit III									
17	17	17	Network Layer Design Issues Store and forward packet switching	Day 17	T2 (Pg : 343-344)	https://www.youtube.com/watch?v=Hgk7-DvBkf4 Unacademy https://www.youtube.com/watch?v=SaQ3RhRVT6c Prof. A.Pal Lecture 19	R1-R3/ C1-C10	Able to understand the Network Layer design issues	CO3
18	18	18	connection less and connection oriented networks-routing algorithms- optimality principle	Day 18	T2 (Pg : 345-348)	https://www.youtube.com/watch?v=601x64peZtU Prof.Indranil Sengupta Lecture 07	R1-R3/ C1-C10	Able to understand the Network Routing	CO3
19	19	19	Distance Vector Routing	Day 19	T2 (Pg : 357)	https://www.youtube.com/watch?v=_SxlpxqIs-s Prof. Sujoy Ghosh Lecture 27	R1-R3/ C1-C10	Able to understand Distance Vector Routing	CO3
20	20	20	Flooding	Day 20	T2 (Pg : 355)	https://slideplayer.com/slide/4918239/		Able to understand the flooding	CO3
21	21	21	Control to Infinity Problem	Day 21	T2 (Pg : 390)	https://www.youtube.com/watch?v=UYASPR4jEkk	R1-R3/ C1-C10	Able to understand the control problems	CO3
22	22	22	Hierarchical Routing	Day22	T2 (Pg : 366)	https://www.youtube.com/watch?v=u0BTdiqhVRI Prof A.Pal Lecture 20	R1-R3/ C1-C10	Able to understand the Hierarchical Routing	CO3

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23	23	23	Congestion control algorithms.	Day 23	T2 (Pg : 384-389)	https://www.youtube.com/watch?v=ZYIdYIt7W_g Prof.A.Pal Lecture 22	R1-R3/ C1-C10	Able to understand the Congestion control Algorithm	CO3
24	24	24	Shortest Path Algorithm	Day 24	T2 (Pg : 353)	https://www.youtube.com/watch?v=YJfApSMbwaE	R1-R3/ C1-C10	Able to understand the Shortest Path algorithm	CO3
Unit IV									
25	25	25	UDP , TCP	Day 25	T2 (Pg : 524-525)	https://www.youtube.com/watch?v=8-3CSAkscYU&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=7 Lecture 11	R1-R3/ C1-C10	Able to understand the UDP TCP	CO4
26	26	26	Connection establishment and termination	Day 26	T2 (Pg : 496-502)	https://www.youtube.com/watch?v=fBPDLGwfSUM&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=8 Lecture 12	R1-R3/ C1-C10	Able to understand the connection establishmet	CO4
27	27	27	sliding window revisited	Day 27	T2 (Pg : 533)	https://www.youtube.com/watch?v=VUdfS70puWI&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=21 Lecture 15	R1-R3/ C1-C10	Able to understand the sliding window	CO4

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28	28	28	flow and congestion control, timers	Day 28	T2 (Pg : 547-550)	https://www.youtube.com/watch?v=SHO9eeWxPxY&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=23 Lecture 22	R1-R3/ C1-C10	Able to understand the flow and congestion control	CO4
29	29	29	Flow control	Day 29	T2 (Pg : 506)	https://www.youtube.com/watch?v=8NxJGHXDOGc	R1-R3/ C1-C10	Able to understand the flow control	CO4
30	30	30	Retransmission	Day 30	T2 (Pg : 543)	https://www.youtube.com/watch?v=SHO9eeWxPxY&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=23 Lecture 22	R1-R3/ C1-C10	Able to compare Forward versus backward reasoning	CO4
31	31	31	TCP extensions	Day 31	T2 (Pg : 555)	https://www.youtube.com/watch?v=5ex1s4lURto&t=58s Lecture 19		Able to understand the TCP extension	CO4
32	32	32	Transport Layer Reliability	Day 32		https://www.youtube.com/watch?v=qclg6FY-FGM&list=PLbRMhDVUMngf-peFloB7kyiA40EptH1up&index=9 Lecture 14		Able to understand the reliability of transport layer	CO4

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Unit V									
33	33	33	**Application Layer:** Application protocols for email,	Day 33	T2 (Pg : 612)	https://www.youtube.com/watch?v=1-DoplhJj5M&list=PL-bZp8Qhr-SblOUugYZPS2xrIe9BJeOfj	R1-R3/ C1-C10	Able to understand the Basic of Application layer	CO5
34	34	34	FTP, WEB, DNS.	Day 34	T2 (Pg : 579-586)	https://www.youtube.com/watch?v=xX9WB4rmOjQ&list=PL-bZp8Qhr-SblOUugYZPS2xrIe9BJeOfj&index=2	R1-R3/ C1-C10	Able to understand the DNS architecture	CO5
35	35	35	**Advanced Networking:**	Day 35	T2 (Pg : 579-586)	https://www.youtube.com/watch?v=jNoTwz6_SQs&list=PL-bZp8Qhr-SblOUugYZPS2xrIe9BJeOfj&index=3		Able to understand the DNS architecture	CO5
36	36	36	overview to network management systems;	Day 36	T2 (Pg : 588-605)	https://www.youtube.com/watch?v=jIC5pWzE2K4&list=PL-bZp8Qhr-SblOUugYZPS2xrIe9BJeOfj&index=6	R1-R3/ C1-C10	Able to understand the Email architecture	CO5
37	37	37	security threats and solutions	Day 37	T2 (Pg : 588-605	https://www.youtube.com/watch?v=EkCzKPYOW-M&list=PL-bZp8Qhr-SblOUugYZPS2xrIe9BJeOfj&index=7	R1-R3/ C1-C10	Able to understand the Email architecture	CO5
38	38	38	Firewalls,	Day 38	T2 (Pg : 611-662)	https://www.youtube.com/watch?v=xlVK9w1eS-Q&list=PL-bZp8Qhr-SblOUugYZPS2xrIe9BJeOfj&index=8	R1-R3/ C1-C10	Able to understand the Email Protocols	CO5

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39	39	39	Access Control Lists,	Day 39	T2 (Pg : 611-662)	https://www.youtube.com/watch?v=qvfrWHrPtaA&list=PL-bZp8Qhr-SblOUugYZPS2xrIe9BJeOfj&index=10	R1-R3/ C1-C10	Able to understand the Web Archit	CO5
40	40	40	IPSec, IDS.	Day 40	T1 (Pg : 840-844)	https://www.youtube.com/watch?v=7v3GDgvdWO4&list=PL-bZp8Qhr-SblOUugYZPS2xrIe9BJeOfj&index=14		Able to understand the file transfer protocols	CO5

*T=Textbook; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 40 Total number of lectures as per planned: - 40

Assignment Plan

Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1	Unit I, Unit II and Unit III	26/04/2023	02/05/2023	CO1, CO2 & CO3
2	Unit III, Unit IV and Unit V	05/05/2023	15/05/2023	CO3, CO4 & CO5

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	**MySQL**	30/05/2023	CO1, CO2, CO3, CO4, CO4

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Computer Networks	Andrew S. Tanenbaum	Pearson	4th Edition
T2	Data Communications and Networking	Behrouz A. Forouzan	TMH	5th Edition
T3	Computer Networking - A top-down approach	Kurose and Ross	Pearson	7th Edition
R1	An Engineering Approach to Computer Networks	S. Keshav	Pearson Education.	2nd Edition

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Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	CISCO **Industry:** Networking Hardware , Networking Software **Location:** California	http://www.cisco.com	Cisco maintains a strong lead in nearly every networking hardware category, with a 51% market share in Ethernet switch revenue and a 37% share in enterprise router revenue. They also rank high in the WLAN market and in SD-WAN equipment.
C2	ARISTA **Industry:** Networking Hardware **Location:** California	http://www.arista.com	Arista focuses on delivering high performing switches for enterprise networking clients and cloud providers, which places it in the running against Cisco.However, Arista also recognizes the importance of diversification. They now offer network monitoring, automation, and analytics for hybrid cloud environments.It will be interesting to see how well Arista integrates their Big Switch Cloud Fabric Software (BCF), especially compared to their competitors like Dell and HPE. And unlike Cisco, Arista appears weaker in areas of SD-WAN and security, which could affect their future agility.
C3	**DISPLAY-LINK** **Industry:** Healthtech, Biotech, Big Data **Location:**	http://www.displaylink.com	DisplayLink-enabled docking solutions simplify infrastructure deployment providing future and backwards compatibility for any operating system, any platform, and any USB connector. Full support for Corporate Install and Microsoft-signed drivers simplifies the installation process based on an organization's wants and needs. DisplayLink works closely with key industry partners, customers and Fortune 500 companies to ensure a seamless experience for Enterprise customers. DisplayLink is a semiconductor and software technology company. They develop the DisplayLink USB graphics technology, which is designed to connect computers and displays using USB, Ethernet, and WiFi. It also allows multiple displays to be connected to a single computer

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C4	**JUNIPER NETWORK** **Industry: Networking Hardware** **Location:** Sunnyvale, California	http://www.juniper.net	Juniper Networks, Inc. is an American multinational corporation headquartered in Sunnyvale, California. The company develops and markets networking products, including routers, switches, network management software, network security products, and software-defined networking technology. Juniper Networks originally focused on core routers, which are used by internet service providers (ISPs) to perform IP address lookups and direct internet traffic. Through the acquisition of Unisphere, in 2002, the company entered the market for edge routers, which are used by ISPs to route internet traffic to individual consumers. In 2003, Juniper entered the IT security market with its own JProtect security toolkit before acquiring security company NetScreen Technologies the following year. In the early 2000s, Juniper entered the enterprise segment, which accounted for one-third of its revenues by 2005. As of 2014, Juniper has been focused on developing new software-defined networking products.
C5	**FUJITSU** **Industry** Fujitsu Fsas Inc., PFU Limited **Location:** Tokyo Japan	http://fujitsu.com	Fujitsu Limited is a Japanese multinational information technology equipment and services company headquartered in Tokyo. In 2018, it was the world's fourth-largest IT services provider measured by global IT services revenue. Fortune named Fujitsu as one of the world's most admired companies and a Global 500 company.
C6	**AT&T** **Industry: financial services, manufacturing, education, healthcare, retail, hospitality** **Location: Texas US**	https://about.att.com	AT&T is a major provider of fixed and mobile network services in the United States, as well as global network services for enterprises. The company has an extensive global MPLS, Internet and Ethernet network, and its high-capacity internet backbone has been significantly expanded from 42 to 67 countries. AT&T has also enhanced its FlexWare NFV platform, adding in uCPE devices and VNFs from third-party vendors. The provider has recently expanded its SD-WAN offering to include Ciscopal Viptela and Silver Peak, complimenting its primary VMware offer.

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C7	**VERIZON** **Industry**: AOL , Cellco **Location** : NewYork	https://www.verizon.com	Verizon is a communications, information and entertainment services provider, and one of the world's largest fixed and mobile network services providers by revenue. The vendor has an extensive global network, including national and metropolitan fiber infrastructure in the United States, European and APAC markets, with a large portfolio of data, voice and managed network services. Verizon offers SD-WAN from Versa, Cisco Viptela, Cisco Meraki and Silver Peak, available as either fully managed, co-managed or self-managed services**.**
C8	**NTT** **Industry**: Banking ,financial services, manufacturing, education, healthcare, retail, hospitality **Location**: Tokyo Japan	https://www.ntt.com	NTT is a global network services provider and the leading network service provider headquartered in Japan. The company has a large global internet backbone with region wide internet connectivity in the APAC region, Europe, North America and Africa. In 2019, NTT merged several networking companies that it owned, including Dimension Data and NTT Communications, to form NTT Ltd. This merger gives NTT an extensive managed and professional service capability, and the vendor continued to expand its global services throughout the year.
C9	**TATA COMMUNICATION** **Industry**: TCS **Location**: Mumbai India	https://www.tatacommunications.com	Tata Communications, part of the Tata Group, is a global provider of enterprise network services. The provider has focused on developing its global internet WAN service, extending its internet backbone to 125 countries and more than 60 local Internet service provider partners. Tata Communications offers managed SD-WAN based on Versa, Cisco Viptela and its own unique offering based on Cisco ISR routers, as well as a global NFV service with uCPE devices and 30 NFV service nodes in main regions and a broad set of virtual functions.

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C10	**Hewlett Packard Enterprise** Industry**: Financial technology Computer hardware Computer software Cloud computing Internet of Things (IoT) Artificial intelligence Computer networking** **Location**: Houston, Texas, United States	https://www.hpe	Hewlett Packard Enterprise (HPE) was created in 2015 when HP split its operation into two. On one side is HP Inc, the printer and PC arm of the company, while HPE deals with enterprise products and services. Since HPE was formed it has consistently grown in terms of both revenue and profit margin, and has been buying businesses and launching new products and services to keep up with competitors. It hasn't become bloated, though, and over the past five years has spun off various business units, most notably its software and enterprise services divisions.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
R1	5G network slicing using SDN and NFV: A survey of taxonomy, architectures and future challenges	Alcardo Alex Barakabitze	Computer Network (Elsevier)	https://doi.org/10.1016/j.comnet.2019.106984	Volume 167, 11 February 2020
R2	HTTP-level e-commerce data based on server access logs for an online store	Grzegorz Chodak	Computer Network (Elsevier)	https://doi.org/10.1016/j.comnet.2020.107589	Volume 183, 24 December 2020
R3	Open, Programmable, and Virtualized 5G Networks: State-of-the-Art and the Road Ahead	Leonardo Bonati	Computer Network (Elsevier)	https://doi.org/10.1016/j.comnet.2020.107516	Volume 182, 9 December 2020

Prof. Anuja Ghasad
Subject In charge

Prof. Swati Raut
Dept. Academic Incharge

Dr. Supriya Sawwashere
Dept. Head CSE

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Website: www.jdcoem.ac.in E-mail: info@jdcoem.ac.in
(An Autonomous Institute, with NAAC "A" Grade)
Affiliated to DBATU, RTMNU & MSBTE Mumbai
Department of Computer Science & Engineering
"A Place to Learn, A Chance to Grow"
Session 2022-23

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

Teaching Plan

Course : B. Tech in Computer Science & engineering	**Year/Semester :** 3rd year	
Name of the Teacher : Prof. Swati Raut	**Subject Code** : **CS6TE01B**	
Subject : Cloud Computing	**Section** : **CSE**	
Periods per Week (each 60 min)	**Lecture**	**3**
	Tutorial	**-**
	Practical	

Course Objective	Course Outcomes
1. To learn the concept of cloud computing and its services. 2. To understand the core concepts of the cloud computing paradigm. 3. To identify different storage virtualization technologies and their benefits. 4. To Learn various Cloud platforms in industry. 5. To understand and articulate business continuity solutions including backup and recovery technologies, local and remote replication solutions.	1. To Remember Cloud Computing and memorize the different Cloud service. 2. Understand the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. 3.Identify the significance of implementing virtualization techniques. 4.Evaluate the need and importance of the Cloud platforms in industry such as Amazon web services, Google AppEngine, Microsoft Azure and Cloud scientific applications. 5. Analyze various information security, and storage security domains and Identify parameters of managing and monitoring storage infrastructure, describe common storage management activities and solutions.

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Actual Teaching Date	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/Online Material/PPT/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO mapping
Unit I – Cloud Computing Fundamental										
1	1	1.1	History of cloud computing, Cloud Computing definition	03-01-2023	06-01-2023	T1:pg no 2 T2:pg no 2,7	https://www.youtube.com/watch?v=NzZXz3fJf6o&list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J 3:15 to 14:29 sec	T1,2/C1,2,4	Understanding Overview of Cloud Computing History	1
2	2	1.2	private, public and hybrid cloud. Applications and challenges of cloud computing	06-01-2023	07-01-2023	T3:pg no 14	https://www.youtube.com/watch?v=NzZXz3fJf6o&list=PLShJJCRzJWxhz7SfG4hpaBD5bKOloWx9J 14:50 to 30:01 sec	T3/C1,2,3	Understand Cloud Fundamentals	1
3	3	1.3	Types of Cloud Services: IaaS, PaaS, SaaS	07-01-2023	10-01-2023	T1:pg no 3	https://www.youtube.com/watch?v=A3FPxuKlnkU&list=PLFW6lRTa1g82dte3YD_7-GoZXcBiK6K9G	T1/C1,2	Understanding Architecture of CC	1
4	4	1.4	Public Cloud Vs Private Clouds..	10-01-2023	17-01-2023	T1:pg no 7 a	https://www.youtube.com/watch?v=kLIhqF0tdbk	T1/C1	Understanding. Deployment models and service models	1
UNIT II: Cloud Architecture and Desktop Virtualization										
5	5	2.1	Introduction to Architecture, Benefits	17-01-2023	20-01-2023	T3:pg no 19	https://www.youtube.com/watch?v=R4spydpBbYk	T3/C1,3	Understanding Issues with	2

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			and challenges				19:17 to 45:12 sec		virtualization.	
6	6	2.2	Application availability, performance, security and disaster recovery	20-01-2023	21-01-2023	T4:pg no 12	https://www.youtube.com/watch?v=_pPlanX5wQY	T4/C1,2	Understanding Virtualization technologies and architectures	2
7	7	2.3	future of Cloud Applications. Desktop and Device Management: Introduction-Objectives,	21-01-2023	24-01-2023	T1:pg no 31	https://www.youtube.com/watch?v=Yh3gCFG-IRI	T1/C1,2	Able to Create virtual machine monitors/hypervisors	2
8	8	2.4	Across Industries Client Desktops	24-01-2023	27-01-2023	T2:pg no 44	https://www.youtube.com/watch?v=GlobK-eWDSo	T2/C3,4	Able to do the analysis the Issues with Multi-tenancy	2
9	9	2.5	, Desktop placement in the cloud Merits Desktop as a Service (DaaS)	27-01-2023	27-01-2023		https://www.youtube.com/watch?v=Yh3gCFG-IRI	T2/C3,4	Able to understand the DAAS	2
10	10	2.6	Desktop Management Watching the four areas Asset Management	28-01-2023	28-01-2023		https://www.youtube.com/watch?v=Yh3gCFG-IRI	T2/C3,4		2
UNIT III: Virtualization										
11	11	3.1	Introduction to Virtualization, Network	31-01-2023	31-01-2023	T1:pg no 49	https://www.youtube.com/watch?v=8TlukLu11Yo	T1/C2,3	Able to implements the Amazon EC2	3

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			virtualization techniques						Service	
12	12	3.2	Virtual Machine (VM), VM Components and process of converting physical to VMs,	03-02-2023	07-02-2023	T1:pg no 53	https://www.youtube.com/watch?v=9HsEMyKrlnw	T1/C2,3,4	Able to implements the Amazon S3 Service	3
13	13	3.3	Block virtualization	07-02-2023	10-02-2023	T1:pg no 58	https://www.youtube.com/watch?v=SKlZzLctmGc&t=110s	T1/C7	Able to implements the Google App Engine Service	3
14	14	3.4	file level storage virtualization	10-02-2023	11-02-2023	T2:pg no 6	https://www.youtube.com/watch?v=tDuruX7XSac	T2/C4,5	Able to implements the Microsoft Azure Service	3
15	15	3.5	Virtual LAN (VLAN) and Virtual SAN	11-02-2023	11-02-2023	T1:pg no 64	https://www.youtube.com/watch?v=jiHcbUr42zg	T1/C3,4	Able to create Private/Hybrid Cloud (VPC)	3
Unit IV: Cloud Application Development										
16	16	2.12	Service creation environments,	14-02-2023	14-02-2023	T4 Pg no 13	https://www.youtube.com/watch?v=R0WygLgY2nM 3:15 to 43:12	T4/C7,8,9	Understand the archtecture of HDFS and GFS	4
17	17	4.1	Storage virtualization: Fixed Content and Archives	17-02-2023	18-02-2023	T5:pg no 82 T2:pg no 32,36	https://www.youtube.com/watch?v=igHywP9VoNk 1:15 to 8:45	T2,5/C2,5,7	Understand Storage virtualization and its Archives types	4

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18	18	4.2	Cloud Applications: Technologies and the processes required when deploying web services;	18-02-2023	21-02-2023	T4:pg no 71	https://www.youtube.com/watch?v=Yh3gCFG-IRI	T4/C7	Understand Types, Features, Benefits, CAS Architecture	4
19	19	4.3	Deploying a web service from inside and outside a cloud architecture, advantages and disadvantages.	21-02-2023	28-02-2023	T2:pg no 77	https://www.youtube.com/watch?v=Yh3gCFG-IRI	T2/C8	Able to implement Object storage and retrieval	4
23	23	4.4	Accessing the Cloud Introduction-Objectives,	28-02-2023	03-03-2023	T2:pg no 189	https://www.youtube.com/watch?v=uUcQMRukdy0 1:2 to 14:29	T2/C5	Understand the overview of emerging technologies such as Cloud storage	4
25	25	4.5	Platforms Web Application Framework-	03-03-2023	04-03-2023	T3:pg no 92	https://www.youtube.com/watch?v=GHsU9_oC2Gw 4:45 to 30	T3/C2	Understand the concepts of Business Continuity and Recovery	4
26	26	4.6	Web Hosting Services Proprietary Methods	04-03-2023	07-03-2023	T3:pg no 82	https://www.youtube.com/watch?v=oU8rCGWPYlY 2:10 to 33:15	T3/C2	Understand the Life cycle of Business Continuity	4
27	27	4.7	Web Applications APIs in Cloud Computing,	07-03-2023	21-03-2023	T3:pg no 13	https://www.youtube.com/watch?v=hemF8sSXrYk 1:34 to 42:12	T3/C5	Identify Backup and Recovery tools	4

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28	28	4.8	Browsers for Cloud Computing Internet Explorer Mozilla Firefox Safari Chrome.	21-03-2023 24-03-2023	24-03-2023	T3 pg no 52	https://www.youtube.com/watch?v=NpAc1XFdkJM 1:23 to 21:45	T3/C5	Able to understand the Recovery process	4
UNIT V: Cloud Services Management										
29	29	5.1	Reliability, availability and security of services deployed from the cloud	10-03-2023	28-03-2023	T3:pg no 72	https://www.youtube.com/watch?v=Yh3gCFG-IRI	T3/C5	Understand backup and restore operations	5
30	30	5.2	Performance and scalability of services, tools and technologies used to manage cloud services deployment;	28-03-2023	31-03-2023	T2:pg no 12,16	https://www.youtube.com/watch?v=Yh3gCFG-IRI	T2/C4	Understand and Distinguish the emerging technologies of Backup and recovery	5
31	31	5.3	Cloud Economics : Cloud Computing infrastructures available for implementing cloud based services	31-03-2023	18-04-2023	T2:pg no 52,76	https://www.youtube.com/watch?v=R4spydpBbYk 19:17 to 45:12 sec	T2/C3,6,8	Understand Storage security and Management steps	5
32	32	5.4	. Economics of choosing a Cloud platform for an organization,	18-04-2023	21-04-2023	T3:pg no 47	https://www.youtube.com/watch?v=oU8rCGWPYlY	T3/C7	Identify the Risk tria and Managing the storage infrastructure	5
33	33	5.5	application requirements, economic constraints	21-04-2023	25-04-2023	T2:pg no 22,26	https://www.youtube.com/watch?v=oU8rCGWPYlY 2:10 to 33:15	T2/C5	Able to Monitoring the storage	5

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									infrastructure	
34	34	5.6	business needs (e.g Amazon, Microsoft	25-04-2023	25-04-2023	T5:pg no 12	https://www.youtube.com/watch?v=R4spydpBbYk 19:17 to 45:12 sec	T5/C8	Identified key management activities	5
35	35	5.7	Google, Salesforce.com	28-04-2023	28-04-2023	T5:pg no 45	https://www.youtube.com/watch?v=oU8rCGWPYlY 2:10 to 33:15	T5/C9	Understand storage management standards	5
36	36	5.8	Ubuntu and Redhat	29-04-2023	29-04-2023	T5:pg no 36	https://www.youtube.com/watch?v=R4spydpBbYk 19:17 to 45:12 sec	T5/C10	Identify the Initiative-Industry trend	5

Assignment Plan

Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1	Assignment 1	25/01/23	06/02/2023	CO1, CO2
2	Assignment 2	24/03/2023	4/04/2023	CO3, CO4

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Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Cloud Computing Principles and Paradigms	Rajkumar Buyya, James Broberg, Andrzej Goscinski	Wiley Publishers	2011

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T2	Cloud Computing Bible	Barrie Sosinsky	Wiley Publishers	2010
T3	Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance	Tim Mather, Subra Kumaraswamy, Shahed Latif	O'Reilly	2010
T4	Information Storage and Management	EMC Corporation	1st Edition, Wiley India	2009
T5	Cloud Computing : Web-based Applications that change the way you work and collaborate online	Michael Miller	Pearson Education	2008

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	Issue/Volume/Page no/Year
P1	A survey on the service interoperability in cloud computing: Client-centric and provider-centric perspective	Nour El Houda Bouzerzour	wileyonlinelibrary.com/journal/spe	DOI: 10.1002/spe.2794
P2	Real-Time Classification of Twitter Data Using Decision Tree Technique	Shivam Nilosey, Abhishek Pipliya and Vijay Malviya	Springer Nature Singapore Pte Ltd. 2020	https://doi.org/10.1007/978-981-15-2071-6_12
P3	Role of Cloud Forensics in Cloud Computing	Role of Cloud Forensics in Cloud Computing	Springer Nature Singapore Pte Ltd. 2020	https://doi.org/10.1007/978-981-15-0184-5_9
P4	Perspectives of Healthcare Sector with	Mohammed Sameer Khan and Shadab Pasha Khan	Springer Nature Singapore Pte Ltd. 2020	https://doi.org/10.1007/978-981-15-2071-6_12

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	Artificial Intelligence			
P5	A Comprehensive Study of Clustering Algorithms for Big Data Mining with MapReduce Capability	Kamlesh Kumar Pandey, Diwakar Shukla and Ram Milan	Springer Nature Singapore Pte Ltd. 2020	https://doi.org/10.1007/978-981-15-2071-6_12
P6	Dynamic Monitoring of Health Using Smart Health Band	Viraj Puntambekar, Shreyas Agarwal and P. Mahalakshmi	Springer Nature Singapore Pte Ltd. 2020	https://doi.org/10.1007/978-981-15-0184-5_9
P7	Sentiment Analysis to Recognize Emotional Distress Through Facebook Status Updates	Swarnangini Sinha, Kanak Saxena	Springer Nature Singapore Pte Ltd. 2020	https://doi.org/10.1007/978-981-15-2071-6_12
P8	Online Appendix to: SLA Management for Big Data Analytical Applications in Clouds: A Taxonomy Study	XUEZHI ZENG	ACM Computing Surveys, Vol. 53, No. 3, Article 46. Publication date: June 2020.	https://doi.org/10.1145/3383464

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Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Tata Consultancy Services	www.tcs.com	TCS or Tata consultancy service is a leading cloud computing service provider to IT industry. They provide various cloud services such as cloud advisory, cloud development and migration, cloud development and

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			assurance, cloud environment build and management and disaster recovery services.
C2	Infosys	www.infosys.com	Infosys is a global consulting, information and outsourcing organization which also offers cloud computing service and a leading player in cloud services in India
C3	Wipro Limited	www.bluedart.com	Wipro is one of the giant leader in IT industry which offers cloud based services such as virtual cloud lab solution, gateway, custom cloud platform engineering and differentiated application engineering
C4	InstaCompute – Tata Communication	www.instacompute.com	Insta compute is a Tata communication company/product which offers a cost effective cloud computing solution. It is one among the top cloud companies in India providing flexible payment, security, round-the-clock technical support and uses basis pricing.
C5	Zenith InfoTech Limited	zenithinfotech.com	Zenith InfoTech is a leading security, cloud computing and IT solution provider which was founded in year 1996. With the brand name of Tiger Cloud and BDR G14 for cloud service, storage, disaster recovery and backup
C6	Cypher Cloud	ciphercloud.com	One of the most trusted brand in cloud computing and virtual appliances, Cypher cloud is a leading cloud service provider in India.
C7	Cirrologix Private Limited	www.cirrologix.com	It is a software development organization which offers cloud based services, software integration, maintenance and designs.
C8	Clogeny Technologies Private Limited	www.clogeny.com	It is a leading cloud computing company and complete computing solution provider including SaaS, PaaS and LaaS
C9	App Point	www.apppoint.in	App India is a software development organization which is engaged with global IT companies like IBM and Microsoft for software development

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			and design
C10	CSQ GLOBAL SOLUTIONS	http://csqglobal.com	A provider of technology-enabled solutions across Cloud such as eLearning, PaaS, SaaS and also offers an array of services in Application Servers, Data Centers, Development Environments, Analytics, Mobility, Digitalization, Testing including Test Environments and SOA based Business Services

Prof. Swati Raut
Subject In charge

Prof. Swati Raut
Dept. Academic Incharge

Dr. Supriya Sawwashere
Dept. Head CSE

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Department of Electronics and Telecommunication Engineering
"Rectifying Ideas, Amplifying Knowledge"
2022-23 (EvenSem)

VISION	MISSION
To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Teaching Plan

Course	**:** B. Tech in Electrical Engineering	**Year/Semester**	**:** 6th Semester (3rd Year)
Name of the Teacher	**:** Miss Pratiksha Panchbhai	**Subject Code**	**:** EE6E003
Subject	**:**Energy Conservation & Audit	**Section**	**:**A
Periods per Week (each 60 min)		**Lecture**	**3**
		Tutorial	**-**
		Practical	**-**

Course Objective	Course Outcomes
Course Objectives: 1. Know Present energy scenario with need of energy audit and energy conservation. 2. Classify and Manage electric and thermal energy in the industry. 3. Identify various aspects of energy audit such as planning, monitoring and implementation. 4. Analyze the energy flow diagram of an industry and identify the energy wasted or a waste stream. 5. Evaluate the techno economic feasibility of the energy conservation technique dopted. 6. Choose appropriate energy conservation method to reduce the wastage of energy	Students will be able to: 1. To define energy conservation methods. 2. Describe main elements of technical systems designed for energy audit and energy conservation. 3. Interpret advantages and disadvantages of different renewable sources of energy 4. Undertake simple analysis to reduce the wastage of energy 5. Interpret the knowledge of energy flow diagram

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1	1	1.1	Basics of Energy Management and Conservation Global and Indian energy scenario.	Day1	T1 10-17	https://beeindia.gov.in/sites/default/files/1Ch1.pdf	--	Learn basics of Energy Management and Conservation	CO1,CO2
	2	1.2	Global environmental concerns, Climate Change, Concept of energy management,	Day2	16-21	https://www.un.org/en/climatechange#:~:text=Climate%20change-,Climate%20change%20refers%20to%20long%2Dterm%20shifts%20in%20temperatures%20and,United%20Nations	--	Will be able to understand the reasons for climate change	CO1,CO2
	3	1.3	energy demand and supply, economic analysis; Carbon Trading & Carbon foot prints.	Day3		https://personal.ems.psu.edu/~radovic/Chapter5.pdf https://www.investopedia.com/ask/answers/04/060404.asp#:~:text=Carbon%20trade%20is%20the%20buying,being%20released%20into%20the%20atmosphere.		Able to learn energy supply and demand	
	4	1.4	Energy Conservation: Basic concepts,	Day 4	51-54	https://www.sciencedirect.com/topics/engineering/conservation-of-energy-principle	--	Learn basics of Energy Conservation	CO1,CO2
	5	1.5	Energy conservation in household, transportation, agricultural, service and industrial sectors;	Day 5	60-75	http://data.conferenceworld.in/ICSTM2/P1532-1538.pdf	--	Able to learn Energy conservation in household, transportation, agricultural, service and industrial sectors	CO1,CO2

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	6	1.6	Lighting & HVAC systems in buildings.	Day 6	54-59	https://www.energy.gov/eere/buildings/articles/chapter-5-lighting-hvac-and-plumbing	--	Able to lean protection system for building	
	7	2.1	Energy Audit Definition, need, and types of energy audit;	Day 7	76-82	https://en.wikipedia.org/wiki/Energy_audit#:~:text=An%20energy%20audit%20is%20an,without%20negatively%20affecting%20the%20output.	--	Learn all the terms related to energy audit	CO3,CO4
	8	2.2	Energy management (audit) approach: Understanding energy costs, bench marking, energy performance,	Day 8	T1 (Pg : 221)	https://watchwire.ai/energy-benchmarking-what-it-is-how-it-works-and-how-to-get-started/#:~:text=Energy%20benchmarking%20means%20assessing%20and,building%20at%20a%20certain%20standard.	--	Understand energy costs, bench marking, energy performance	CO3,CO4
	9	2.3	matching energy use to requirement, maximizing system efficiencies, optimizing the input energy requirements;	Day 9	T1 (Pg : –302)	https://beeindia.gov.in/sites/default/files/1Ch3.pdf	--	Able to learn energy management by optimizing the resources	CO3,CO4
	10	2.4	Fuel & energy substitution; Energy audit instruments; Energy Conservation Act	Day 10	T1 (Pg : – 225)	cpuc.ca.gov/about-cpuc/divisions/energy-division/building-decarbonization/fuel-substitution-in-energy-efficiency	--	Learn various Fuel & energy substitution; Energy audit instruments	CO3,CO4
	11	2.5	Duties and responsibilities of energy managers and auditors.	Day 11	T1 (Pg : – 225)	https://sdatripura.in/duties/	--	Understand Duties and responsibilities of energy managers and auditors.	CO1,CO2
	12	3.1	Material & Energy balance and Waste Heat Recovery Facility as an energy system;	Day 12	T1 (Pg : –301)	https://beeindia.gov.in/sites/default/files/1Ch4.pdf	--	Learn Material & Energy balance and Waste Heat Recovery systems	CO3,CO4
	13	3.2	Methods for preparing process flow; material	Day 13		https://beeindia.gov.in/sites/default/files/1.4_material_a			

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			and energy balance diagrams.			nd_energy_balance.pdf			
	14	3.3	Cogeneration and waste heat recovery;	Day 14	T1 (Pg : –301)	https://sustainable.stanford.edu/operations/energy-climate/cogen#:~:text=An%20energy%20supply%20system%20that,(CHP)%2C%20or%20cogeneration.	--	Understand the importance of co generation	CO5,CO6
	15	4.1	Energy Action Planning, Monitoring and Targeting: Energy Action Planning : Key elements; Force field analysis; Energy policy purpose, perspective, contents, formulation, ratification;	Day 15	T1 (Pg : –302)	https://beeindia.gov.in/sites/default/files/1.5_energy_action_planning.pdf	--	Understand the overall energy monitoring system	CO1,CO2
	16	4.2	Organizing the management: location of energy management, top management support, managerial function, roles and responsibilities of energy manager, accountability;	Day 16		https://www.energy.gov/sites/default/files/2013/11/f4/webcast_20100701_role_energy_manager.pdf		Understand the hierarchy of energy flow management	CO2,CO4
	17	4.3	Motivation of employees: Information system-designing barriers, strategies; Marketing and communicating: Training and planning.	Day 17	T1 (Pg : – 305)	https://granite.pressbooks.pub/organizationalcommunication/chapter/chapter-1/	--	Understand the inputs needed to motivate the employees	CO3,CO4
	18	4.4	Monitoring and Targeting : Defining monitoring & targeting; Elements of	Day 18		https://granite.pressbooks.pub/organizationalcommunication/chapter/chapter-1/	--	Define monitoring & targeting and data analysis for CUSUM	CO3,CO4

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			monitoring & targeting; Data and information analysis; Techniques: energy consumption, production, cumulative sum of differences (CUSUM);			https://beeindia.gov.in/sites/default/files/1Ch8.pdf			
	19	4.5	Energy Service Companies; Energy management information systems; SCADA systems.	Day 19		http://energysystems.am/automation/scada/		Get information of Energy Service Companies and SCADA system	
	20	5.1	Electrical Energy Management: Supply side: Methods to minimize supply-demand gap, renovation and modernization of power plants,	Day 20	T1 (Pg : –177)	https://www.investopedia.com/terms/s/supply-sidetheory.asp	--	Learn Supply side: Methods to minimize supply-demand gap and modernization of power plants	CO3,CO4
	21	5.2	Electrical Energy Management: Supply side: Methods to minimize supply-demand gap, renovation and modernization of power plants,	Day 21	T1 (Pg : –179)	https://www.investopedia.com/terms/s/supply-sidetheory.asp	--	Learn Supply side: Methods to minimize supply-demand gap and modernization of power plants	CO5,CO6
	22	5.3	Demand side management: conservation in motors, pumps and fan systems; energy efficient motors.	Day 22	T1 (Pg : –181)	https://www.electricalindia.in/reactive-power-management-voltage-control-to-avoid-blackouts/	--	Learn all the demand side Management for energy generation	CO1,CO2
	23	5.4	reactive power management,	Day 23	T1(186-188)	https://www.electricalindia.in/reactive-power-management-voltage-	--	Study the need of reactive power management	CO1,CO2

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						control-to-avoid-blackouts/			
2	24	5.5	Demand side management: conservation in motors, pumps and fan systems; energy efficient motors.	Day 24		https://www.researchgate.net/publication/259645352_Energy_Efficient_Motor_Driven_Systems		Learn all the demand side Management for energy generation	CO2,CO3
	25	5.6	Demand side management: conservation in motors, pumps and fan systems; energy efficient motors.	Day 25	T1 (Pg : – 193)	https://www.researchgate.net/publication/259645352_Energy_Efficient_Motor_Driven_Systems	--	Learn all the demand side Management for energy generation	CO3,CO4
	26	6.1	Thermal energy Management : Energy conservation in boilers,	Day 26	T1 (Pg : –194)	https://www.slideshare.net/manjunathnr00/energy-conservation-boiler-133836685	--	Learn Thermal energy Management on boiler side	CO3,CO4
	27	6.2	Energy conservation in steam turbines and Furnaces;	Day 27	T1 (Pg : –197)	https://www.researchgate.net/publication/259644876_Energy_Conservation_in_Steam_Boiler	--	Learn energy conservation in steam turbines	CO3,CO4
	28	6.3	Energy conservation in steam turbines and Furnaces;	Day 28	T1 (Pg : 197-199)	https://www.researchgate.net/publication/259644876_Energy_Conservation_in_Steam_Boiler	--	Learn energy conservation in steam turbines	CO5,CO6
	29	6.4	Application of FBC.	Day 29	T1 (Pg : 200)	https://www.beeindia.gov.in/sites/default/files/2Ch6.pdf	--	Study Application of FBC	CO5,CO6
	30	6.5	Heat exchangers and heat pumps.	Day 30		https://www.beeindia.gov.in/sites/default/files/2Ch6.pdf		Gain knowledge of Heat exchangers and heat pumps.	

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 30 Total number of lectures as per planned: - 31

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Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	Short Note on Primary & Secondary Energy	30/01/2023	15/02/2023	I, II
2	Types of Energy Audit	21/02/2023	08/03/2023	I.II

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's
1	Study of Energy Audit Report	25/02/2023	I, II, III, IV

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Energy Management	P. O'Callaghan	McGraw - Hill Book Company, 1993	

Subject Teacher **Academic Incharge** **HOD (EE)**

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An Autonomous Institute, with NAAC "A" Grade

Department of Electronics and Telecommunication Engineering

"Rectifying Ideas, Amplifying Knowledge"

2022-23 (Odd Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Teaching Plan

Course : B. Tech in Electronics & Telecommunication Engineering		**Year/Semester** : IIIrd Semester (3rd Year)	
Name of the Teacher : Dr. S. L. Haridas		**Subject Code** : ET3T005	
Subject : Integrated Circuits & applications		**Section** :ETC - A	
Periods per Week (each 60 min)		**Lecture**	**3**
		Tutorial	**1**
		Practical	**-**

Course Objective	Course Outcomes
1. To understand characteristics of various Analog Circuits. 2. To study and interpret the datasheet. 3. To study various op-amp parameters and their significance for Op-Amp. 4. To analyze and identify linear and nonlinear applications of Op-Amp. 5. To understand functionalities of PLL.	Students should be able to: 1. Understand and explain the basic concepts of OPAMP. 2. Demonstrate the working principle of various analog circuits. 3. Conduct experiments using analog electronic components, electronic instruments and modern tool. 4. Analyze analog circuits to evaluate various performance parameters. 5. Compare multivibrator circuits, Data converters. 6. Design and realize filters, Oscillators, linear and non-linear applications of Op-Amp.

Sr. No	Lec No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book	URL's (NPTEL/Online Material/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO mapping

					(Page no)				
Unit I –Introduction to Operational Amplifier									
1	1	1	Introduction to Integrated Circuits, IC packages, Pin configuration, Op-Amp Fundamentals: Transfer Characteristic, Open loop amplifier Configuration	Day 1	T2 (Pg : 1-3) T3 (Pg : 8 –19 & 44 - 47)	https://youtu.be/IpXNCwsnxjM https://www.youtube.com/watch?v=clTA0pONnMs	P1/	Students learn the basic of Integrated circuits and OPAMP	C-1,2,3,4
2	2	2	Ideal Opamp Characteristics, Op-Amp parameters such as offset voltage, bias & offset currents, slew rate, CMRR, PSRR etc.	Day 2	T2 (Pg : 37-42) T3 (Pg : 40 –43 & 110-133)	https://www.youtube.com/watch?v=kiiA6WTCQn0 https://www.youtube.com/watch?v=fa433z1hzjY	P1/	Students understand the ideal OPAMP & its various characteristics	C-1,2,3,4
3	3	3	Block Diagram of OPAMP, Differential amplifier Configurations	Day 3	T2 (Pg : 53-56) T3 (Pg : 2 –7)	https://www.youtube.com/watch?v=6zYFPQ6bET0	P6/	Students will learn the internal circuits of OPAMP and various differential amplifier confidurations.	C-1,2,4
4	4	4	Differential amplifier Analysis	Day 4	T2 (Pg : 56-68)	https://www.youtube.com/watch?v=vlFIpCVytTM	P6/	Students will understand the biasing of differential amplifier & its various parameters.	C-1,2,4
5	5	5	Feedback Configurations: Inverting & Non inverting amplifier	Day 5	T2 (Pg : 43-48) T3 (Pg : 71 –93)	https://youtu.be/cCpCIWoHOJc	P1/	Students will learn why, how negative feedback used with OPAMP such as Inverting & Non inverting amplifiers.	C-1,2,3,4,6
Unit II – OPAMP Linear Applications									
6	6	6	Voltage follower,	Day 6	T2 (Pg : 49, 135-	https://www.yout	P1/	learn the linear	C-

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			Summing amplifier, scaling and averaging amplifier		140) T3 (Pg :200 – 204)	ube.com/watch?v=jsKSfaFQ4d4		applications as summing amplifier.	1,2,3,4,6
7	7	7	Instrumentation amplifier and applications,	Day 7	T3 (Pg : 141-144)	https://www.youtube.com/watch?v=pSctPegtZfc	P14/	Understand the use of OPAMP in instrumentation.	C-1,2,3,4,6
8	8	8	Integrator and differentiators (Practical considerations and design)	Day 8	T2 (Pg : 164-175) T3 (Pg : 229-233)	https://www.youtube.com/watch?v=OPvs7A554Rw	P15/	Understand how the different mathematical operations will carried out with OPAMP.	C-1,2,3,4,6
9	9	9	current to voltage converters, voltage to current converters	Day 7	T2 (Pg : 146-147) T3 (Pg : 217-226)	https://www.youtube.com/watch?v=DeDk0RI3Oa0 https://www.youtube.com/watch?v=OMnZehJNGCY	P10/	Students learn about C to V and V to C converters.	C-1,2,3,4,6
10	10	10	Peak detector using OpAmp & Transistor and analog multipliers.	Day 8	T2 (Pg : 151) T3 (Pg : 361-362)	https://www.youtube.com/watch?v=w4531AVjBYY https://www.youtube.com/watch?v=_xGqfXiUkqk	P16/	Stdents will able to understand analog computers and its compnent with OPAMP	C-1,2,3,4,6
Unit III – OPAMP Non Linear Applications									
11	11	11	Comparators	Day 9	T2 (Pg : 207-212) T3 (Pg : 315-327)	https://www.youtube.com/watch?v=k9zQjEaKtfk	P17/	Students will able to understand various comparator circuits.	C-1,2,3,4,6
12	12	12	Log and antilog amplifiers	Day 10	T2 (Pg : 155-159)	https://www.youtube.com/watch?v=Nrfb-s0wl6g	P18/	Students will learn how non linear applications will imlpemented using OPAMP.	C-1,2,3,4,6
13	13	13	Schmitt trigger, Clipper and Clamper	Day 11	T2 (Pg : 212-216, 151-153) T3 (Pg : 315-	https://www.youtube.com/watch?v=6MWiVStJK7M	P20/	Learnt about real time non linear applications such as schmitt trigger,	C-1,2,3,4,6

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					327)			clipper and clamper.	
14	14	14	Precision Rectifier.	Day 12	T2 (Pg : 148-150) T3 (Pg : 354-356)	https://www.youtube.com/watch?v=UYT-VHdXk_k	P3,P4,P5/	Learnt about how to convert AC to DC using OPAMP.	C-1,2,3,4,6
15	15	15	Multivibrators: Bistable, Monostable, Astable multivibrator circuits using Op-Amp, Sample/Hold circuits	Day 13	T2 (Pg : 216-222) T3 (Pg : 287-289)	https://www.youtube.com/watch?v=pUibCkUB364	P11/	Learnt about the square wave generator using OPAMP.	C-1,2,3,4,5,6
Unit IV – Signal Generator									
16	16	16	Principle of Oscillators, Barkhausen's criterion	Day 14	T2 (Pg : 222-223) T3 (Pg : 279-281)	https://youtu.be/0RSI-QJ5-4A	P19/	Learnt about Concept of Oscillators.	C-1,2,3,4,6
17	17	17	Oscillator types: RC, LC oscillators	Day 15	T2 (Pg : 223-230) T3 (Pg :281–284)	https://youtu.be/K0BMVASajm4	P19/	Understand the various types of Oscillators.	C-1,2,3,4,6
18	18	18	Triangular wave generator, Saw tooth wave generators	Day 16	T2 (Pg : 223-230) T3 (Pg : 289 – 293)	https://www.youtube.com/watch?v=-_Ny8YjPY-U	P19/	Students get the details about other types of waveform generation.	C-1,2,3,4,6
19	19	19	Monolithic timer IC 555, applications of IC 555	Day 17	T2 (Pg : 311-321) T3 (Pg : 400-411)	http://www.infocobuild.com/education/audio-video-courses/electronics/BasicElectronics-Patil-IIT-Bombay/lecture-69.html	P2/	Student will get the information about Timer IC 555 and how it will generate timing waveforms.	C-2,3,4
20	20	20	V to F and F to V converters	Day 18	T3 (Pg : 330-340)	https://www.youtube.com/watch?v=DeDk0RI3Oa0	P9/	Students learn the implementation of Voltage to frequency & Frequency to	C-1,2,3,4,6

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								Voltage converter using OPAMP.	
Unit V – Deign of Converters & Filters									
21	21	21	D-A conversion techniques	Day 19	T2 (Pg : 348-357) T3 (Pg : 342-347)	https://youtu.be/wa7pIviT-do	P8/	Students learn the various types & implementation of D-A converter using OPAMP	C-1,2,3,4,5,6
22	22	22	A-D Conversion techniques	Day 20	T2 (Pg : 358-365) T3 (Pg : 348-350)	https://youtu.be/wa7pIviT-do	P8/	Students learn the various types & implemntation of A-D converter using OPAMP	C-1,2,3,4,5,6
23	23	23	First and second order Low Pass filter	Day 21	T2 (Pg : 262-268) T3 (Pg : 250-260)	https://youtu.be/fhCTxP1ZLHI	P12/	Students will understand and design Low Pass Filters.	C-1,2,3,4,6
24	24	24	High Pass filter	Day 22	T2 (Pg : 268-272) T3 (Pg : 261-265)	https://youtu.be/Fjgb-GobkHE	P12/	Students will understand and design High Pass Filters.	C-1,2,3,4,6
25	25	25	Band Pass filter, Band Select and All pass active filters.	Day 23	T2 (Pg : 272-282) T3 (Pg : 268-277)	https://youtu.be/80WTmTbIr6Y	P12/	Students will understand and design Band Pass Filters.	C-1,2,3,4,6
Unit VI – Phase Lock Loop & Multipliers									
26	26	26	Block diagram of PLL	Day 24	T2 (Pg : 327-328) T3 (Pg : 413-420)	https://youtu.be/KeO3fhLftfQ	P13/	Students will understand concept Phase Lock Loop.	C-2,3,4
27	27	27	lock range, capture range and Sample circuits for each block	Day 25	T2 (Pg : 329-342) T3 (Pg : 413-420)	https://www.youtube.com/watch?v=bJNDh46uI3w	P13/	Students will understand and analyse various parameters of PLL.	C-2,3,4
28	28	28	Applications of PLL - Frequency synthesizer FM	Day 26	T2 (Pg : 342-345) T3 (Pg : 420-	https://www.youtube.com/watch?v=AmZK4a9eJwU	P21/	Students will study various application of PLL.	C-2,3,4

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			demodulator		424)				
29	29	29	AM demodulator, FSK demodulator	Day 27	T2 (Pg : 342-345) T3 (Pg : 425-427)	https://ocw.mit.edu/resources/res-6-010-electronic-feedback-systems-spring-2013/course-videos/lecture-19-phase-locked-loops/	P21/	Students will stydy various application of PLL.	C-2,3,4
30	30	30	Analog multiplier, Multiplier IC	Day 28	T2 (Pg : 159-164)	https://encrypted-vtbn0.gstatic.com/video?q=tbn:ANd9GcTUn-qmtsxBJyk--CcxVZs5RHjJzziYdxLVqlW7D4pYrCZmKLfS	P21/	Students will understand analog Computers & its components using OPAMP.	C-2,3,4

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 30

Total number of lectures as per planned: - 30

Tutorial Plan

Week	Topic	No. Of Problems	Mapped With CO
1	Numerical on Inverting amplifier, Non inverting Amplifier etc	06	1,2,3,4,6
2	Numerical on summing amplifier, integrator, differentiator etc	06	1,2,3,4,6
3	Numerical on Schmitt trigger, rectifiers etc.	04	1,2,3,4,6
4	Design of Oscillators, Multivibrators using IC 555	04	1,2,3,4,5,6
5	Design of Filters	03	1,2,3,4,6

Assignment Plan

Assignment	Topic	Given	Submission	Mapped

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No.		Date	Date	With CO
1	Basics of OPAMP, Linear applications	17/8/2020	24/8/2020	1,2,3,4

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's
1	Implementation of various circuits using pspice		1,2,3,4,5,6

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Op-amp & Linear ICs'	David A. Bell	oxford	2013
T2	Linear Integrated Circuits	D. Roy Choudhary, Sheil B.Jani	New Age	III edition, 2007
T3	Op-amps and Linear Integrated Circuits	Ramakant A. Gayakward	PHI	IV edition, 2003
T4	A Monograph on Electronics Design Principals	N. C. Goyal and Khetan	Khanna Publications	
T5	Design with Operational Amplifiers and Analog Integrated Circuits	Sergio Franco	Mc Graw Hill.	
T6	Opamps & Linear Integrated Circuits Concepts & Applications	Fiore	Cengage	2010
T7	Fundamentals of Analog Circuits	Floyd , Buchla	Pearson	2013
T8	Integrated Electronics – Analog and Digital circuits system	Jacob Millman, Christos C. Halkias	Tata McGraw Hill	2003
T9	Op-amp and Linear ICs	Robert F. Coughlin, Fredrick F. Driscoll	PHI Learning	6th edition, 2012
T10	Operational Amplifier Design and Applications	Tobey, Graham, Huelsman	McGraw Hill.	

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Texas Instruments	www.ti.com	It is a global semiconductor company that designs, manufactures, tests and sells analog and embedded processing chips.
C2	Toshiba	www.toshiba.semicon-storage.com	It offers a wide range of linear ICs including op amps, comparators, transistor arrays, and power amplifier ICs.

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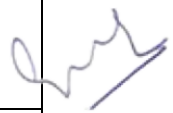
C3	Analog Devices	www.analog.com	It is a world leader in the design, manufacture, and marketing of a broad portfolio of high performance analog, mixed-signal, and digital signal processing (DSP) integrated circuits (ICs) used in virtually all types of electronic equipment.
C4	Advanced Micro Devices	www.amd.com	It designs the circuitry for microprocessors, graphics, embedded devices and accelerated processing units.
C5	Cofil	www.cofil.com	It is world's leaders in the field of cam mechanisms for industrial automation.
C6	Silicon Labs	www.silabs.com	It is a global technology company that designs and manufactures semiconductors, other silicon devices and software, which it sells to electronics design engineers and manufacturers in Internet of Things infrastructure, industrial automation, consumer and automotive markets worldwide.
C7	Signetics	www.signetic.com	Signetics was an American electronics manufacturer specifically established to make integrated circuits. Founded in 1961, they went on to develop a number of early microprocessors and support chips, as well as the widely used 555 timer chip.
C8	Maxim Integrated	www.maximintegraed.com	From our sensor platforms to IC solutions for embedded security, power management, interface, communications, and much more, our technologies empower design innovation.
C9	Arrow	www.arrow.com	The company specializes in distribution and value added services relating to electronic components and computer products.
C10	OHM Technologies	www.ohmtechnologies.com	It is engaged in offering precession made Scientific Electronic Equipment to all leading technical institutions in India and other countries

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Operational amplifiers teaching and students' understanding	Nikolaos F. Voudoukis	https://www.researchgate.net/publication/319716474	DOI: 10.1109/EDUCON.2017.7942865 ·	2017
P2	Understanding of IC555 Timer and IC 555 Timer Tester	Himani Goyal	International Journal of Inventive Engineering and Sciences (IJIES)	ISSN: 2319–9598	Volume-3 Issue-2, January 2015
P3	A NOVEL CMOS PRECISE FULL-WAVE RECTIFIER BY OPERATIONAL AMPLIFIER AND NEW STRUCTURE FOR DIODE	AREF VAKILI, MOHSEN SADEGHI & ABBAS	BEST: International Journal of Management, Information Technology and Engineering (BEST: IJMITE) :		Vol. 1, Issue 2, Nov 2013, 1-6



		GOLMAKANI	https://www.researchgate.net/publication/236867285		
P4	Novel precision full-wave rectifier	S. J. G. Gift	https://ieeexplore.ieee.org/xpl/conhome/7272/proceeding	https://doi.org/10.1109/ICECS.2000.911519	17-20 Dec. 2000
P5	CMOS precision full-wave and half-wave rectifier	S. Ramasamy	https://ieeexplore.ieee.org/xpl/conhome/5938215/proceeding	https://doi.org/10.1109/CSAE.2011.5952911	14-07-2011
P6	High-Performance Full-Differential Op-Amp Design	Yang Yang	https://ieeexplore.ieee.org/xpl/conhome/5210823/proceeding	https://doi.org/10.1109/ICIE.2009.266	21-08-2009
P7	Simulation versus real world of operational amplifier circuits	Gheorghe-Eugen Subtirelu	9th International Symposium on Advanced Topics in Electrical Engineering (ATEE)	https://doi.org/10.1109/ATEE.2015.7133940	25-06-2015
P8	Design of operational amplifier, analog to digital converter for the measurement of bone strain using CMOS technology	M. Siva Sankari	International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS)	10.1109/ICIIECS.2015.7193104	2015
P9	Design of a Linear Voltage to Frequency converter	Shajin Prince, Samson Immanuel J, Manoj G, Amir Anton Jone A, Bini D	International Journal of Innovative Technology and Exploring Engineering (IJITEE)	ISSN: 2278-3075	Volume-9 Issue-1, November 2019
P10	A current to voltage converter for cryogenics using a CMOS operational amplifier	K. Hayashi	25th International Conference on Low Temperature Physics (LT25)	doi:10.1088/1742-6596/150/1/012016	2016
P11	Sample and hold circuits for low-frequency signals in analog-to-digital converter	Soliman A. Mahmoud	International Conference on Information and Communication Technology Research (ICTRC)	10.1109/ICTRC.2015.7156415	2015
P12	Analog filter design: Current design techniques and trends	Edgar Sánchez-Sinencio	IEEE Custom Integrated Circuits Conference (CICC)	10.1109/CICC.2017.7993716	2017
P13	Phase Locked Loop – A Review	Shilpi Maji, Supantha Mandal Suraj Kumar Saw	International Journal of Engineering Research & Technology (IJERT)	ISSN: 2278-0181	CMRAES - 2016 Conference Proceedings
P14	A Review on Instrumentation Amplifier and Methods to Improve CMRR	Jasbir Kaur, Anisha Ganpati	International Journal of Electrical Electronics & Computer Science Engineering www.ijeecse.com	E-ISSN : 2348-2273 | P-ISSN : 2454-1222	Volume 5, Issue 1 February, 2018

P15	Design and Simulation of VFA and CFA Based Integrator and Differentiator using NI Multisim and their Comparison	Vijaylaxmi Kalyani Aayushi Arya	International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)	ISSN: 2278-909X	Vol. 3 Issue 8, August 2014
P16	Two-phase low-power analogue CMOS peak detector with high dynamic range	E Malankin	Journal of Physics: Conference Series 675 (2016) 042032	doi:10.1088/1742-6596/675/4/042032	IOP Publishing
P17	Design and Simulation of Op-Amp based Comparator for Sigma Delta Modulator	Basaveshwara B R, Dr. Kiran A Gupta	International Research Journal of Engineering and Technology (IRJET)	e-ISSN: 2395-0056	Volume: 05 Issue: 09 | Sep 2018
P18	A Novel Approach to Drive Digital CMOS Inverter Using Logarithmic Amplifier	Rekha Murthy	International Journal of Science and Research (IJSR)	ISSN (Online): 2319-7064	2013
P19	Theoretical and experimental research on the current-mode RC oscillators	Luiza Grigorescu Ioana Diaconescu	IEEE 8th International Conference on Electronics, Computers and Artificial Intelligence (ECAI)	**DOI:** 10.1109/ECAI.2016.7861076	2016
P20	A novel Schmitt trigger and its application using a single four terminal floating nullor (FTFN)	Ashish Ranjan Harika Pamu Huirem Tarunkumar	Analog Integrated Circuits and Signal Processing	https://doi.org/10.1007/s10470-018-1229-y	11 June 2018
P21	Research on phase-locked loop control and its application	Dajin Zhang Peng Gao Dong Xie	IEEE Information Technology, Networking, Electronic and Automation Control Conference	**DOI:** 10.1109/ITNEC.2016.7560475	2016

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Department of Electronics and Telecommunication Engineering
"Rectifying Ideas, Amplifying Knowledge"
2020-21 (Even Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Teaching Plan

Course : B. Tech in Electronics & Telecommunication	**Year/Semester :**4th Semester (2nd Year)	
Name of the Teacher : Prof. Gayatri Bhoyar	**Subject Code :**ET4T004	
Subject : Electronic Devices and Circuits- II	**Section :**ETC	
Periods per Week (each 60 min)	**Lecture**	**2**
	Tutorial	**1**
	Practical	**2**

Course Objective	Course Outcomes
1. To introduce semiconductor devices MOSFET, it's characteristics, DC analysis, biasing and applications 2. To analyze and interpret MOSFET circuits for small signal 3. To study the different types of voltage regulators 4. To design different electronic circuits	At the end of this course students will demonstrate the ability to 1. Explain the working principle, operation and characteristics of Semiconductor devices such as MOSFET 2. Apply Knowledge of semiconductor devices and concepts to implement various electronic circuits. 3. Analyze different amplifier configurations. 4. Evaluate the small signal model and performance parameters of the device. 5. Design different oscillator circuits for various frequencies 6. Build and test the performance of electronic circuits

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/ PPT/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapped
Module-1: MOSFET									
1	1	1	MOSFET Introduction, Structure, Symbol	Day 1	T3(120-123)	https://nptel.ac.in/courses/108/107/108107142/	C1-C16	Students will be able to recognize different types of MOSFETS	CO1
2	2	2	Construction of n-channel E-MOSFET, MOS Transistor operation	Day 2	T3(120-123)	https://www.youtube.com/watch?v=g30xTHas3aU	C1-C16	Students will be able to demonstrate construction and working principle of MOSFET	CO1
3	3	3	EMOSFET Characteristics & parameters	Day 3	T3(124-128)	https://www.youtube.com/watch?v=VSUOFdMN00E	C1-C16	Students will be able to Explain relation between various parameters of MOSFET	CO1, CO4
4	4	4	Non-ideal voltage current characteristics viz. Finite output resistance, body effect	Day 4	T3(124-128)	https://nptel.ac.in/courses/108/106/108106158/	C1-C16	Students will be able to Explain secondary effects in MOFET and how it affects threshold voltage of MOSFET and related drain current	CO1, CO4
5	5	5	Sub-threshold conduction, breakdown effects and temperature effects	Day 5	T3 (136-139)	https://nptel.ac.in/courses/108/106/108106158/	C1-C16	Students will be able to Explain secondary effects in MOFET and how it affects threshold voltage of MOSFET and related drain current	CO1, CO4
6	6	6	N-MOS, P-MOS and CMOS devices	Day 6	T3 (140-142)	https://www.youtube.com/watch?v=RBXh5JwA2vI	C1-C16	Students will be able to differentiate PMOS, NMOS and CMOS devices.	CO1
Module-2: MOSFET Biasing and its DC Analysis									
7	7	7	Common MOSFET configurations: Common source circuit	Day 7	T3 (146-152)	https://nptel.ac.in/courses/108/106/108106084/	C1-C16	Students will be able to analyze common MOSFET configurations	CO2, CO3

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8	8	8	Load Line & Modes of operation	Day 8	T3 (153-155)	https://www.chegg.com/homework-help/definitions/mosfet-bias-and-load-lines-4	C1-C16	Students will be able to identify the regions of operation of MOSFET	CO2, CO3
9	9	9	DC Analysis, constant current source biasing	Day 9	T3 (156-163)	https://www.youtube.com/watch?v=umw6DSVKRbM	C1-C16	Students will be able to perform DC Analysis of MOSFET	CO2, CO3
10	10	10	MOSFET as switch, diode/active resistor	Day 10	T3 (165-167)	https://mixsignal.files.wordpress.com/2017/06/1_lesson7-2.pdf	C1-C16	Students will be able toDemonstrate applications of MOSFET	CO2
11	11	11	Current sink and source, Current mirror	Day 11	T3 (171-175)	https://nptel.ac.in/courses/117/101/117101105/ https://nptel.ac.in/courses/108/108/108108111/	C1-C16	Students will be able toDesign Current sources, Current sinks and current mirror circuits	CO2
Module-3: CMOS Inverter									
12	12	12	Principle of operation,DC characteristics	Day 12	T1(87-89)	https://nptel.ac.in/courses/108/106/108106158/	C1-C16	Students will be able to explain the principle of operation of CMOS inverter.	CO1, CO2
13	13	13	DC characteristics	Day 13	T1(87-89)	https://nptel.ac.in/courses/108/106/108106158/	C1-C16	Students will be able toanalyze DC characteristics of CMOS inverter	CO1, CO2
14	14	14	Transient characteristics, noise margin	Day 14	T1(89-91)	https://nptel.ac.in/courses/108/106/108106158/	C1-C16	Students will be able toanalyze transient characteristics and Noise margin of CMOS inverter	CO1, CO2
15	15	15	Static loadMOS inverter	Day 15	T1(89-93)	https://www.youtube.com/watch?v=fiQpWCOt2qE	C1-C16	Students will be able toanalyzeStatic loadMOS inverter.	CO1, CO2
16	16	16	Transmission gate	Day 16	T1(11-12)	https://nptel.ac.in/courses/108/106/108106158/	C1-C16	Students will be able to explain the operation of transmission gate.	CO1, CO2
Module-4: Study of CMOS Logic									
17	17	17	Study of Combinational	Day 17	T1(9-10)	https://nptel.ac.in/courses/108/106/108106158/	C1-C16	Students will be able to Design Combinational logic	CO1, CO2

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			logicgates					gates Using CMOS Gates	
18	18	18	Combinational logic gates	Day 18	T1(9-10)	https://nptel.ac.in/courses/108/107/108107129/	C1-C16	Students will be able to Design Combinational logic gates Using CMOS Gates	CO1, CO2
19	19	19	Compound gates	Day 19	T1(11-12)	https://nptel.ac.in/courses/108/107/108107129/	C1-C16	Students will be able to Compound gates Using CMOS Gates	CO1, CO2
20	20	20	Multiplexers	Day 20	T1(13-15)	https://nptel.ac.in/courses/108/106/108106158/	C1-C16	Students will be able to Design Multiplexers Using CMOS Gates	CO1, CO2
21	21	21	Memory elements using CMOS technology	Day 21	T1(13-16)	https://nptel.ac.in/courses/108/106/108106158/	C1-C16	Students will be able to Design Latches Using CMOS Gates	CO1, CO2
22	22	22	Memory elements using CMOS technology	Day 22	T1(13-16)	https://nptel.ac.in/courses/108/107/108107129/	C1-C16	Students will be able to Design flip Flops Using CMOS Gates	CO1, CO2
Module-5: Oscillators									
23	23	23	Barkhausen criterion, stability with feedback.	Day 23	T4 (484, 471-475)	https://www.youtube.com/watch?v=skDVcnVwK3A https://www.youtube.com/watch?v=xHNDrbB-iWY	C1-C16	Students will be able to illustrate the criterion for oscillations.	CO5
24	24	24	Classification of oscillators, RC Oscillators:FET RC Phase Shift oscillator	Day 24	T2 (758-760)	https://nptel.ac.in/courses/117/101/117101105/	C1-C16	Students will be able to classify oscillators	CO5
25	25	25	Wein bridge oscillator	Day 25	T2(772)	https://nptel.ac.in/courses/117/101/117101105/	C1-C16	Students will be able design Wein bridge oscillator for a given frequency	CO5
26	26	26	LC Oscillators: Hartley and Colpitts oscillators	Day 26	T2 (760-765)	https://nptel.ac.in/courses/117/101/117101105/	C1-C16	Students will be able design Hartley and Colpitts oscillators for a given frequency	CO5, CO6
27	27	27	Crystal oscillators, UJT Relaxation oscillator	Day 27	T2 (765-769)	https://www.digimat.in/nptel/courses/video/108108111/L32.html	C1-C16	Students will be able toDemonstrate the working of Crystal oscillator and UJT	CO5

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								relaxation oscillator	
Module-6: Voltage Regulators									
28	28	28	Block diagram of an (317,337) adjustable three terminal positive and negative regulators typical connection diagram	Day 28	T2 (792-795)	https://www.youtube.com/watch?v=SQ LM 317 Data Sheet http://www.ti.com/lit/ds/slvs044x/slvs044x.pdf	C1-C16	Students will be able to Design adjustable positive voltage regulator using 317	CO2
29	29	29	Block diagram of an (317,337) adjustable three terminal positive and negative regulators typical connection diagram	Day 29	R5 (715-716)	https://www.ti.com/lit/ds/symlink/lm337-n.pdf/ LM137, LM337-N Data Sheet http://www.ti.com/lit/ds/symlink/lm137.pdf	C1-C16	Students will be able to design adjustable negative voltage regulator using 337	CO2
30	30	30	Current boosting, Low drop out voltage regulators	Day 30		https://www.analog.com/en/analog-dialogue/articles/low-dropout-regulators.html	C1-C16	Students will be able to Demonstrate current boosting and low dropout voltage regulators.	CO2
31	31	31	Introduction to Switch Mode Power supply (SMPS), Block diagram of SMPS Types of SMPS	Day 31	R6 (654-660)	https://nptel.ac.in/courses/108/108/108108036/	C1-C16	Students will be able to Explain working principle of SMPS	CO2
32	32	32	Comparison of Linear Power supply and SMPS	Day 32	R6 (660-661)	https://www.youtube.com/watch?v=3qoyjp_8TcY	C1-C16	Students will be able to design Power supply	CO2

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 32 Total number of lectures as per planned: -32

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Tutorial Plan			
Week	**Topic**	**No. Of Problems**	**Mapped With CO**
1	Tutorial Sheet is attached		

Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	Unit 1 and 2	26/03/2021	02/04/2021	CO2,CO4, CO5
2	Unit 4 and 5	19/05/2021	28/05/2021	CO1, CO2,CO4

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's not covered in TP**
1	Design of FET based Hartley Oscillator using Multisim	02/05/2023	CO5
2	Design of CMOS NAND Gates using eSim	11/05/2023	CO5

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Text Books

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	CMOS VLSI Design – A Circuits andSystems Perspective	Neil Weste and David Harris, Addison Wesley	Pearson	Fourth edition
T2	Electronic Devices and Circuits Theory	R.L.Boylestad&Nashlesky	Prentice Hall of India	Ninth Edition
T3	Microelectronics- Circuit Analysis and Design	Donald Neaman	TataMcGraw Hill	Fourth Edition

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T4	Integrated Electronics- Analog and Digital Circuits and Systems	Millman, Halkias	TataMcGraw Hill	Second Edition
Reference Books				
R1	Electronics Devices & Circuits	BrijeshIyer, S. L. Nalbalwar, R. Dudhe	SynergyKnowledgeware Mumbai ISBN:9789383352616	2017
R2	Electronic Devices and Circuits	David A. Bell	Prentice Hall of India	Fourth Edition
R3	Electronic Devices	Floyd	Pearson	Seventh Edition
R4	Microelectronic Circuits	Sedra and Smith	Oxford University Press	2004
R5	Electronic Devices and Circuits Principles and Applications	N. P. Deshpande	TataMcGraw Hill	2004
R6	Electronic Devices and Circuits	S. Salivahanan, N. S. Kumar	TataMcGraw Hill	Second Edition

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Sibridge Technologies	sibridgetech.com	A provider of innovative value added solution for design, verification and embedded systems development to semiconductors and electronic product companies
C2	SmartPlay Technologies	smartplayin.com	A provider of digital, analog, wirelesssoftware and system design and an independent design house for design and customization of 3G smart phones
C3	Terminus Circuits	terminus Circuits.com	A solution provider for OEM (Original Equipments Manufacturer) through custom IPs
C4	Adroit IC Design	adroiticdesign.com	A fabless semiconductor company designing next generation IP in cutting edge process technology nodes
C5	Ineda Systems	inedasystems.com	A provider of low power SOC's for the use in both consumer and enterprise

			applications.
C6	Infineon Technologies India Pvt. Ltd.	infineon.com	A provider of semiconductors and system solutions for automative and industrial electronics and chip card and security applications
C7	Masamb Electronics Systems	masamb.com	A provider of semiconductor design services and Embedded Systems Design solutions.
C8	Saankhya Labs	saankhyalabs.com	A fabless semiconductor company designing software defined Universal demodulator IC for Digital and Analog TV reception.
C9	Semtronics Micro Systems	semtronicsmicrosystems.com	A provider of IC and IC based power systems design and manufacturing of LED drivers
C10	ON Semiconductor	www.onsemi.com	A provider of innovative energy efficient power and signal management logic, discrete and custom semiconductors products.
C11	Texas Instruments	www.ti.com	A global semiconductor design and manufacturing company. Innovate with 80000+ analog Ics and Embedded processors, software & support
C12	National Instruments	www.ni.com	A global provider in automated Test and Measurement Systems
C13	AMD	www.amd.com	A global provider of Processor and Semicustom ICs and products
C14	Motorola	www.motorola.in	A company designing Android cell phones and modular smartphones.
C15	Xilinx	www.xilinx.com	Inventor of the FPGA, programmable SoCs, and ACAP. Provider of highly-flexible programmable silicon, enabled by a suite of advanced software and tools. Xilinx delivers the most dynamic processing technology in the industry, enabling rapid innovation with its adaptable, intelligent computing.
C16	Intel	www.intel.com	A company designing processors, manufactures motherboard chipsets, NI Controllers, Memory chips, embedded processors and semiconductor devices related to communication and computing.

Research Papers:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Performance Analysis of Constant Current Source for Different Aspect Ratio	Gyan Prakash Pal	IEEE International Conference on Computational Intelligence & Communication Technology	10.1109/CICT.2015.14	2015
P2	Current source gate drive circuits with low power consumption for high frequency power converters	AyatoSagehashi	9th International Conference on Power Electronics and ECCE Asia	10.1109/ICPE.2015.7167906	2015
P3	Design and development of a novel MOSFET structure for reduction of	Mukherjee, Debasis	https://www.inderscienceonline.com/loi/ijisc	https://doi.org/10.1504/IJISC.2020.104624	Volume1, issue 1, 29 January 2020

	reverse bias pn junction leakage current				
P4	Mathematical model of the microelectronic oscillator based on the BJT-MOSFET structure with negative differential resistance	Andriy Semenov	2017 IEEE 37th International Conference on Electronics and Nanotechnology (ELNANO)	https://doi.org/10.1109/ELNANO.2017.7939736	18-20 April 2017
P5	A 10-A High-Precision DC Current Source With Stability Better Than 0.1 ppm/h	Nong Wang	School of Electrical Engineering and Automation, Harbin Institute of Technology, Harbin, China	10.1109/TIM.2014.2376114	2014
P6	Two new Schmitt trigger circuits based on current sink and current source inverters	Sk. Apsana Parveen ; M. S. S. Rukmini ; AvireniSrinivasulu	Interntional Conference on Signal Processing and Communication Engineering Systems	10.1109/SPACES.2015.7058233	2015
P7	4H-SiC Trench MOSFET With Floating/Grounded Junction Barrier-controlled Gate Structure	Xintian Zhou	IEEE Transactions on Electron Devices	https://doi.org/10.1109/TED.2017.2755721	20 October 2017
P8	Design of low voltage bandgap reference circuit using subthreshold MOSFET	Sushma S Sangolli	5th Nirma University International Conference on Engineering (NUiCONE)	10.1109/NUICONE.2015.7449627	2015
P9	Electrical characteristics of gate-all-around MOSFET ring oscillators using TCAD simulation	Sutae Kim	2018 International Symposium on VLSI Technology, Systems and Application (VLSI-TSA)	https://doi.org/10.1109/VLSI-TSA.2018.8403835	16-19 April 2018
P10	A subthreshold MOSFET bandgap reference with ultra-low power supply voltage	Yilei Li	9th IEEE International Conference on ASIC	10.1109/ASICON.2011.6157341	2011
P11	A 0.9-V 33.7-ppm/°C 85-nW Sub-Bandgap Voltage Reference Consisting of Subthreshold MOSFETs and Single BJT	Lidan Wang	IEEE Transactions on Very Large Scale Integration (VLSI) Systems	10.1109/TVLSI.2018.2836331	Volume: 26 , Issue: 10 , Oct. 2018
P12	Studying the operation of MOSFET RC-phase shift oscillator under different environmental conditions	Reiham O. Ibrahim	Science direct journal Nuclear-engineering-and-technology	https://doi.org/10.1016/j.net.2020.01.017	Volume: 52 , Issue:8 August 2020, Pages 1764-1770.

P13	A Colpitts Oscillator-Based Self-Starting Boost Converter for Thermoelectric Energy Harvesting With 40-mV Startup Voltage and 75% Maximum Efficiency	Baek Min Lim	IEEE Journal of Solid-State Circuits	https://doi.org/10.1109/JSSC.2018.2863951	Volume: 53, Issue: 11, Nov. 2018)
P14	A CMOS Inverter-Like Class-D/E Power Amplifier with No RF-Choke and No Dead-Time Requirement	Gagan Deep Singh	IEEE International Symposium on Circuits and Systems (ISCAS)	10.1109/ISCAS.2018.8351789	2018
P15	A 0.18µm CMOS switched-capacitor amplifier using current-starving inverter based op-amp for low-power biosensor applications	Ryan Selby	IEEE 4th Latin American Symposium on Circuits and Systems (LASCAS)	10.1109/LASCAS.2013.6519039	2013
P16	Design and Implementation of MOSFET Based Folded Cascode Current Mirror	Manendra Singh	2018 International Conference on Intelligent Circuits and Systems (ICICS)	https://doi.org/10.1109/ICICS.2018.00016	19-20 April 2018
P17	A CMOS inverter-based class-AB pseudo differential amplifier for HF applications	ApirakSuadet	IEEE International Conference of Electron Devices and Solid-State Circuits (EDSSC)	10.1109/EDSSC.2010.5713694	2010
P18	Transconductance CMOS inverter based AC coupling amplifier	HervéBarthélemy	IEEE 12th International New Circuits and Systems Conference (NEWCAS)	10.1109/NEWCAS.2014.6933972	2014
P19	A highly efficient 1.9-GHz Si high-power MOS amplifier	I. Yoshida	IEEE Transactions on Electron Devices	10.1109/16.662810	Volume: 45 , Issue: 4 , Apr 1998
P20	Modeling of Short-Channel Effects in GaN HEMTs	MojtabaAllaei	IEEE Transactions on Electron Devices	https://doi.org/10.1109/TED.2020.3005122	Volume: 67, Issue: 8, Aug. 2020)
P21	Analysis and Design of Class-E Power Amplifier With MOSFET Parasitic Linear and Nonlinear Capacitances at Any Duty Ratio	Mohsen Hayati	IEEE Transactions on Power Electronics	10.1109/TPEL.2013.2247633	Volume: 28 , Issue: 11 , Nov. 2013
P22	Millimeter-wave CMOS power amplifiers in common-source MOSFETs	Sang-Hyun Hwang	International SoC Design Conference	10.1109/SOCDC.2008.4815657	2008
P23	High-Drain Field Impacting Channel-Length Modulation Effect for Nano-Node N-Channel FinFETs	Mu Chun wang	MDPI Journal	https://doi.org/10.3390/cryst11030262/	Volume 11, Issue 3, March 2021

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P24	SiC MOSFET threshold-stability issues	AiversJ.Lelis	Science direct journal Materials Science in Semiconductor Processing	https://doi.org/10.1016/j.mssp.2017.11.028	Volume: 78 May 2018, Pages 32-37
P25	The gain advantages of four cascaded single stage distributed amplifier configurations	Ben Banyamin	IEEE MTT-S International Microwave Symposium digest.	10.1109/MWSYM.2000.861764	IEEE MTT-S International Microwave Symposium3:1325 - 1328 vol.3 · February 2000
P26	Switched-mode power supply design guidelines for smartphones and tablets for reducing RF emissions	Yagnesh V. Waghela	International Conference on ElectroMagnetic Interference & Compatibility (INCEMIC)	10.1109/INCEMIC.2016.7921502	2016
P27	Multiple output SMPS with improved input power quality	Shikha Singh	5th International Conference on Industrial and Information Systems	10.1109/ICIINFS.2010.5578673	2010
P28	Wide Range Current Mirror Implemented with Triode Region Transistors	Hayk a. Aghayan	2020 IEEE 40th International Conference on Electronics and Nanotechnology (ELNANO)	https://doi.org/10.1109/ELNANO50318.2020.9088817	22-24 April 2020
P29	A Comparative Study Of Cntfet And Mosfet Devices Through The Design Of Current Mirrors	Roberto Marani	International Journal of Advances in Engineering & Technology,	https://orcid.org/0000-0003-4949-987X http://www.scopus.com/inward/authorDetails.url?authorID=7004631160&partnerID=MN8TOARS	Vol. 13, Issue 4, pp. 116-122, August, 2020
P30	A Review on Analysis of Performance Parameters in Low Voltage Current Mirror Circuits	S. Saranya	Springer Proceedings Advances in Materials Research	https://doi.org/10.1007/978-981-15-8319-3_106/	SPM, volume 5,05 February 2021

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Course Co-ordinator

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Department of Electronics and Telecommunication Engineering

"Rectifying Ideas, Amplifying Knowledge"

2022-23 (Odd Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Teaching Plan

Programme :B. Tech in Electronics & Tele. Engineering	**Year/Semester :**5th Semester (3rd Year)
Name of the Teacher : Prof.AkankshaS.Sontakke	**CourseCode :**ET5O005A
Course : Basic Electronic Components	**Section :**ETC

Periods per Week (each 60 min)	Lecture	**4**
	Practical	**-**
	Tutorial	**-**

Course Objective	Course Outcomes
1. Understand key elements of basic electronics and their representation. **2.** Understand the concept of digital electronics. **3.** Understand the principle of microprocessor and microcontroller. **4.** Understand principles of sensors, its characteristics, interfacing with DAQ. **5.** Understand the concept of signal modelling and Op-amp.	1. Remember and understand the key elements of basic electronics and their representation. 2. Identify the various logic gates and their applications in digital electronics. 3. Distinguish between combinational and sequential circuits. 4. Analyze various Sensors & Actuators. 5. Interface the Sensors, Actuators using appropriate data acquisition system. 6. Design small applications of Opamp.

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Sr. No.	Lec. No.	Topic Code	Contents to be Covered	Planned Teaching Dates/ Days	Text Book (Page No) Reference Book (Page No)	URL's (NPTEL/Online Material/PPT/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapping
Module-1: Semiconductor Devices (6 HRS)									
1	1	1.1	Introduction to basic electronic components: Resistor, Capacitor	Day 1	R1 (166-173)	https://youtu.be/GKX9Vy0YHws https://youtu.be/XUR-dnDa7eIhttps://youtu.be/n6mVIX7yNws	C1-C10, P1, P10,P15	Students will be able to aware about the various electronic components.	CO1
2	2	1.2	Inductor and Power supply	Day 2	R1(174-180)	https://nptel.ac.in/content/storage2 https://youtu.be/_nIbf69sXQY?list=PLEu4uwntMkZqu5aoxTNrcnC0vBq0mNH9Q		Students will know about the use of power supply.	CO1
3	3	1.3	Working principle and application of Zener diode, Varactor diode	Day 3	R2(397-400) R2(400)	https://youtu.be/x9vcHOsn9hE https://nptel.ac.in/content/storage2/courses/117101057		Students will be aware about how Zener and Varactor diode works and it's applications.	CO1
4	4	1.4	LED, PIN diode and Laser diode	Day 4	R1 (180-185)	https://nptel.ac.in/courses/108/104/108104130/		Students will be attentive about optical sources and detectors.	CO1
5	5	1.5	Transistor and applications: Working principle of BJT, FET	Day 5	R2(395-398)	https://nptel.ac.in/courses/108/104/108104130/		Students will be aware about the different types of transistors and it's application.	CO1
6	6	1.6	MOSFET, application of BJT and MOSFET as amplifier and switch.	Day 6	R2(401-408)	https://nptel.ac.in/courses/108/104/108104130/		Students will know MOSFET works as amplifier and switch.	CO1

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Module-2: Digital Electronics Part-1(6 HRS)									
7	7	2.1	Number System	Day 7	R2 (116-120)	https://youtu.be/Q5fRmZzgEpU	C1-C10	Students will be able to understand the number system and conversion.	CO2
8	8	2.2	Boolean algebra	Day 8	R1 (94-103)	https://youtu.be/3oXJq1x_iJ4		Students will be aware about the Boolean as well as De Morgan's laws.	CO2
9	9	2.3	Logic gates	Day 9	R1 (105-110)	https://youtu.be/0lwhoQ5aQe8 https://youtu.be/n1CJZx4llto	C1-C10	Students will know the different types of logic gates.	CO2
10	10	2.4	Introduction to Combinational Circuits: Multiplexer	Day 10	R2(1106-1112) R2(1114-1115)	https://youtu.be/voh5UcC5wVM?list=PLgwJf8NK-2e7tzLIDL4aXUbtRFY3ykmkT		Students will be attentive about the different combinational circuits.	CO2
11	11	2.5	De-multiplexer, Encoder	Day 11	R2(1117-1119) R2(1125-1125)	https://youtu.be/FarRWppOF-E https://youtu.be/voh5UcC5	C1-C10	Students will be aware about the design of DEMUX & Encoder.	CO2
12	12	2.6	Decoder	Day 12	R2(1136-1144) R2(1146-1152)	https://youtu.be/JoV6IAyOxEA?list=PLgwJf8NK-2e7tzLIDL4aXUbtRFY3ykmkT	C1-C10	Students will be awake about various types of decoder and it's implementation.	CO2
Module-3: Digital Electronics Part-2(6 HRS)									
13	13	3.1	Introduction to Sequential Circuits: S-RFlip Flop	Day 13	R1 (1-6) R2(529)	https://nptel.ac.in/courses/117106086/23,26	C1-C10 P16	Students will know about sequential circuits.	CO3
14	14	3.2	J-K Flip Flop	Day 14	R1 (7-27) R2(530-533)	https://www.digimat.in/nptel/courses/video/108101092/L01.html		Students will be aware about JK flip-flop & it's design.	CO3

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15	15	3.3	D Flip Flop	Day 15	R1 (38-41) R2(534-538) R1 (44-57,65,64) R2(544-548)	https://youtu.be/0R59T9W7eGY https://youtu.be/rCisiEMAvro		Students will know about design and conversion of D-F/F.	CO3
16	16	3.4	T Flip Flop	Day 16	R1 (42-43,70,70) R2(574-576) R1 (80-84,85-86)	https://youtu.be/F2zhcfyrr2o https://youtu.be/1OM3Bd8GXUo		Students will aware about design and conversion of T-F/F.	CO3
17	17	3.5	Registers	Day 17	R1 (87-91) R1 (142-143)	https://nptel.ac.in/content/storage2/nptel		Students will be aware register and it's different types.	CO3
18	18	3.6	Counters: Synchronous and Asynchronous.	Day 18	R1 (133-136)	https://nptel.ac.in/content/storage2/courses/117101057	C1-C10, P8 P23	Students will be attentive about counters & it's types.	CO3
Module-4: Introduction to Sensors &Actuators(6 HRS)									
19	19	4.1	Static and Dynamic Sensors: Position Sensors, Potentiometer, LVDT, Encoders	Day 19	R6 (151-161)	https://youtu.be/pWRcD7PgR1Q	C1-C10, P8, P9,P18	Students will be able to compare various types of sensors.	CO4
20	20	4.2	Proximity sensors: Optical, Inductive, Capacitive	Day 20	R6 (162-164) R6 (170-181)	https://youtu.be/QWq5CAmIM98		Students will be aware about proximity sensors& it's type.	CO4
21	21	4.3	Motion Sensors: Variable Reluctance; Temperature Sensor: RTD, Thermocouples	Day 21	R6 (182-183) R6 (232-245)	https://youtu.be/E3nzs2IjEXQ		Students will be aware about temperature sensors & it's type.	CO4
22	22	4.4	Force / Pressure Sensors: Strain gauges	Day 22	R6(71-77)	https://youtu.be/9VpimWrPTaM		Students will be able to derive the expression of strain gauge.	CO4

23	23	4.5	Flow sensors: Electromagnetic	Day 23	R6(79-82)	https://youtu.be/4EDOMEGThMQ?list		Students will be understood about how the electromagnetic sensor works.	CO4
24	24	4.6	Actuators: Stepper motor, Servo motor, Solenoids	Day 24	R6(133-142)	https://youtu.be/OptOCxuY-ME https://youtu.be/nq3CyAWsS6A	P20-P21-P22	Students will be aware about actuators and it's working.	CO4
Module-5: Data Acquisition System(6 HRS)									
25	25	5.1	Interfacing of Sensors / Actuators to DAQ system	Day 25	R1 (284-289)	https://nptel.ac.in/content	C1-C10,P19	Students will be able to understand how the sensors are interface.	CO5
26	26	5.2	Bit width, Sampling theorem, Aliasing	Day 26	R1 (290-300)	https://youtu.be/0rcQsC4HUfk https://nptel.ac.in/content/storage2/courses/108101092/Week-4-Antenna-Arrays-II	C1-C10, P7	Students will be aware about sampling theorem & aliasing concept.	CO5
27	27	5.3	Sample and hold circuit	Day 27	R1 (324-327)	https://youtu.be/89Ow7FrYeIQ	C1-C10	Students will be able to understand effect of sample& hold circuit.	CO5
28	28	5.4	Sampling frequency, ADC (Successive Approximation)	Day 28	R1 (328-343)	https://youtu.be/sZObIhzAjUk	C1-C10, P5, P6	Students will be aware about how analog signal converted to digital.	CO5
29	29	5.5	DAC (R-2R)	Day 29	R1 (349-362) R1 (365-369)	https://youtu.be/AIsZqFT03C4	C1-C10	Students will be aware about how digital signal converted to analog.	CO5
30	30	5.6	Current and Voltage Amplifier	Day 30	R1 (619-636) R2(826-827) R2(777-781)	https://nptel.ac.in/courses/108/101/108101092/	C1-C10	Students will be know about different amplifier circuits.	CO5
Module-6: Signal Conditioning and Operational Amplifier(6 Hrs)									

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31	31	6.1	Types of electronic signals, Need for signal processing	Day 31	R2(689-689) R2(707-708)	https://youtu.be/FhirfLrqTGE?list=PLgwJf8NK-2e7tzLIDL4aXUbtRFY3ykmkT	C1-C10	Students will be able to identify the different types of electronics signal.	CO6
32	32	6.2	Operational amplifiers: Types, classification and applications	Day 32	R1(549-565) R2(710-716) R2(718-727, 749-750)	https://youtu.be/DHBvqFKEryA	C1-C10	Students will be aware about the Opam& it's types.	CO6
33	33	6.3	Electro-magnetic Relays	Day 33	R1(500-505) R2(781-785, 791-796) R1(739-805) R2(797-805)	https://youtu.be/cunddFiQzrk https://nptel.ac.in/courses/108/101/108101092/	C1-C10	Students will know how electromagnetic relays work.	CO6
34	34	6.4	Data representation systems: Displays, Seven segment displays	Day 34	R1(811-876) R2(809-815) R2(811-813)	https://nptel.ac.in/content/storage2/courses/108101092/Week-5-Microstrip-Antennas	C1-C10, P2	Students will be able to design different data representation system.	CO6
35	35	6.5	LCD displays, Printers	Day 35	R1(81-87)	https://nptel.ac.in/courses/110/101/108101092/ https://youtu.be/Q0tZPz6GKMg	P12	Students will know how display and printers work.	CO6
36	36	6.6	Data loggers, Data Acquisition Cards/Systems	Day 36	R1(893-933) R2(829-830)	https://youtu.be/v3qDI5mWWuI	C1-C10, P3,P11	Students will be aware about data storage devices.	CO6

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 36

Total number of lectures as per planned: -36

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Tutorial Plan			
Week	**Topic**	**No. of Problems**	**Mapped With CO**
Not Applicable			

Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	Unit No.1(Introduction to basic electronic components)	23/08/22	29/08/22	1
2				

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's not covered in TP**
1			

Unit wise Marks and Question distribution					
Unit-1	**Unit-2**	**Unit-3**	**Unit-4**	**Unit-5**	**Unit-6**

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Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
R1	Electronic Devices and Circuits	S. Salivahanan, N. Suresh Kumar	Tata McGraw Hill, 2011.	2nd / 2011
R2	Fundamentals of Digital Circuits	A. Anand Kumar	Prentice Hall India	4th / 2016
R3	Modern Digital Electronics	R. P. Jain	Tata McGraw Hill	4th Edition
R4	Linear Integrated Circuit	D.RoyChaoudhary, Shail B. Jain	New Age International Publication	4th Edition
R5	Op-amps and Linear Integrated Circuit	Ramakant A. Gaikwad	Pearson Publication.	4th Edition
R6	Mechatronics -A Multidisciplinary approach	Bolton	Prentice Hall	4th Edition/2009

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Sensors India Delhi	https://www.sensorsindia.com	SENSORS INDIA designs, develops and manufactures special-purpose, custom-built, Test and Measuring equipments. It also provides design and engineering software services. Sensors India regards its customers as partners who decide the success of our company. With team of engineers having experience in Electrical, Power Electronics, Pneumatics, Material selection, basic design and elaborate conceptualization of final test system.
C2	ISA – The International Society of Automation	http://brandfamily.isa.org	Automation professionals create and apply technology to monitor and control the production and delivery of products and services. We work in industries like Chemicals, Food and Beverage, Oil and Gas, Petroleum Refining, Pharmaceuticals, Aerospace, Automotive, Engineering and Construction Firms, Building Automation, Pipeline and Natural Gas Utilities, Electrical Utilities, Nuclear Power, and Water/Wastewater Utilities.

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C3	Satyam Mechatronics Pvt. Ltd.	https://www.tradeindia.com/Seller-6571494-Satyam-Mechatronics-Pvt-Ltd-/	About Satyam Mechatronics Pvt. Ltd. :- Established in 2007 , Satyam Mechatronics Pvt. Ltd. has made a name for itself in the list of top service providers of Ultrasonic Proximity Sensor ,Digital Temperature Controllers in India. Satyam Mechatronics Pvt. Ltd. is listed in Trade India's list of verified companies offering wide array of Sensors etc. Contact here for Ultrasonic Proximity Sensor ,Digital Temperature Controllers in Nashik, Maharashtra.
C4	Macurex Sensors Pvt. Ltd	https://www.indiamart.com/macurex-senso/aboutus.html	Macurex is a leading manufacturer and exporter of Electrical /Electronic /Electro-Mechanical parts for the Automotive & Appliance sectors . We are a TS16949 & ISO 9001:2000 certified company. We have a team of young and dynamic professionals, who constantly strive to provide the best work culture as well as emphasize continuously on improving the quality of the products, so that it delivers only the best to its ever-demanding expectations of customers who are our partners in growth.
C5	Toshiba America Inc. (TAI)	https://www.toshiba.com/tai/about_us.jsp	The five companies, which along with TAI are known collectively as Toshiba America Group, are Toshiba America Electronic Components, Inc. (Semiconductor and storage solutions), Toshiba America Energy Systems Corporation (Power generation solutions), Toshiba America Information Systems, Inc. (IOT and Solutions), Toshiba International Corporation (Industrial, power electronics & transmission & distribution solutions), and Toshiba America Research, Inc. (R&D).
C6	Siemens	https://new.siemens.com/global/en/company/about.html	Siemens is a global powerhouse focusing on the areas of electrification, automation and digitalization. One of the world's largest producers of energy-efficient, resource-saving technologies, Siemens is a leading supplier of systems for power generation and transmission as well as medical diagnosis. In infrastructure and industry solutions the company plays a pioneering role.
C7	AutomationDirect	https://www.automationdirect.com	Automationdirect.com, originally founded as PLCDirect in 1994, has quickly grown from a tiny PLC company to a well-recognized name in the Industrial Automation Market. As the first industrial controls company to successfully use a direct sales catalog for PLC products, Automationdirect.com is now setting the standard online in industrial control sales.

C8	ABB	https://new.abb.com	ABB scientists and technologists are continually innovating a comprehensive range of products, systems and services that increase energy efficiency, reliability and productivity for our industrial, utility and infrastructure customers.
C9	Metso	https://www.metso.com	Metso Outotec is a frontrunner in sustainable technologies, end-to-end solutions and services for the aggregates, minerals processing, metals refining and recycling industries globally. Metso Outotec's headquarters is in Helsinki, Finland, and the company employs over 15,000 people in more than 50 countries.
C10	OMRON	https://www.ia.omron.com	OMRON Sensing Components detect, measure, analyze, and process various changes that occur on productions sites, such as changes in position, length, height, displacement, and appearance. They also contribute to predicting and preventing future events.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	A Novel Infrared Temperature Measurement with Dual Mode Modulation of Thermopile Sensor	Chih-Hsiung Shen	Sensors	https://doi.org/10.3390/s19020336	30 November 2018; Accepted: 14 January 2019; Published: 15 January 2019
P2	A Passive Tracking System Based on Geometric Constraints in Adaptive Wireless Sensor Networks	Biao Zhou	Sensors	https://doi.org/10.3390/s18103276	23 July 2018; Accepted: 26 September 2018; Published: 29 September 2018
P3	Proposal of An Equal-Stiffness and Equal-Stroke 2D Micro-Positioning Platform Driven by Piezoelectric Actuators	Feng Sun	Actuators	https://doi.org/10.3390/s18103276	30 May 2020; Accepted: 26 June 2020; Published: 29 June 2020

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P4	Research on an Electromagnetic Actuator for Vibration Suppression and Energy Regeneration	Wei Wei	Actuators	https://doi.org/10.3390/act9020042	14 April 2020 / Revised: 7 May 2020 / Accepted: 20 May 2020 / Published: 22 May 2020
P5	DESIGN OF HIGH ACCURATE DATA ACQUISITION SYSTEM FOR REAL TIME MONITORING OF POWER GRID	Muni Sankar	International Journal of Scientific and Research Publications		IJSRP, Volume 7, Issue 7, July 2017 Edition [ISSN 2250-3153]
P6	A Review paper on SAR ADC using reversible gates	Farhat Siddique	Journal of Emerging Technologies and Innovative Research (JETIR)		March 2016, Volume 3, Issue 3 JETIR (ISSN-2349-5162)
P7	Programmable Logic Controller (PLC) in Automation	Mallikarjun G. Hudedmani	Advanced Journal of Graduate Research	https://doi.org/10.21467/ajgr.2.1.37-45	ISSN:2456-7108, Volume 2, Issue 1, pp. 37-45, July2017
P8	PLC Based Industrial Automation System	Amit Bhimrao Jadhav	International Conference on Recent Trends in Engineering and Management Science (RTEM 2014), At Nagpur		Apr-14
P9	Integration of alarm design in fault detection and diagnosis through alarm-range normalization	MatthieuLucke	Elsevier Control Engineering Practice	https://doi.org/10.1016/j.conengprac.2020.104388	Volume 98, May 2020, 104388
P10	The future of PID control	K.J.Åström	Elsevier Control Engineering Practice	https://doi.org/10.1016/S0967-0661(01)00062-4	Volume 9, Issue 11, November 2001, Pages 1163-1175
P11	Review on Interactive	Apurva J.Mane1,	international Research Journal of Engineering and		Volume: 03 Issue: 08 | Aug-

	Embedded Data Acquisition System for Real Time Application	Dr. Suhas S. Patil	Technology(IRJET)		2016 Pages 278-280
P12	Review of digital printing technologies for electronic materials	Kye-Si Kwon, Md Khalilur Rahman, Thanh HuyPhung, Stephen D Hoath, SunhoJeongand Jang Sub Kim	Flex. Print. Electron.5(2020) 043003	https://doi.org/10.1088/2058-8585/abc8ca	Received 13 February 2020 Revised 26 June 2020 Accepted for publication 9 November 2020 Published 15 December 2020
P13	The future of PID control	K.J.Åström	Elsevier Control Engineering Practice	https://doi.org/10.1016/S0967-0661(01)00062-4	Volume 9, Issue 11, November 2001, Pages 1163-1175
P14	PassiveComponents and Low Pass Filters Using Solvent-free Eco-friendly Fabrication	Muhammad Hamza Zulfiqar	2021 IEEE International Conference on Flexible and Printable Sensors and Systems (FLEPS)	DOI: 10.1109/FLEPS51544.2021.9469750	Date of Conference: 20-23 June 2021 Date Added to IEEE Xplore: 05 July 2021
P15	Mathematical Modelling of Basic Electronic Components with Index Matrices	Valeri Gochev	2019 International Conference on Information Technologies (InfoTech)	DOI: 10.1109/InfoTech.2019.8860887	Date of Conference: 19-20 September 2019 Date Added to IEEE Xplore: 07 October 2019

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P16	Design of Sequential Circuits with Timing Analysis and Considerations	Krishan Kumar, Sonal Dahiya	http://ijesc.org/		Volume 7 Issue No.5October 2018
P17	Visible Light Communication using Laser Diode based Remote Phosphor Technique	Hyunchae Chun SujanRajbhandari	Conference: IEEE International Conference on Communications (ICC 2015)	DOI:10.1109/ICCW.2015.7247373	Conference Paper · June 2015
P18	Real Time Temperature Measurement for the Thermal protection of Switched ReluctanceMachine	E.Annie Elisabeth Jebaseeli , S.Paramasivam	International Journal of Engineering and Technology (IJET)		Vol 5 No 3 Jun-Jul 2013
P19	Design, Implementation and Control of an Improved Hybrid Pneumatic-Electric Actuator for Robot Arms	BEHRAD ROUZBEH 1 , GARY M. BONE 1 , GRAHAM ASHBY2 , AND EUGENE LI	Digital Object Identifier 10.1109/ACCESS.2019.2891532		Received December 12, 2018, accepted December 25, 2018, date of publication January 10, 2019, date of current version February 8, 2019.VOLUME 7, 2019

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P20	A comparative study of DC servo motor parameter estimation using various techniques	Arslan Ahmed Amin	Automatika Journal for Control, Measurement, Electronics, Computing and Communication	DOI:10.1080/00051144.2022.2036935	2022, VOL. 63, NO. 2, 303–312 Received 12 January 2021 Accepted 28 January 2022
P21	Position and Speed Control of Brushless DC Motors Using Sensorless Techniques and Application Trends	José Carlos Gamazo-Real,* Ernesto Vázquez-Sánchez, and Jaime Gómez-Gil	SENSOR	doi: 10.3390/s100706901	Published online 2010 Jul 19
P22	Position and Speed Control of Brushless DC Motors using Sensorless Techniques: A Review	Ms. Poonam M. Yadav, Prof. Mr. Gadgune S. Y	International Journal of Engineering Research & Technology (IJERT)	DOI : 10.17577/IJERTV8IS010023	Vol. 8 Issue 01, January-2019
P23	Design of counters using reversible logic	V. Rajmohan; V. Ranganathan	2011 3rd International Conference on Electronics Computer Technology	DOI: 10.1109/ICECTECH.2011.5941973	Date of Conference: 08-10 April 2011

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Department of Electronics and Telecommunication Engineering

"Rectifying Ideas, Amplifying Knowledge"

2022-23 (Even Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Teaching Plan

Programme : B. Tech in Electronics & Telecommunication	**Year/Semester :**6th Semester (3rdYear)	
Name of the Teacher : Prof. Akanksha S.Sontakke	**Course Code :** ET6E004B	
Course :AI: Knowledge Representation & Reasoning	**Section :**ETC	
Periods per Week (each 60 min)	**Lecture**	**3**
	Tutorial	**0**
	Practical	**0**

Course Objectives	Course Outcomes
1. Study the concepts of Artificial Intelligence. 2. Learn the methods of solving problems using Artificial Intelligence. 3. Learn the knowledge representation techniques, reasoning techniques and planning.	At the end of this course students will be able to 1. Understand the basic principles of Artificial Intelligence and challenges involved in designing intelligent systems by exploring human intelligence nature and its role in problem solving. 2. Represent given problem using state space representation and apply informed and uninformed search techniqueson it. 3. Analyze the issues in the design of search programs and apply appropriate search algorithms 4. Apply knowledge representation techniques and problem solving strategies to common AI applications. 5. Use Prolog Programming language using predicate logic 6. Design Knowledge Based Systems.

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/PPT/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapped
Module-1: Introduction									
1	1	1.1	What is AI? The AI Problems, The Underlying Assumption	Day 1	T1(1-4)	https://nptel.ac.in/courses/106105078	C1-C15	Students will be able to Understand the basic principles of Artificial Intelligence	CO1
2	2	1.2	AI Techniques, The Level of The Model	Day 2	T1(15-20)	https://www.youtube.com/watch?v=fV2k2ivttL0	C1-C15	Students will be able to Understand the basic Artificial Intelligence techniquesand level of model	CO1
3	3	1.3	Criteria For Success, Some General References, One Final Word.	Day 3	T1(20-24)	https://www.youtube.com/watch?v=fV2k2ivttL0	C1-C15	Students will be able to Understand thechallenges involved in designing intelligent systems	CO1
Module-2: Search Techniques									
4	4	2.1	Problems, State Space Search & Heuristic Search Techniques, Defining The Problems As A State Space Search	Day 4	T1(25-30)	https://www.youtube.com/watch?v=5g6iT_26zGQ	C1-C15	Students will be able to Represent given problem using state space representation	CO2
5	5	2.2	Production Systems, Production Characteristics	Day 5	T1(31-44)	https://archive.nptel.ac.in/courses/106/106/106106226/	C1-C15	Students will be able to understand Production Systems and Production Characteristics	CO2, CO3
6	6	2.3	Issues In the Design of Search Programs, Additional Problems. Generate-And-Test	Day 6	T1(45-51)	https://archive.nptel.ac.in/courses/106/106/106106226/	C1-C15	Students will be able to analyze Issues in the Design of Search Programs	CO2, CO3
7	7	2.4	Hill Climbing, Best-First Search, Problem Reduction	Day 7	T1(52-67)	https://www.youtube.com/watch?v=ZOvRZ7UJMjk	C1-C15	Students will be able to apply informed and uninformed search techniques	CO2
8	8	2.5	Constraint Satisfaction, Means-Ends Analysis	Day 8	T1(68-74)	https://www.digimat.in/nptel/courses/video/106106158/L01.html	C1-C15	Students will be able to applyCSP and MEA on Problems	CO2, CO3

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Module-3: Expending Predicate Logic									
9	9	3.1	Representation Simple Facts in Logic	Day 9	T1(99-102)	nptel.ac.in/courses/106/106/106106140/	C1-C15	Students will be able to represent Simple facts in Logic	CO1, CO2
10	10	3.2	Representation Simple Facts in Logic	Day 10	T1(99-102)	nptel.ac.in/courses/106/106/106106140/	C1-C15	Students will be able to represent Simple facts in Logic	CO1, CO2
11	11	3.3	Representing Instance And Isa Relationships	Day 11	T1(103-104)	https://www.youtube.com/watch?v=SwuFzvDOVVs	C1-C15	Students will be able to represent Instance and Isa Relationships	CO1, CO2
12	12	3.4	Computable Functions And Predicates	Day 12	T1(105-107)	https://www.youtube.com/watch?v=eUFFCynDZaM	C1-C15	Students will be able to represent Computable Functions and Predicates	CO1, CO2
13	13	3.5	Resolution	Day 13	T1(108-112)	https://www.youtube.com/watch?v=eaCVH8XWaPc	C1-C15	Students will be able to problems by resolution	CO1, CO2
Module-4: Representing Knowledge Using Rules									
14	14	4.1	Procedural Knowledge	Day 14	T1(129-130)	https://www.youtube.com/watch?v=2ONm2TdQEh0	C1-C15	Students will be able to understandProcedural Knowledge	CO4
15	15	4.2	Procedural versus Declarative Knowledge	Day 15	T1(130)	https://www.youtube.com/watch?v=2ONm2TdQEh0	C1-C15	Students will be able to distinguish between Procedural and Declarative Knowledge	CO4
16	16	4.3	Logic Programming	Day 16	T1(131-133)	https://www.digimat.in/nptel/courses/video/106106140/L42.html	C1-C15	Students will be able to understandLogic Programming	CO4
17	17	4.4	Forward Reasoning	Day 17	T1(133-134)	https://www.digimat.in/nptel/courses/video/106106226/L85.html	C1-C15	Students will be able to understandStudents will be able to understand	CO4
18	18	4.5	Forward Versus Backward Reasoning	Day 18	T1(134)	https://www.youtube.com/watch?v=gMRQNvC-nQY	C1-C15	Students will be able to distinguish between Forward and Backward Reasoning	CO4
Module-5: Game Playing									
19	19	5.1	Overview, And Example Domain : Overview, MiniMax	Day 19	T1(231-233)	https://www.youtube.com/watch?v=a2tqR2eUlek	C1-C15	Students will be able to understandOverview and basic concepts in game playing	CO3, CO4
20	20	5.1	Alpha-Beta Cut-off, Refinements	Day 20	T1(234-236)	https://www.youtube.com/watch?v=0oqhN5tvLgA	C1-C15	Students will be ableunderstandAlpha-Beta Pruning	CO3, CO4
21	21	5.1	Iterative deepening	Day 21	T1(242-244)	https://www.youtube.com/watch?v=5LMXQ1NGHwU	C1-C15	Students will be ableunderstandIterative deepening	CO3, CO4

22	22	5.2	The Blocks World, Components of A Planning System	Day 22	T1(247-250)	https://www.youtube.com/watch?v=CfxqP8JRa2c https://www.youtube.com/watch?v=7lvthOTND_I	C1-C15	Students will be ableunderstandComponents of a Planning System	CO3, CO4
23	23	5.3	Goal Stack Planning	Day 23	T1(255-258)	https://www.youtube.com/watch?v=w5vm3TxRpaQ	C1-C15	Students will be able understand Goal Stack Planning	CO4
24	24	5.4	Nonlinear Planning Using Constraint Posting	Day 24	T1(262-267)	https://www.youtube.com/watch?v=wt2iN_XrNkk	C1-C15	Students will be able understand Nonlinear Planning Using Constraint Posting	CO4
25	25	5.5	Hierarchical Planning, Reactive Systems, Other Planning Techniques	Day 25	T1(268-269)	https://www.youtube.com/watch?v=wt2iN_XrNkk	C1-C15	Students will be able understand Hierarchical Planning and Other Planning Techniques	CO4
Module-6: Introduction to Prolog									
26	26	6.1	Syntax and Numeric Function	Day 26	T1(27-40)	nptel.ac.in/courses/106/105/106105079/	C1-C15	Students will be able to understand Syntax and Numeric Function in Prolog	CO5
27	27	6.2	Basic List Manipulation Functions in Prolog	Day 27	T1(64-74)	nptel.ac.in/courses/106/105/106105079/	C1-C15	Students will be able to understand Basic List Manipulation Functions in Prolog	CO5
28	28	6.3	Functions, Predicates and Conditional	Day 28		nptel.ac.in/courses/106/105/106105079/	C1-C15	Students will be able to understand Functions, Predicates in Prolog	CO5
29	29	6.4	Input, Output and Local Variables	Day 29	T1(137-142)	nptel.ac.in/courses/106/105/106105079/	C1-C15	Students will be able to understandInput, Output and Local Variables	CO5
30	30	6.5	Iteration and RecursionProperty	Day 30		nptel.ac.in/courses/106/105/106105079/	C1-C15	Students will be able to apply Iteration and Recursion Property	CO5
31	31	6.6	Lists and Arrays, Miscellaneous Topics	Day 31		nptel.ac.in/courses/106/105/106105079/	C1-C15	Students will be able to understandLists and Arrays	CO5
32	32	6.7	LISP and Other AI Programming Languages	Day 32		nptel.ac.in/courses/106/105/106105079/	C1-C15	Students will be able to use programming languages	CO5

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*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 28 Total number of lectures as per planned: -32

Tutorial Plan			
Week	**Topic**	**No. of Problems**	**Mapped With CO**
1	NA	NA	NA

Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	Unit 1 and 2	23/01/2023	06/02/2023	CO1, CO2
2	Unit 4 and 5	22/03/2023	04/04/2023	CO4

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's not covered in TP**
1	Introduction to Natural Language Processing(NLP)	15/04/2023	CO4, CO5

Text Books

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Artificial Intelligence	Elaine Rich, Kevin Knight, & Shivashankar B Nair	Tata Mcgraw-Hill	3rd Edition
Reference Books				
R1	Artificial Intelligence – A Modern Approach	Stuart Russell and Peter Norvig	Mc Graw Hill	4thEdition

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R2	PROLOG Programming For Artificial Intelligence	Ivan Bratko	Addison-Wesley	

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Accenture	www.accenture.com	Company is one of the Top consultancies and IT service providers, globally. Being repeatedly mentioned in the Forbes top 50, Accenture provides opportunities for a good artificial intelligence career for freshers and experienced professionals.
C2	Apple	www.apple.com	The company is popularly known for its developments in mobile phone and mobile devices technology. It's a brand that symbolises innovation as it has created revolutions in mobile devices technology and aided in the global digital revolution.
C3	Bosch	www.bosch.com	The company is one of the world's leading engineering companies and holds the same reputation in India as well. Its range of products includes consumer goods, mobility hardware and software, industrial technology and building technology.
C4	Google	www.google.com	Google.ai, the artificial intelligence division of the tech giant is renowned for its efforts to make technology accessible throughout the globe. Starting your artificial intelligence career with google can open up an array of opportunities.
C5	Niki.ai	www.niki.ai	The company, backed by Ratan Tata himself, is a promising platform for the digital revolution that is going to happen in India. Niki is an AI-powered chatbot that can predict and respond to vernacular languages, and currently is integrated into several android and IOS apps, and platforms like Facebook..
C6	InData Labs	www.indatalabs.com	The company is a high-quality provider of Big Data and Artificial Intelligence services tailored to the unique and challenging requirements of their Clients. The company specializes in Data Science, Data Analytics, Artificial Intelligence, Computer Vision, Business Intelligence, and Machine Learning.
C7	Aibono	https://www.aibono.com	Aibono began operations in 2014 by offering AI-powered precision farming solutions to help farmers use analytics, the Internet of Things, and data science to improve yield. The company has since expanded its offerings to sync precision farming with real-time demand and just-in-time harvesting. The solution synchronizes the cropping matrix and predictive harvesting at the farm with retailer consumption data
C8	Raven Industries	https://ravenind.com/	Raven is a technology company that creates innovative solutions to solve great challenges. Utilizing our strength in engineering, manufacturing, and technological innovation, Raven is a leader in precision agriculture and situational awareness markets.
C9	Influential	https://influential.co/	Influential is an AI social data and conversion technology, as well as a Developer Partner of IBM Watson and a Facebook Marketing Partner. Utilizing a network of over 1,000,000 social media influencers as a tactic for distribution, Influential runs

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			both native and paid campaigns on Facebook, Instagram, Snapchat, Twitter, and YouTube for Fortune 500 brands including Walmart, McDonald's, Pepsi, Nestlé, General Mills, Toyota, Samsung, Sony Pictures and many more
C10	Heuritech	http://heuritech.com	Heuritech's solution allows for smoother communication and collaboration between different teams by fostering a data-driven mindset and transforming traditional decision-making. With its cutting-edge artificial intelligence approach, it supports brands in their digital transformation so they can dedicate themselves to what's most important: creating
C11	AIBrain Inc.	www.aibrain.com	AIBrain is an artificial intelligence company with the goal of building fully autonomous AI by unifying the three essential aspects of intelligence: Problem Solving, Learning and Memory.
C12	Invoca	https://www.invoca.com	Invoca is the cloud leader in AI-powered conversation intelligence for revenue teams that enables marketing, sales, customer experience, and eCommerce teams to understand and immediately act on the information consumers share via conversations.
C13	Appier	http://www.appier.com	Appier is a software-as-a-service (SaaS) company that uses artificial intelligence (AI) to power business decision-making. Appier's products are designed to help companies build a holistic view of their customers, understand their preferences, anticipate their actions and ultimately make decisions that lead to better business outcomes
C14	Microsoft	https://www.microsoft.com/en-in	Across Microsoft 365, AI powers innovative apps that can help you write and design better, visualize maps and charts in Excel, and streamline your inbox. From Microsoft's popular virtual assistant Cortana, web search engine Bing, software Office 365, conversational chatbots, or its communication platforms, the platform has been heavily integrating intelligent functionality into its applications and services.
C15	Alibaba Cloud	https://www.alibabacloud.com/	Alibaba Cloud develops highly scalable cloud computing and data management services providing large and small businesses, financial institutions, governments, and other organizations with flexible, cost-effective solutions to meet their networking and information needs

ResearchPapers:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	A Brief Introduction to Artificial Intelligence	C. Williams	Proceedings OCEANS '83	https://doi.org/10.1109/OCEANS.1983.1152096	13 January 2011
P2	Artificial Intelligence (AI) applications	Raju Vaishya	Published in Science Direct	https://doi.org/10.1	Volume 14, Issue

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	for COVID-19 pandemic			016/j.dsx.2020.04.012	4, July–August 2020
P3	AI-Based Modeling: Techniques, Applications and Research Issues Towards Automation, Intelligent and Smart Systems	Iqbal H. Sarker	Published in Springer	https://link.springer.com/article/10.1007/s42979-022-01043-x#auth-Iqbal_H_-Sarker	10 February 2022
P4	Artificial Intelligence in Agriculture: A Literature Survey	GouravmoyBanerjee	International Journal of Scientific Research in Computer Science Applications and Management Studies	ISSN 2319 – 1953	Volume 7, Issue 3 (May 2018)
P5	COVID-19 Artificial Intelligence Diagnosis using only Cough Recordings	Jordi Laguarta	The IEEE Open Journal of Engineering in Medicine and Biology	https://www.embs.org/ojemb/articles/covid-19-artificial-intelligence-diagnosis-using-only-cough-recordings/	September 30, 2020
P6	Managing Artificial Intelligence	Nicholas Berente	Published in Research gate	doi: 10.25300/MISQ/2021/16274	Vol 45, No 3, 2021
P7	A Knowledge Reasoning Algorithm Based on Network Structure and Representation Learning	Jinkui Yao	International Conference on Information, Communication and Networks (ICICN)	https://doi.org/10.1109/ICICN51133.2020.9205073	24 September 2020
P8	Application Analysis of Reasoning Engine Based on Artificial Intelligence in Medical Data Mining	Chenchen Li	IEEE International Conference of Safety Produce Informatization (IICSPI)	https://doi.org/10.1109/IICSPI51290.2020.9332459	01 February 2021
P9	Applying knowledge representation and reasoning to (simple) goal models	Alexander Borgida	IEEE International Workshop on Artificial Intelligence for Requirements Engineering (AIRE)	https://doi.org/10.1109/AIRE.2014.6894857	26-26 August 2014
P10	Overview of artificial intelligence in medicine	Amisha	Journal of Family medical science and Primary care	https://www.ncbi.nlm.nih.gov/pmc/issues/340268/	2019 Jul

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P11	An Overview of Artificial Intelligence Applications for Power Electronics	S Zhao	IEEE Transactions on Power Electronics	https://doi.org/10.1109/TPEL.2020.3024914	Volume: 36, Issue: 4, April 2021
P12	Key challenges for delivering clinical impact with artificial intelligence	Christopher J. Kelly	Published in Springer	https://link.springer.com/article/10.1186/s12916-019-1426-2	29 October, 2019
P13	A Survey on Explainable Artificial Intelligence (XAI): Toward Medical XAI	EricoTjoa	IEEE Transactions on Neural Networks and Learning Systems	https://doi.org/10.1109/TNNLS.2020.3027314	20 October 2020
P14	A comprehensive review on automation in agriculture using artificial intelligence	Kirtan Zha	Published in Science Direct in Artificial Intelligence in Agriculture	https://doi.org/10.1016/j.aiia.2019.05.004	Volume 2, June 2019,
P15	Artificial intelligence and sustainable development	Margaret A. Goralski	The International Journal of Management Education	https://doi.org/10.1016/j.ijme.2019.100330	Volume 18, Issue 1, March 2020
P16	Artificial intelligence and machine learning to fight COVID-19	Ahmad Alimadadi	Journal of AI and Machine Learning for Understanding Biological Processes	https://doi.org/10.1152/physiolgenomics.00029.2020	Volume 52, issue 4 ,3 April 2020
P17	A Review of AI and ML Applications for Computing Systems	Atul Negi	International Conference on Emerging Trends in Engineering and Technology, ICETET	https://doi.org/10.1109/ICETET-SIP-1946815.2019.9092299	14 May 2020
P18	Artificial Intelligence and Machine Learning Applications in Smart Production: Progress, Trends, and Directions	Raffaele Ciof	Published in MDPI Journal	doi:10.3390/su12020492	8 January 2020
P19	Applications of Artificial Intelligence and Machine Learning in the Area of SDN and NFV: A Survey	Anteneh A. Gebremariam	IEEE SSD International Multi-Conference on Systems, Signals and Devices	https://doi.org/10.1109/SSD.2019.8893244	11 November 2019

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P20	Applications of Artificial Intelligence in Machine Learning: Review and Prospect	Sumit Das	International Journal of Computer Applications	10.5120/20182-2402	Volume 115 - Number 9, 2015
P21	Role of Application of Artificial Intelligence (AI) and Its Importance in the Healthcare Industry	Giriraj Kiradoo	International Journal of Advanced Research in Engineering and Technology (IJARET),	http://www.iaeme.com/IJARET/issues.asp?JType=IJARET&VType=9&IType=2	Volume 9, Issue 2, March-April 2018
P22	Research on Application of Artificial Intelligence in Medical Education	Hang Zhao	International Conference on Engineering Simulation and Intelligent Control (ESAIC)	https://doi.org/10.1109/ESAIC.2018.00085	11 November 2018
P23	Artificial Intelligence and its Application in Different Areas	AvneetPannu	International Journal of Engineering and Innovative Technology (IJEIT)	ISSN: 2277-3754	Volume 4, Issue 10, April 2015
P24	AI Empowered Communication Systems for Intelligent Transportation Systems	ZhihanLv	IEEE Transactions on Intelligent Transportation Systems	https://doi.org/10.1109/TITS.2020.3017183	Volume: 22 Issue: 7, July 2021
P25	Research on Artificial Intelligence Algorithm and Its Application in Games	CundongTang	International Conference on Artificial Intelligence and Advanced Manufacturing (AIAM)	https://doi.org/10.1109/AIAM50918.2020.00085	11 May 2021

Prof. Akanksha S.Sontakke
Course Co-ordinator

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Academic Incharge

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An Autonomous Institute, with NAAC "A" Grade
Department of Electronics and Telecommunication Engineering
"Rectifying Ideas, Amplifying Knowledge"
Session: 2022-23 (Odd Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Teaching Plan

Course : B. Tech in Electronics & Telecommunication	**Year/Semester :**7th Semester (4th Year)	
Name of the Teacher : Prof. M. Hassan	**Subject Code :**BTEXPE704C	
Subject : Digital Communication	**Section :**ETC	
Periods per Week (each 60 min)	**Lecture**	**3**
	Tutorial	**-**
	Practical	**2**

Course Objective	Course Outcomes
1. To understand the building blocks of digital communication system. **2.** To know the principles of sampling & quantization **3.** To study the various waveform coding schemes **4.** To learn the various baseband transmission schemes **5.** To understand the various band pass signaling schemes **6.** To know the fundamentals of channel coding	1. Remember Knowledge of theory and practice related to Digital communication. 2. Understand knowledge about various techniques of digital communication Systems. 3. Analyze the spectral characteristics of band pass signaling schemes and their noise performance 4. Design error control coding schemes 5. Identify and solve engineering problems related to Mobile communication system

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapping
Unit I – Information Theory									
1	1	1	Discrete Memory less source	Day 1	R1 (Pg : 3 – 4)	https://nptel.ac.in/courses/117/105/117105144/	C1-C10	Students will understand the basic of Discrete Memory less source.	CO1
2	2	2	Information Sources	Day 2	R1 (Pg : 4-12)	https://nptel.ac.in/courses/117/105/117105144/	C1-C10	Students will be able to explain Information Sources.	CO1
3	3	3	Entropy, Mutual Information	Day 3	R1 (Pg 13 –14)	http://nptel.ac.in/courses/nptel_download.php?subjectid=106105034 .	C1-C10	Students will be able to know Entropy, Mutual Information	CO1
4	4	4	Discrete Memory less channels	Day 4	T1 (Pg : 545 –548)	https://nptel.ac.in/content/storage2/courses/downloads/108104091/noc19_ee08_Assignment9.pdf	C1-C10	Students will be able to explain Discrete Memory less channels.	CO1, CO3
5	5	5	Binary Symmetric Channel	Day 5	T1(Pg : 548 –554)	https://nptel.ac.in/content/storage2/courses/downloads/108104091/noc19_ee08_Assignment9.pdf	C1-C10	Students will be able to analyze the process of Binary Symmetric Channel	CO1, CO3, CO5
6	6	6	Channel Capacity	Day 6	T1 (Pg : 554– 557)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/117102059/lec41.pdf	C1-C10	Students will be able to analyze Channel Capacity.	CO1, CO3, CO5
7	7	7	Hartley - Shannon law	Day 7	T1 (Pg : 559– 565)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/117102059/lec41.pdf	C1-C10	Students will be able to use Hartley - Shannon law	CO1, CO3
8	8	8	Source coding theorem - Shannon - Fano & Huffman codes.	Day 8	T1 (Pg : 565– 569)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/117102059/lec41.pdf	C1-C10	Students will be able to Compare different Source coding theorems	CO1, CO3
Unit II – Waveform Coding & Representation									
9	9	9	Prediction filtering and DPCM	Day 9	T1 (Pg : 569– 571)	https://www.youtube.com/watch?v=4uQsp10rGKU	C1-C10	Students will be able to understand the concept of Prediction filtering and DPCM	CO1, CO3
10	10	10	Delta Modulation	Day 10	T1 (Pg : 575 – 581)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/106105081/lec5.pdf	C1-C10	Students will able to understand Delta Modulation	CO2
11	11	11	ADPCM & ADM spectra,	Day 11	T1 (Pg : 582– 584)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/106	C1-C10	Students will be able to describe ADPCM & ADM	CO2

			synchronization			105081/lec5.pdf			
12	12	12	principles-Linear Predictive Coding	Day 12	T1 (Pg : 523 – 533)	https://pdfs.semanticscholar.org/6976/9a2e530a4cbda767e4a7cce3284a50371c7b.pdf	C1-C10	Students will learn about the process of Linear Predictive Coding	CO2
13	13	13	Properties of Line codes	Day 13	R1 (Pg : 136-152)	https://www.fradownix.com/fr/digital-and-anlalog-communication-systems	C1-C10	Students will be able to interpret Properties of Line codes	CO2
14	14	14	Power Spectral Density	Day 14	T1 (Pg : 392 – 394)	https:///nptel_data3/html/mhrd/ict/textnptel.ac.in/content/storage2/111102014/lec7.pdf	C1-C10	Students will be able to understand Power Spectral Density	CO4
15	15	15	Unipolar / Polar RZ	Day 15	T1 (Pg : 394 – 396)	https:///nptel_data3/html/mhrd/ict/textnptel.ac.in/content/storage2/111102014/lec7.pdf	C1-C10	Students will be able to Classify Unipolar / Polar RZ	CO4
16	16	16	NRZ – Bipolar NRZ - Manchester	Day 16	T1 (Pg : 397 – 401)	https:///nptel_data3/html/mhrd/ict/textnptel.ac.in/content/storage2/111102014/lec7.pdf	C1-C10	Students will be able to understand the NRZ – Bipolar NRZ - Manchester	CO4
Unit III – Baseband Transmission & Reception									
17	17	17	ISI – Nyquist criterion for distortion less transmission	Day 17	T1 (Pg : 402 – 414)	https://nptel.ac.in/content/storage2/courses/downloads/108104091/noc19_ee08_Assignment13.pdf	C1-C10	Students will be able to determine Nyquist criterion	CO4
18	18	18	Pulse shaping	Day 18	T1 (Pg : 491 – 493)	https://scholar.google.co.in/scholar?q=Gaussian+process,+noise+nptel&hl=en&as_sdt=0&as_vis=1&oi=scholart	C1-C10	Students will be able to represent Pulse shaping	CO4
19	19	19	Correlative coding	Day 19	R1(809-812)	http://everscience.org/verify.php	C1-C10	Students will be able to analyze Correlative coding	CO5, CO6
20	20	20	Eye pattern	Day 20	R3 (Pg :332 – 335)	https://onlinelibrary.wiley.com/doi/pdf/10.1002/0470024135.app1	C1-C10	Students will be able to demonstrate Eye pattern	CO5, CO6
21	21	21	Receiving Filters	Day 21	R5 (Pg :513 – 520)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec19.pdf	C1-C10	Students will be able to know Receiving Filters	CO5, CO6
22	22	22	Matched Filter	Day 22	R2 (Pg : 383 – 392)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec19.pdf	C1-C10	Students will be able to design Matched Filter.	CO5, CO6
23	23	23	Correlation receiver	Day 23	R2 (Pg : 388 – 391)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec19.pdf	C1-C10	students will be able to analyze Correlation receiver	CO5, CO6

24	24	24	Adaptive Equalization	Day 24	R2 (Pg : 287-289)	https://www.tutorialspoint.com/Passband-Transmission	C1-C10	Students will be able to understand Adaptive Equalization	CO4, CO5
Unit IV – Digital Modulation Scheme									
25	25	25	Geometric Representation of signals	Day 25	R2 (Pg : 290--292)	https://onlinelibrary.wiley.com/doi/pdf/10.1002/0470024135.app1	C1-C10	Students will be able to draw Geometric Representation of signals.	CO4, CO5
26	26	26	Generation, detection, PSD	Day 26	R2 (Pg : 293-299)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/117102062/lec27.pdf	C1-C10	Students will be able to derive Generation, detection, PSD.	CO4, CO5
27	27	27	BER of Coherent BPSK	Day 27	R5 (Pg: 417-422)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec56.pdf	C1-C10	Students will be able to understand BER of Coherent BPSK	CO4, CO5
28	28	28	BFSK	Day 28	T1 (Pg : 689–690)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec56.pdf	C1-C10	Students will be able to understand BFSK	CO4, CO5
29	29	29	QPSK, QAM	Day 29	R2 (Pg : 338-346)	http://www.digimat.in/nptel/courses/video/108102096/L19.html	C1-C10	Students will be able to explain the generation and detection of QPSK, QAM	CO4, CO5
30	30	30	Carrier Synchronization	Day 30	T1 (Pg : 673–676)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec56.pdf	C1-C10	Students will be able to understand Carrier Synchronization	CO4, CO5
31	31	31	Structure of Non-coherent Receivers	Day 31	T1 (Pg : 696–699)	https://www.youtube.com/watch?v=SKTVtzqlJ7Y	C1-C10	Students will be able to understand Structure of Non-coherent Receivers	CO4, CO5
32	32	32	Principle of DPSK	Day 32	R2 (Pg: 625-628) R3 (Pg: 445-449)	https://nptel.ac.in/courses/117/105/117105136/	C1-C10	Student will be able to understand Principle of DPSK	CO4
Unit V – Error Control Coding									
33	33	33	Channel coding theorem	Day 33	R2 (Pg: 633-637)	Lecture 2 https://nptel.ac.in/courses/117/105/117105136/	C1-C10	Students will be able to understand Channel coding theorem	CO4
34	34	34	Linear Block codes	Day 34	R3 (Pg: 455-460)	https://nptel.ac.in/courses/117/105/117105136/	C1-C10	Students will be able to use Linear Block codes	CO4
35	35	35	Hamming codes	Day 35	R5 (Pg: 642-648)	Lecture 4 and 5 https://nptel.ac.in/courses/117/105/117105136/	C1-C10	Students will be able to understand the concept of Hamming codes	CO4
36	36	36	Cyclic codes	Day 36	T1 (Pg : 746 – 750)	https://www.youtube.com/watch?v=QHDxbbc1GWs	C1-C10	Students will be able to understand Cyclic codes.	CO4
37	37	37	Convolution codes	Day 37	T1 (Pg : 681–690)	https://onlinelibrary.wiley.com/doi/pdf/10.1002/0470024135.app1	C1-C10	Students will be able to demonstrate Eye pattern	CO5, CO6

38	38	38	Numerical on Convolution Code	Day 38	R2 (Pg : 328-326)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec19.pdf	C1-C10	Students will be able to know Convolution Code	CO5, CO6
39	39	39	Viterbi Decoder	Day 39	T1 (Pg : 663–666)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec19.pdf	C1-C10	Students will be able to design Viterbi Decoder.	CO5, CO6
40	40	40	Numerical on Viterbi Decoder	Day 40	T1 (Pg : 686–689)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec19.pdf	C1-C10	students will be able to analyze Viterbi Decoder	CO5, CO6
Unit VI – Mobile communication									
41	41	41	Cellular Telephone systems	Day 41	R5 (Pg: 407-412)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/106105081/lec5.pdf	C1-C10	Students will able to understand Cellular Telephone systems	CO2
42	42	42	Digital cellular telephone	Day 42	T1 (Pg : 679–680)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/106105081/lec5.pdf	C1-C10	Students will be able to describe Digital cellular telephone	CO2
43	43	43	Mobile communication system	Day 43	R2 (Pg : 328-336)	http://www.digimat.in/nptel/courses/video/108102096/L19.html	C1-C10	Students will be able to explain Mobile communication system	CO4, CO5
44	44	44	Role of mobile communication	Day 44	T1 (Pg : 663–666)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec56.pdf	C1-C10	Students will be able to understand Role of mobile communication	CO4, CO5
45	45	45	Mobile hotspot	Day 45	T1 (Pg : 686–689)	https://www.youtube.com/watch?v=SKTVtzqIJ7Y	C1-C10	Students will be able to understand mobile hotspot	CO4, CO5
46	46	46	Mobile applications related to rural development, GPS	Day 46	R2 (Pg: 615-618) R3 (Pg: 435-439)	https://nptel.ac.in/courses/117/105/117105136/	C1-C10	Student will be able to understand Mobile applications related to rural development, GPS	CO4

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 36 Total number of lectures as per planned: -46

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Assignment Plan

Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1	Unit 1, 2: Information Theory, waveform representation	08/02/2023	15/02/2023	CO1 and CO3
2	Unit 3 and 4 : Baseband Digital Transmission, Digital Modulation Scheme	06/03/2023	13/03/2023	CO2 and CO4

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's not covered in TP**
1	Types of Communication System	28/02/2023	CO4, CO6
2	Architecture of IS-95 for mobile communication	24/03/2023	CO4, CO6

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Communication Systems	A. Bruce Carlson, Paul B. Crilly	Mc Graw Hill	Fifth
T2	Modern Digital and Analog communication Systems	B.P.Lathi	Oxford	Fourth
Reference Books				
R1	Digital Communications Fundamentals And Applications	Bernard Sklar, Pratibha kumar Roy	Person Education	Second
R2	Digital Communications	Dr. Sanjay Sharma	S.K.kataria & Sons	Sixth
R3	Digital Communication	Simon Haykin	Wiley	2014
R4	Digital Communication	John G. Proakis	Pearson Education	5th Edition, 2014
R5	Digital communication	J.S.Chitode	Technical Publication, Pune	Edition 2007

Company/Industry:

Code	Company/ Industry Name	Website	Detailed Information
C1	Neel Networks	https://www.indiamart.com/neel-networks/	Neel networks is here to bring best possible solutions for your business wherever communication is required. As a first-class telecommunication supplier, we guarantee more assistance, more honesty and better value for money.
C2	Air Tel	https://www.airtel.in	Bharti Airtel Limited is a leading global telecommunications company with operations in 18 countries across Asia and Africa. It is headquartered in New Delhi, India. The company ranks amongst the top three mobile service providers globally in terms of subscribers. In India, the company's product offerings include 2G, 3G and 4G wireless servic...
C3	Reliance Jio	www.rcom.co.in	Reliance Jio is an entire ecosystem that allows Indians to live the digital life to the fullest. This ecosystem consists of powerful broadband networks, useful applications, best-in-class services and smart devices distributed to every doorstep in India.

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C4	BSNL	www. bsnl.co.in	BSNL is a technology-oriented company and provides all types of telecom services namely telephone services on wireline, wireless local loop (WLL) and mobile, broadband, internet, leased circuits and long-distance telecom service. The company has been in the forefront of technology with 100 per cent digital technology switching network.
C5	AT & T Inc	www.att.com	AT&T Inc. is an American multinational conglomerate holding company headquartered at Whitacre Tower in Downtown Dallas, Texas. It is the world's largest telecommunications company, the largest provider of mobile telephone services and the largest provider of fixed telephone services through AT&T Communications
C6	Vodafone	www.vodafone.in	Vodafone Group pl is a British multinational telecommunications company. It predominantly operates services in the regions of Asia, Africa, Europe, and Oceania. Among mobile operator groups globally, Vodafone ranked 4th (behind China Mobile, Bharti Airtel and Vodafone Idea, of which the Group owns a 45% stake) in the number of mobile customers (313 million) as of 2018
C7	Telefonica	www.telefonica.com	Telefónica is a Spanish multinational telecommunications company headquartered in Madrid, Spain. It is one of the largest telephone operators and mobile network providers in the world. It provides fixed and mobile telephony, broadband and subscription television, operating in Europe and the Americas.
C8	MTNL	www. mtnl.net.in	MTNL is a 100% government owned top 10 telecom companies in India and the only wholly state-owned telecom sector companies in the list of top 10 telecom companies in India. This is one of the biggest telecom company in India offering IPTV, landline, and broadband besides mobile network.
C9	Telenor	www.telenor.com	Telenor India is a major upcoming telecom company in India. This top telecom company in India was previously known as Uninor when it was launched in 2009 and is headquartered at New Delhi, India. This leading mobile network companies in India has recently been acquired by the Bharti Airtel group in September 2017 .
C10	Tata Teleservices	www.tatateleservices.coms	Tata Teleservices is a leading telecom brand in India and has more than 60 million consumers for its top 10 mobile networks in India. This mobile network companies in India also offers landline and broadband services across many parts of the country.

Research Papers:

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Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	The Probability of Error Due to Intersymbol Interference and Gaussian Noise in Digital Communication Systems	O. Shimbo	IEEE transactions on Communication Technology	org/10.1109/TCOM.1971.1090619	Volume: 19 , Issue: 2 , April 1971
P2	“Optimal Binary Communications With Nonequal Probabilities”	Valery P. Ipatov	IEEE Transactions on Education	10.1109/TCOMM.2006.885062	Volume: 55 , Issue: 1 , Jan. 2007
P3	Intersymbol Interference in Digital Communication Systems	John G. Proakis	Wiley Encyclopedia of Telecommunications	doi.org/10.1002/0471219282.eot409	15 April 2003

P4	A new degree of freedom for energy efficiency of digital communication systems	Dushyantha A. Basnayaka	IEEE transaction on Communication	10.1109/TCOMM.2017.2684164	Volume: 65 , Issue: 7 , July 2017
P5	Transmultiplexers as precoders in modern digital communication: a tutorial review	P.P. Vaidyanathan	IEEE International Symposium on Circuits and Systems	10.1109/ISCAS.2004.1329590	03 September 2004
P6	Spatial Sigma-Delta Modulation for the Massive MIMO Downlink	Mingjie Shao	53rd Asilomar Conference on Signals, Systems, and Computers	https://doi.org/10.1109/IEEECONF44664.2019.9048918	03 March 2020
P7	Development and study of demodulators for frequency-hopping spread spectrum signals	D.I.Kaplun	2017 Progress In Electromagnetics Research Symposium - Spring (PIERS)	https://doi.org/10.1109/PIERS.2017.8261781	22-25 May 2017
P8	The research of Spread Spectrum in deep space communication	Yu Wang	2nd International Asia Conference on Informatics in Control, Automation and Robotics (CAR 2010)	https://doi.org/10.1109/CAR.2010.5456608	6-7 March 2010
P9	Improved Spread Spectrum: A New Modulation Technique for Robust Watermarking	Henrique S. Malvar	IEEE TRANSACTIONS ON SIGNAL PROCESSING	https://doi.org/10.1109/TSP.2003.809385	VOL. 51, NO. 4, APRIL 2003
P10	Automatic Modulation Identification of QPSK and GMSK using Wavelet Transform for Adaptive Demodulator in SDR	P. Prakasam	2007 International Conference on Signal Processing, Communications and Networking	https://doi.org/10.1109/ICSCN.2007.350651	22-24 Feb. 2007
P11	OFDM and Its Wireless Applications: A Survey	Taewon Hwang	IEEE Transactions on Vehicular Technology	https://doi.org/10.1109/TVT.2008.2004555	Volume: 58 , Issue: 4 , May 2009)
P12	Design and implement of the OFDM communication system	Ping Chen	IEEE International Workshop on Open-source Software for Scientific Computation	https://doi.org/10.1109/OSSC.2011.6184695	12-14 Oct. 2011
P13	Ultra-Wideband Communications using Hybrid Matched Filter Correlation Receivers	Fredrik Tufvesson	IEEE Transactions on Wireless Communications	https://doi.org/10.1109/TWC.2006.04767	Volume: 5 , Issue: 11 , November 2006
P14	Duty Cycle Based Digital Multiplexing Technique for Advanced Communication System	S.B.Lande	2015 International Conference on Computational Intelligence and Communication Networks (CICN	https://doi.org/10.1109/CICN.2015.107	18 Aug. 2016
P15	Digital Time-Division Multiplexing Readout Circuit for Sensor Arrays	Anubhav Sahu	IEEE Transactions on Applied Superconductivity	https://doi.org/10.1109/TASC.2016.2637336	Volume: 27 , Issue: 4 , June 2017
P16	The Delta-Sigma Modulator [A Circuit for All Seasons]	Behzad Razavi	IEEE Solid-State Circuits Magazine	https://doi.org/10.1109/MSSC.2016.2543061	Volume: 8 , Issue: 2 , Spring 2016

P17	Delta-sigma modulation for direct digital frequency synthesis	Dayu Yang	IEEE Transactions on Very Large Scale Integration (VLSI) Systems	https://doi.org/10.1109/TVLSI.2008.2008458	Volume 17, Issue 6June 2009
P18	Statistical Estimation of Error Probability in a Digital Wireless Communication Network	Clement Taymanesh Nyah	2014 UKSim-AMSS 16th International Conference on Computer Modelling and Simulation	https://doi.org/10.1109/UKSim.2014.16	23 Feb, 2015
P19	Advanced personal communication system	K. Kohiyama	IEEE Conference on Vehicular Technology	https://doi.org/10.1109/VETEC.1990.110314	06 Aug , 2002
P20	Analysis, optimization, and implementation of a hybrid DS/FFH spread-spectrum technique for smart grid communications	Mohammed Olama	EURASIP Journal on Advances in Signal Processing volume 2015	https://doi.org/10.1186/s13634-015-0208-z	Jan, 25 (2015)

Prof. M. Hassan
Subject Teacher

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Department of Electronics and Telecommunication Engineering
"Rectifying Ideas, Amplifying Knowledge"
2022-23 (Even Sem)

VISION	MISSION
"To be a Department providing high quality & globally competent knowledge of concurrent technologies in the field of Electronics and Telecommunication."	1. To provide quality teaching learning process through well-developed educational environment and dedicated faculties. 2. To produce competent technocrats of high standards satisfying the needs of all stakeholders.

Teaching Plan

Course : B. Tech in Electronics & Telecommunication	**Year/Semester :**8th Semester (4th Year)	
Name of the Teacher : Prof. Tushar Joshi	**Subject Code** : ET8O004	
Subject : Advanced Processors & Controllers	**Section** :NA	
Periods per Week (each 60 min)	**Lecture**	**4**
	Tutorial	**-**
	Practical	**-**

Course Objective	Course Outcomes
The objective of this course is to provide students with 1. To learn microprocessor programming and architectures of advance processors. 2. To understand different characteristics of processors. 3. Interfacing and Programming of processors. 4. To understand need and application of ARM Microprocessors in embedded system.	At the end of this course students will demonstrate the ability to 1. Understanding basic concepts of microprocessor 8085. 2. Explain the hardware architecture of 8051. 3. Discuss the ARM microprocessor architectures and its features. 4. To analyse Arduino Boards and Components. 5. To develop simple assembly language programs. 6. To elaborate practical applications of different processors.

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/ PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapping
Unit I – INTRODUCTION TO 8085									
1	1	1	Microprocessor systems with bus organization.	Day 1	T2 (Pg : 3 – 4)	https://www.youtube.com/watch?v=o6W0opScrKY&list=PLuv3GM6-gsE01L9yDO0e5UhQapkCPGnY3	C1-C5	Students will be able to learn microprocessor basics.	CO1
2	2	2	Microprocessor Architecture &Operations, Memory, I/O Device,	Day 2	T2 (Pg : 4-12)	https://www.youtube.com/watch?v=o6W0opScrKY&list=PLuv3GM6-gsE01L9yDO0e5UhQapkCPGnY3	C1-C5	Students will be able to learn microprocessor Architecture	CO1
3	3	3	Memory and I/O Operations	Day 3	T2 (Pg 13 –14)	https://www.youtube.com/watch?v=FivoJofCaTs&list=PLuv3GM6-gsE01L9yDO0e5UhQapkCPGnY3&index=4	C1-C5	Students will be able to learn microprocessor Memory Operations	CO1
4	4	4	Introduction to 8085 assembly language programming	Day 4	T2 (Pg : 45 –54)	https://www.youtube.com/watch?v=KSXEPEoPefM&list=PLuv3GM6-gsE01L9yDO0e5UhQapkCPGnY3&index=9	C1-C5	. Students will be able to learn microprocessor Programming of processor	CO1, CO3
5	5	5	8085 Microprocessor Architecture and its operation	Day 5	T2(Pg : 55 –60)	https://nptel.ac.in/content/storage2/courses/downloads/108104091/noc19_ee08_Assignment9.pdf	C1-C5	Students will be able to analyze microprocessor architecture	CO1, CO3, CO5
6	6	6	Address, Data And Control Buses	Day 6	T2 (Pg : 554– 557)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/117102059/lec41.pdf	C1-C5	Students will be able to understand microprocessor Address, Data And Control Buses	CO1, CO3, CO5
7	7	7	Pin Functions, De-multiplexing of	Day 7	T3 (Pg : 559– 565)	https://nptel.ac.in/content/storage2/nptel_data3/ht	C1-C5	Students will be able to understand Pin Functions	CO1, CO3

			Buses			ml/mhrd/ict/text/117102059/lec41.pdf		of microprocessor	
8	8	8	Generation Of Control Signals.	Day 8	T2 (Pg : 565– 569)	https://www.youtube.com/watch?v=Ib6Ruzlf6uU&list=PLuv3GM6-gsE01L9yDO0e5UhQapkCPGnY3&index=10	C1-C5	Students will be able to learn microprocessor Control Signals	CO1, CO3
9	9	9	Assembly Language Programming Basics, Introduction to 8085 instructions, Addressing Modes,	Day 9	T2 (Pg : 569– 571)	https://www.youtube.com/watch?v=4uQsp10rGKU	C1-C5	Students will be able to learn microprocessor instructions	CO1, CO3
10	10	10	Writing, Assembling & Executing a Program.	Day 10	T2 (Pg : 575 –581)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/106105081/lec5.pdf	C1-C5	Students will be able to learn microprocessor Assembly Language Programming	CO2
Unit II – INTRODUCTION TO 8051									
11	11	11	Microcontrollers: Microprocessors and Micro- controllers	Day 11	T1 (Pg : 8– 14)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/106105081/lec5.pdf	C1-C5	Students will be able to learn microcontroller	CO2
12	12	12	8051 controller, Block Diagram &Architecture	Day 12	T1 (Pg : 23 –33)	https://www.youtube.com/watch?v=liRPtvj7bFU&list=PL0E131A78ABFBFDD0	C1-C5	Students will be able to learn microcontroller architectures	CO2
13	13	13	8051 Instruction Set	Day 13	T1 (Pg : 36-52)	https://www.youtube.com/watch?v=HXYhBCpDoVc&list=PL0E131A78ABFBFDD0&index=8	C1-C5	Students will be able to learn microprocessor programming	CO2
14	14	14	Addressing modes & introduction to programming	Day 14	T1 (Pg : 36-52)	https://www.youtube.com/watch?v=HXYhBCpDoVc&list=PL0E131A78ABFBFDD0&index=8	C1-C5	Students will be able to learn programming	CO2
15	15	15	Addressing modes & introduction to programming	Day 15	T1 (Pg : 36-52)	https://www.youtube.com/watch?v=mM35VuJgjeA&list=PL0E131A78ABFBFDD0&index=9	C1-C5	Students will be able to learn programming of 8051	CO2

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16	16	16	8051 Timers	Day 16	T1 (Pg : 136-152)	https://www.youtube.com/watch?v=mM35VuJgjeA&list=PL0E131A78ABFBFDD0&index=9	C1-C5	Students will be able to understand timers of 8051 & its applications	CO2
17	17	17	Serial I/O, Interrupts	Day 17	T1 (Pg : 156-172)	https://www.youtube.com/watch?v=BqxFgPafhvg&list=PL0E131A78ABFBFDD0	C1-C5	Students will be able to learn 8051 ports.	CO2
Unit III – ARM PROCESSORS									
18	18	18	ARM Micro-controllers – overview, features	Day 18	R2 (Pg : 9 – 24)	https://nptel.ac.in/courses/117104072	C1-C5	Students will be able to learn ARM Micro-controllers	CO4
19	19	19	ARM 7 – architecture, Thumb, Register Model	Day 19	R2 (Pg : 39 – 45)	https:///nptel_data3/html/mhrd/ict/textnptel.ac.in/content/storage2/111102014/lec7.pdf	C1-C5	Students will be able to learn ARM 7 – architecture	CO4
20	20	20	Addressing modes	Day 20	R2 (Pg : 46 –49)	https://www.youtube.com/watch?v=0xgvINDxXJI&list=PLbRMhDVUMngcJu5oUhgpgYqtOn7DmSfuU	C1-C5	Students will be able to understand Addressing modes of ARM7	CO4
21	21	21	The RISC design philosophy, ARM design philosophy	Day 21	R2 (Pg : 50 – 62)	https://nptel.ac.in/content/storage2/courses/downloads/108104091/noc19_ee08_Assignment13.pdf	C1-C5	Students will be able to understand architecture of ARM	CO4
22	22	22	embedded system hardware- AMBA bus protocol	Day 22	R2 (Pg : 91 – 93)	https://www.youtube.com/watch?v=0xgvINDxXJI&list=PLbRMhDVUMngcJu5oUhgpgYqtOn7DmSfuU	C1-C5	Students will be able to understand architecture of ARM7	CO4
23	23	23	Registers, CPSR-Processor modes Banked registers	Day 23	R2 (Pg : 95 – 99)	https://www.youtube.com/watch?v=0xgvINDxXJI&list=PLbRMhDVUMngcJu5oUhgpgYqtOn7DmSfuU	C1-C5	Students will be able to understand architecture of ARM	CO4
24	24	24	Pipeline-	Day 24			C1-C5	Students will be able to	CO4

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			Characteristics					understand architecture of ARM	
25	25	25	Fundamentals of ARM instructions, Barrel shifter.	Day 25	R2 (Pg : 100 – 113)	https://archive.nptel.ac.in/content/storage2/courses/106108100/pdf/Lecture_Notes/LNm1.pdf	C1-C5	Students will be able to understand instruction set of ARM	CO4
26	26	26	Advantages & Disadvantages of ARM processors	Day 26	R2 (Pg : 191 – 193)	https://archive.nptel.ac.in/content/storage2/courses/106108100/pdf/Lecture_Notes/LNm1.pdf	C1-C5	Students will be able to learn Advantages & Disadvantages of ARM processors	CO4
Unit IV – ARDUINO									
27	27	27	Introduction to Arduino	Day 27	R1(809-812)	https://www.youtube.com/watch?v=H9OEAn3Uc2w	C1-C5	Students will be able to learn Arduino	CO5, CO6
28	28	28	Architecture,Advantages	Day 28	R3 (Pg :332 – 335)	https://www.youtube.com/watch?v=H9OEAn3Uc2w	C1-C5	Students will be able to learn Arduino Architecture	CO5, CO6
29	29	29	Versions of Arduino	Day 29	R5 (Pg :513 –520)	https://www.youtube.com/watch?v=bTIE9GTc1eM&list=PLBfIgVyhwjwGOjb7LVAcPN6CFd97wqwFp	C1-C5	Students will be able to know Versions of Arduino	CO5, CO6
30	30	30	Characteristics and layout of UNO	Day 30	R2 (Pg : 383 –392)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec19.pdf	C1-C5	Students will be able to know Versions of Arduino	CO5, CO6
31	31	31	Introduction to Arduino IDE software	Day 31	R2 (Pg : 388 –391)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec19.pdf	C1-C5	students will be able to understand Arduino IDE software	CO5, CO6
32	32	32	Introduction to sensors and actuators	Day 32	R2	https://www.youtube.com/watch?v=bTIE9GTc1eM&list=PLBfIgVyhwjwGOjb7LVAcPN6CFd97wqwFp	C1-C5	students will be able to understand sensors and actuato	CO5, CO6

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33	33	33	Case study example.	Day 33	R2	https://www.youtube.com/watch?v=bTIE9GTc1eM&list=PLBfIgVyhwjwGOjb7LVAcPN6CFd97wqwFp	C1-C5	students will be able to understand applications	CO5, CO6
Unit V – Introduction to Raspberry Pi									
34	34	34	Introduction to Raspberry Pi	Day 34	R8 (Pg : 287-289)	https://www.tutorialspoint.com/Passband-Transmission	C1-C5	Students will be introduced to Raspberry Pi	CO4, CO5
35	35	35	OS for Raspberry Pi	Day 35	R8 (Pg : 290--292)	https://onlinelibrary.wiley.com/doi/pdf/10.1002/0470024135.app1	C1-C5	Students will be able to learn OS for Raspberry Pi.	CO4, CO5
36	36	36	Raspberry Pi processor	Day 36	R8 (Pg : 293-299)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/117102062/lec27.pdf	C1-C5	Students will be able to understand Raspberry Pi processor	CO4, CO5
37	37	37	Versions of Raspberry pi models	Day 37	R9 (Pg: 417-422)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec56.pdf	C1-C5	Students will be able to understand Raspberry Pi processor models.	CO4, CO5
38	38	38	Versions of Raspberry pi models	Day 38	R9 (Pg : 689– 690)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec56.pdf	C1-C5	Students will be able to understand Raspberry Pi processor models.	CO4, CO5
39	39	39	Hardware components of Raspberry Pi 3	Day 39	R8 (Pg : 338-346)	http://www.digimat.in/nptel/courses/video/108102096/L19.html	C1-C5	Students will be able to analyze Hardware components.	CO4, CO5
40	40	40	Hardware components of Raspberry Pi 3	Day40	R8 (Pg : 673– 676)	https://nptel.ac.in/content/storage2/nptel_data3/html/mhrd/ict/text/108101113/lec56.pdf	C1-C5	Students will be able to analyze Hardware components.	CO4, CO5
41	41	41	Case study of IoT Applications based on RaspberryPi	Day 41	R8 (Pg : 696– 699)	https://www.youtube.com/watch?v=SKTVtzqlJ7Y	C1-C5	Students will be able to learn from live examples	CO4, CO5
Unit VI – Applications of 8085 & 8051									
42	42	42	Case study: Traffic Controller using 8085	Day 42	T2	https://nptel.ac.in/courses/117/105/117105136/	C1-C5	Student will be able to understand from working of traffic lights	CO4

			Microprocessor						
43	43	43	Temperature Control Using 8051	Day 43	T1	Lecture 2 https://nptel.ac.in/courses/117/105/117105136/	C1-C5	Student will be able to understand from working of Temperature Control Using 8051	CO4
44	44	44	ARM Cortex (STM32) based Solar Street Light	Day 44	R6	https://nptel.ac.in/courses/117/105/117105136/	C1-C5	Students will be able to learn Solar Street Light	CO4
45	45	45	Arduino Based Home Automation System	Day 45	eResources	https://nptel.ac.in/courses/117/105/117105136/	C1-C5	Students will be able to understand Home Automation System	CO4
46	46	46	Arduino Based Home Automation System	Day 46	eResources	https://www.youtube.com/watch?v=QHDxbbc1GWs	C1-C5	Students will be able to understand Home Automation System	CO4
47	47	47	Quadcopter using Raspberry Pi.	Day 47	eResources	https://www.instructables.com/The-Drone-Pi	C1-C5	Students will be able to understand working of Quadcopter	CO4
48	48	48	Quadcopter using Raspberry Pi.	Day 48	eResources	https://www.instructables.com/The-Drone-Pi	C1-C5	Students will be able to understand working of Quadcopter	CO4

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 48 Total number of lectures as per planned: -48

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Tutorial Plan			
Week	**Topic**	**No. Of Problems**	**Mapped With CO**
1	NA		

Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	Unit 1:	02/01/2023	09/01/2023	CO 1 and CO 3
2		22/02/2023	01/03/2023	CO2 and CO5

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date**	**Mapped with CO's not covered in TP**
1	Use of open source software to perform operations.	20/3 /2023	PO1, PO2, PO5 ,PSO1
2			

TEXT BOOKS / REFERENCE BOOKS :

Sr. No.	Title of the Book	Publication	Author/s
1	The 8051 microcontroller & embedded system, using assembly and C	Pearson	Mazidi & Mazidi
2	Microprocessor and interfacing 8085	Tata Mc Gram Hill	Douglas V Hall
3	Microprocessor-Architecture, programming and application with 8085	Penram International	Gaonkar
4	Introduction to microprocessor & microcontrollers	2e Elsevier	Crisp
5	ARM system-on-chip architecture	2e Pearson Education	

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6	8051 microcontrollers: Applications based introduction	Elsevier	Calcut
7	8085-86 microprocessors Architecture progg and interfaces	Wiley	D V kodavade, S. Narvadkar
8	8051 microcontroller	TMH	Udyashankara V., Mallikarjunaswamy
9	The MCS-51 microcontroller	Oxford university press.	Han-way Huang
10	"Programming the Raspberry Pi: Getting Started with Python",	McGraw Hill	Simon Monk

References Books:

1. ARM System Developer's guide –Andrew N. SLOSS, ELSEVIER Publications, ISBN 978-81-8147-646-3, 2016
2. ARM Assembly Language – William Hohl, CRC Press, ISBN:978-81-89643-04-1
3. ARM System-on-chip Architecture by Steve Furber, Pearson Education, ISBN978-81- 317-0840-8, 2E,2012
4. LPC 2148 USER MANUAL
5. IN SIDE R'S GUIDE TO PHILIPS ARM7 BASED MICROCONTROLLERShitex.co.uk
6. ARM Programming Techniques – from ARM website
7. Embedded Systems: A Contemporary Design Tool- James K. Peckol ISBN: 978-0-471- 72180-2 October 2007, ©2008
8. Eben Upton and Gareth Halfacree, "Raspberry Pi User Guide", August 2016, 4th edition, John Wiley & Sons
9. Alex Bradbury and Ben Everard, "Learning Python with Raspberry Pi", Feb 2014, JohnWiley& Sons
10. Michael Margolis, "Arduino Cookbook", First Edition, March 2011, O'Reilly Media, Inc

E-Resources:

1) https://www.raspberrypi.org/magpiissues/Projects_Book_v1.pdf
2) https://www.sim8085.com/
3) http://www.edsim51.com/
4) https://nptel.ac.in/courses/117104072
5) https://archive.nptel.ac.in/content/storage2/courses/106108100/pdf/Lecture_Notes/LNm1.pdf
6) https://ict.iitk.ac.in/courses/learn-iot-through-arduino-and-raspberry-pi/

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Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Cypress Semiconductor	Cypress.com	Cypress Semiconductor offers microprocessors which deals with modern electronic demands.
C2	INFINEON	https://www.infineon.com/	organize operations in four segments: Automotive, Industrial Power Control, Power & Sensor Systems and Connected Secure Systems.
C3	Amulet Technologies	http://www.amulettechnologies.com/	Amulet Technologies microprocessors has been a leading global market player. Focusing from many of the applications today, Amulet Technologies Smart Displays includes its flagship including legacy products running 8-bit microprocessors.
C4	EPSON	https://www.epson.co.in/	Epson invariably has innovative microprocessors solutions targeting today's market needs.
C5	STMicroelectronics	https://www.st.com/content/st_com/en.html	STMicroelectronics creates the sparks by its world class microprocessors. Empowering advanced innovation, STMicroelectronics has been embedding the most advanced innovations with its microprocessors offerings.

Research Papers:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Microcontroller Based Maximum Power Point Tracking For Photovoltaic Solar Panel	**Museeb M. Jasim**	IEEE transactions on Communication Technology	DOI:10.33899/rengj.2011.26604	Volume: 19 , Issue: 2 , December 2011
P2	Review on 40 Pins Microcontroller 8051	Prachi Dukale	International Journal of Computer Sciences and Engineering	https://doi.org/10.26438/ijcse/v7i10.98101	Volume-7 , Issue-10 , Page no. 98-101, Oct-2019
P3	Design and Modeling of Arm Processor Microcontroller	Nishanth .B	International Journal of Advances in Engineering and Management	DOI:10.35629/5252-02103040	December 2020

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P4	Development of Ethernet Based Remote Monitoring and Controlling of MST Radar Transmitters using ARM Cortex Microcontroller	Lakshmi Narayana ROSHANNA	International Journal of Advances in Engineering and Management	CC BY 4.0	January 2013
P5	Working Principle of Arduino and Using it as a Tool for Study and Research	Leo Louis	International Journal of Control, Automation, Communication and Systems	DOI:10.5121/ijcacs.2016.1203	July 2018

Prof. Tushar Joshi
Subject Teacher

Prof. Avinash K. Ikhar
Academic Incharge

Dr.P.r.Kshirsagar
HOD (EN/ETC)

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Department of Information Technology

"Progress Beyond Excellence"

2022-23 (Even Sem)

VISION	MISSION
To be recognized as a centre of excellence in the field of Information Technology where inquisitive minds of students are fostered, leading to skills professionals for satisfying the needs of society.	1. Apply knowledge of engineering fundamentals & cutting-edge technology to identify and implement innovative solutions for engineering problems and issue in society at large. 2. Build strong interpersonal skills and will engage in life long learning to enhance their career positions, both as team members and leaders.

TEACHING PLAN

NAME OF THE TEACHER :- **Prof. Mittal Patne**

SUBJECT :- Advance Tools for Software SUBJECT CODE :- **IT8TE06C**

YR/SEM :- **2nd Year / 4th Semester**

Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no)	Reference Book (Page no)	URL's (NPTEL/Online Material/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapping
Unit 1: Cyber Security Software Tools.										
1	1	1.1	Introduction, How Important Is Cybersecurity.	05.12.22	T1 pg. no. 15		www.digimat.in/nptel/courses/video/106105150/L01.html		Student will able to important of Cybersecurity.	CO1
2	2	1.2	Types of Cybersecurity Tools	12.12.22	T1 pg. no. 20		www.digimat.in/nptel/courses/video/106105150/L01.html	P2, C1	Types of Cybersecurity.	CO1
3	3	1.3	Comparison of Top Cybersecurity Software.	19.12.22	T1 pg. no. 30		www.digimat.in/nptel/courses/video/106105150/L01.html	P2, C1	Student will able to understand the top	CO1

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									Cybersecurity of software.	
4	4	1.4	List of Best Cybersecurity Tools .SolarWinds Security Event Manager Syxsense System	26.12.22	T1 pg. no. 35		www.digimat.in/nptel/courses/video/106105150/L01.html	P2, C1	Student will able to understand the List of tools.	CO1
5	5	1.5	SolarWinds Security Event Manager Syxsense System.	02.01.23	T1 pg. no. 38		www.digimat.in/nptel/courses/video/106105150/L01.html	P2, C1	Student will able to know SolarWinds Security Event Manager Syxsense System,	CO1
6	6	1.6	Mechanic Ultimate Defense Acunetix Netsparker.	09.01.23	T1 pg. no. 45		www.digimat.in/nptel/courses/video/106105150/L01.html	P2, C1	Student will able to understand the Mechanic Ultimate Defense Acunetix Netsparker..	CO1
Unit 2: Business Management Software										
7	7	2.1	What Is Business Management Software?	16.01.23	T1 pg. no. 181		www.digimat.in/nptel/courses/video/106101163/L01.html	P2, C2	Student will able to Business Management Software.	CO2
8	8	2.2	Benefits of Business Management Software	23.01.23	T1 pg. no. 183		www.digimat.in/nptel/courses/video/106101163/L01.html	P2, C2	Student will able to Benefits of Business Management Software.	CO2
9	9	2.3	List of Best Business Management Software	30.01.23	T1 pg. no. 189		www.digimat.in/nptel/courses/video/106101163/L01.html	P2, C2	Student will able to understand the List	CO2

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									of Best Business Management Software	
10	10	2.4	Comparison of Top Business Management Software.	31.01.23	T1 pg. no. 190		www.digimat.in/nptel/courses/video/106101163/L01.html	P2, C2	Student will able to understand Comparison of Top Business Management Software	CO2
11	11	2.5	monday.com, Studio Creatio, Oracle NetSuite	06.02.23	T1 pg. no. 192		www.digimat.in/nptel/courses/video/106101163/L01.html	P2, C2	Student will able to know different types Software.	CO2
12	12	2.6	Keap , Process Bliss, HubSpot.	07.02.23	T1 pg. no. 195		www.digimat.in/nptel/courses/video/106101163/L01.html	P2, C2	Student will able to know different types Software.	CO2
13	13	2.7	Additional Business Management Tools.	13.02.23	T1 pg. no. 198		www.digimat.in/nptel/courses/video/106101163/L01.html	C2	Student will able to Additional Business Management Tools.	CO2
Unit 3: CRM Software Tools										
14	14	3.1	Introduction to CRM Tool.	20.02.23		R1 pg. no. 455	www.digimat.in/nptel/courses/video/106101163/L01.html	P3, C3	Student will able to Introduction to CRM Tool.	CO5
15	15	3.2	Features of CRM System	21.02.23		R1 pg. no. 457	www.digimat.in/nptel/courses/video/106101163/L01.html	P3,C3	Student will able to Features of CRM System.	CO5
16	16	3.3	Benefits: several famous CRM Tools like Salesforce CRM.	27.02.23		R1 pg. no. 458,460	www.digimat.in/nptel/courses/video/106101163/L01.html	P3,C3	Student will able to understand Benefits: several famous CRM Tools like Salesforce CRM.	CO5
17	17	3.4	SAP CRM, ZOHO CRM, Oracle CRM	28.02.23		R1 pg. no. 465	www.digimat.in/nptel/courses/video/106101163/L01.html	P3,C3	Student will able to Understand the SAP CRM etc.	CO5

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18	18	3.5	Microsoft Dynamics CRM, Nimble CRM.	06.03.23		R1 pg. no. 470	www.digimat.in/nptel/courses/video/106101163/L01.html	P3,C3	Student will able to understand the Microsoft Dynamics CRM, Nimble CRM.	CO5
19	19	3.6	Sugar CRM, Hubspot CRM	07.03.23		R1 pg. no. 472	www.digimat.in/nptel/courses/video/106101163/L01.html	P3,C3	Student will able to understand basic concept Sugar CRM, Hubspot CRM	CO5
20	20	3.7	PIPEDRIVE CRM, CRM Creatio.	07.03.23		R1 pg. no. 476	www.digimat.in/nptel/courses/video/106101163/L01.html	P3,C3	Student will able to understand PIPEDRIVE CRM, CRM Creatio.	CO5
Unit 4: Business Analysis Tools										
21	21	4.1	Introduction.	13.03.23		R1 pg. no. 526	www.digimat.in/nptel/courses/video/106101163/L01.html	P1, P2, P3, C4	Student will able to Introduction of Business Analysis tools.	CO4
22	22	4.2	Importance of Business Analysis, Business Analysis Techniques, Business Analysis Process	13.03.23		R1 pg. no. 528	www.digimat.in/nptel/courses/video/106101163/L01.html	P1, P2, P3, C4	Student will able to understand Importance of Business Analysis,	CO4
23	23	4.3	Sequentially, How Do Business Analysts Analyze Business Requirements	14.03.23		R1 pg. no. 540	www.digimat.in/nptel/courses/video/106101163/L01.html	P1, P2, P3, C4	Student will able to understand How do business.	CO4
24	24	4.4	Most Popular Business Analysis Tools	20.03.23		R1 pg. no. 548	www.digimat.in/nptel/courses/video/106101163/L01.html	P1, P2, P3, C4	Student will able to understand most popular business.	CO4

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25	25	4.5	Pipedrive (CRM) , Oracle NetSuit, Xplenty	20.03.23		R1 pg. no. 550	www.digimat.in/nptel/courses/video/106101163/L01.html	P1, P2, P3, C4	Student will able to understand Pipedrive (CRM) , Oracle NetSuit, Xplenty	CO4
26	26	4.6	Wrike, Business Process Diagramming	20.03.23		R1 pg. no. 553	www.digimat.in/nptel/courses/video/106101163/L01.html	P1, P2, P3, C4	Student will able to understand Wrike, Business Process Diagramming	CO4
24	27	4.7	Wire framing, Flowcharts	21.03.23		R1 pg. no. 555	www.digimat.in/nptel/courses/video/106101163/L01.html	P1, P2, P3, C4	Student will able to understand Wire framing, Flowcharts	CO4
25	28	4.8	Model Building Designing , Requirements Management	21.03.23		R1 pg. no. 560	www.digimat.in/nptel/courses/video/106101163/L01.html	P1, P2, P3, C4	Student will able to understand Model Building Designing , Requirements Management	CO4
Unit 5: Test Tools and Automation Testing Tools										
26	26	5.1	Introduction	27.03.23	T3 pg. no. 25		www.digimat.in/nptel/courses/video/106101163/L01.html	P1, C5	Student will able to understand basic of test tools.	CO3
27	27	5.2	Tool Selection, Tool Lifecycle.	27.03.23	T3 pg. no. 27		www.digimat.in/nptel/courses/video/106101163/L01.html	P1,C5	Student will able to understand Tool selection Life cycle.	CO3
28	28	5.3	Tool Metrics, Automation testing Tools- Selenium Webdriver Tools.	27.03.23	T3 pg. no. 42		www.digimat.in/nptel/courses/video/106101163/L01.html	P1,C5	Student will able to know Basic concept of Automation testing.	CO3
29	29	5.4	QTP/UFT, Load Runner & QC AutoIT	27.03.23	T3 pg. no. 45		www.digimat.in/nptel/courses/video/106101163/L01.html	P1,C5	Student will able to know AutOIT.	CO3
30	30	5.5	Rest Assured Framework, Agile Scrum Methodology	28.03.23	T3 pg. no. 53		www.digimat.in/nptel/courses/video/106101163/L01.html	P1,C5	Student will able to know the concept of Memory allocation:	CO3

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									Continuous Memory Allocation	
31	31	5.6	Appium. Framework TestNG, POM	28.03.23	T3 pg. no. 56		www.digimat.in/nptel/courses/video/106101163/L01.html	P1,C5	Student will able to know the concept of TestNG,POM.	CO3

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 36 Total number of lectures as per planned: - 48

Course Outcomes:

After learning the course the students should be able:

1. Analyze the structure of OS and basic architectural components involved in OS design.
2. Compare and illustrate various process and CPU Scheduling algorithms
3. Evaluate the requirement for process synchronization and coordination handled by operating system
4. Apply to design deadlock prevention and avoidance algorithms
5. Design and construct the following OS components: Schedulers, Memory management systems, Virtual Memory and Paging systems.
6. Describe and analyze the file management and its allocation policies

Text Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Advanced Software Testing - Vol. 2, 2nd Edition, 2nd Edition. O'REILLY MEDIA, INC	Advanced Software Testing - Vol. 2, 2nd Edition, 2nd Edition. O'REILLY MEDIA, INC	Advanced Software Testing - Vol. 2, 2nd Edition, 2nd Edition. O'REILLY MEDIA, INC	Advanced Software Testing - Vol. 2, 2nd Edition, 2nd Edition. O'REILLY MEDIA, INC
T2	Paul C. Jorgensen, Software Testing: A Craftsman‟s Approach, 3rd Edition, CRC Press, 2007.	Paul C. Jorgensen, Software Testing: A Craftsman‟s Approach, 3rd Edition, CRC Press, 2007.	Paul C. Jorgensen, Software Testing: A Craftsman‟s Approach, 3rd Edition, CRC Press, 2007.	Paul C. Jorgensen, Software Testing: A Craftsman‟s Approach, 3rd Edition, CRC Press, 2007.
T3	Learning Path Learn Selenium , O'Reilly Media, INC.	Learning Path Learn Selenium , O'Reilly Media, INC.	Learning Path Learn Selenium , O'Reilly Media, INC.	Learning Path Learn Selenium , O'Reilly Media, INC.

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Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
R1	Software Testing Techniques,	Boris Beizer	Dreamtech	2009

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Google	www.google.com	Android OS Chrome Server Other products
C2	Facebook	https://www.facebook.com/	Apache Hive, Thrift, HHVM etc
C3	Microsoft	https://www.microsoft.com/en-in	Windows, Visual Studio, Microsoft Server etc
C4	Apple	https://www.apple.com/in/	The operating system is written in C/C++
C5	Nvidia	https://www.nvidia.com/en-us/	
C6	VMware	https://www.vmware.com/in.html	Entire product line core
C7	Redhat	https://www.redhat.com/en	Linux means C
C8	Intel	https://www.intel.in/	Intel /AMD, Hardware manufacturers use C / C++ for drivers
C9	AMD	https://www.amd.com/en	Intel/ AMD, Hardware manufacturers use C / C++ for drivers
C10	Infopulse	https://www.infopulse.com	Infopulse is a software development company that delivers services ranging from software research and development to integration and support. To deliver the best solutions to their clients, Infopulse uses a wide range of technologies, including C and C++.
C11	Eleks	https://eleks.com	Eleks is an IT company that has 25+ years of experience in delivering services in software engineering, big data, mobility, quality assurance, and more. To handle all these projects, Eleks uses the major technology stacks, including C and C++ technologies.

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Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/ Page no/Year
P1	Software Testing Techniques: A Literature Review	Muhammad Abid Jamil	2016 6th International Conference on Information and Communication Technology for The Muslim World (ICT4M)	DOI: 10.1109/ICT4M.2016.045 INSPEC Accession Number: 16615183	Date Added to IEEE *Xplore*: 16 January 2017
P2	Research on software testing techniques and software automation testing tools	Karuturi Sneha	2017 International Conference on Energy, Communication, Data Analytics and Soft Computing (ICECDS)	DOI: 10.1109/ICECDS.2017.8389562 INSPEC Accession Number: 17859333	Date Added to IEEE *Xplore*: 21 June 2018
P3	Research on Software Testing Technology Under the Background of Big Data	Jing Wang	2018 2nd IEEE Advanced Information Management,Communicates,Electronic and Automation Control Conference (IMCEC)	DOI: 10.1109/IMCEC.2018.8469275 INSPEC Accession Number: 18115386	Date Added to IEEE *Xplore*: 23 September 2018

Subject Teacher **Academic Incharge** **Head of Department IT**

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Department of Mechanical Engineering
2022-23 (Odd Sem)

VISION	MISSION
"To be a centre of excellence imparting professional education satisfying societal and global needs". ."	1. Transforming students into lifelong learners through quality teaching, training and exposure to concurrent technologies. 2. Fostering conducive atmosphere for research and development through well-equipped laboratories and qualified personnel in collaboration with global organizations.

Teaching Plan

Course	**: B-Tech in Mechanical Engineering**	**Year/Semester**	**:** 7th Semester (4th Year)
Name of the Teacher	**:** Prof. D.A. Agrawal	**Subject Code**	**:** BTMEC704E
Subject	**:** Refrigeration & Air Conditioning	**Section**	**:**Mech- B
Periods per Week (each 60 min)		**Lecture**	**3**
		Tutorial	**-**
		Practical	**-**

Course Objective	Course Outcomes
1. To understand the applications of refrigerator & air conditioning. 2. To understand the difference between VCRS & VARS 3. Analysis of Standard Vapour compression Refrigeration System. 4. Identify various natural and artificial methods of refrigeration 5. The learner can do microcontroller design based systems and thus can become successful entrepreneur and meet needs of Indian and multinational industries. 6. Understand the basic air conditioning processes on psychometric charts, calculate cooling load for its applications in comfort and industrial air-conditioning.	1. Define Unit of refrigeration, VCRS-VARS system, compressor, evaporator, expansion device, condenser, air refrigeration cycle, refrigerant, cryogenics, psychometric process & chart, air condition unit, window & split AC, air transmission system, air washer etc. 2. Describe types of refrigeration system, compressor, condenser, expansion device, evaporator, air conditioning units, refrigerant, air transmission system and predict their importance for various applications. 3. Apply concept of refrigeration and air conditioning for desire application. 4. Analyze problems associate with conventional refrigeration and air condition system. Investigate how to utilize concept to improve existing system and its effect.

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	5. Combine Knowledge of refrigeration, air conditioning, cryogenics, psychometric process, air transmission system etc. and prepare activity to improvise current cooling system. 6. Evaluate performance of an activity designed base on refrigeration and air conditioning system, justify own opinion based on expressed concept, idea, activity, test, result and recommend improvements.

Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/OnlineMaterial /PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO Mapping
Unit I – Introduction									
1	1	1	History, Fundamentals of refrigeration, Unit, Applications, Methods of producing cooling, Refrigeration systems,	Day 1	T1 (Pg : 3– 9)	https://nptel.ac.in/courses/112/107/112107208/ lect1	C1-C10	Students should able to understand cooling process methods of refrigeration in day today life	CO1
2	2	2	Thermodynamics of refrigeration, Primary and secondary refrigeration, Heat Pump	Day 2	T1 (Pg : 12-15)	https://nptel.ac.in/courses/112/107/112107208/ lect2	C1-C10	Students should able to understand cooling process methods of refrigeration in day today life	CO1
Unit 2: Vapour Compression System									
3	3	3	Thermodynamics analysis, theoretical and actual cycle	Day 3	T1 (Pg : 25-29)	https://nptel.ac.in/courses/112/107/112107208/ lect3	C1-C10	Should acquire idea of VCRS and its component	CO1
4	4	4	Use of P-h and T-s diagram for problem solving	Day 4	T1 (Pg : 30-38)	https://nptel.ac.in/courses/112/107/112107208/ lect1 4	C1-C10	Should acquire idea of VCRS and its component	CO1
5	5	5	COP, Effect of evaporator and condenser temperature on cycle performance	Day 5	T1 (Pg : 39-45)	https://nptel.ac.in/courses/112/107/112107208/ lect5	C1-C10	Should acquire idea to increase to COP of the system.	CO1

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6	6	6	Effects of suction superheating Liquid sub-cooling.	Day 6	T1 (Pg : 46-52)	https://nptel.ac.in/courses/112/107/112107208/ lect 6	C1-C10	Should acquire idea to increase to COP of the system.	CO1
7	7	7	liquid-vapour heat exchanger, estimation of compressor displacement	Day 7	T1 (Pg : 55-62)	https://nptel.ac.in/courses/112/107/112107208/ lect 7	C1-C10	Should acquire idea to increase to COP of the system.	CO2
8	8	8	COP and power requirement, waste heat recover opportunities	Day 8	T1 (Pg : 62-66)	https://nptel.ac.in/courses/112/107/112107208/ lect8	C1-C10	Should acquire idea to increase to COP of the system.	CO2
Unit 3: Compound Vapour Compression System									
9	9	9	Multi-evaporator	Day 7	T1 (Pg : 101-108)	https://nptel.ac.in/courses/112/107/112107208/ lect9	C1-C10	Should understand importance of multi-staging in VCRS system	CO1
10	10	10	Multi-evaporator	Day 8	T1 (Pg : 110-115)	https://nptel.ac.in/courses/112/107/112107208/ lect 10	C1-C10	Concept of multi evaporator system and its application.	CO1
11	11	11	multi-compressor systems	Day 9	T1 (Pg : 116-119)	https://nptel.ac.in/courses/112/107/112107208/ lect11	C1-C10	Concept of multi compressor system and its application.	CO1
12	12	12	multi-compressor systems	Day 10	T1 (Pg : 120-125)	https://nptel.ac.in/courses/112/107/112107208/ lect12		Concept of multi compressor system and its application.	CO2
13	13	13	cascade system (no mathematical treatment) Vapour Absorption System	Day 11	T1 (Pg : 133-139)	https://nptel.ac.in/courses/112/107/112107208/ lect 13	C1-C10	Concept of cascade system and its application.	CO2
14	14	14	Aqua-ammonia system, lithium bromide-water system, Electrolux refrigerator,	Day 12	T1 (Pg : 140-148)	https://nptel.ac.in/courses/112/107/112107208/ lect 14	C1-C10	Should able to understand VARS and its component	CO3
15	15	15	comparison with vapour compression cycle (descriptive	Day 13	T1 (Pg : 150-158)	https://nptel.ac.in/courses/112/107/112107208/ lect 15	C1-C10	Should able to understand lithium bromide water system processes.	CO3

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			treatment only), P-T-ξ chart						
16	16	16	thermodynamic analysis, and capacity control, solar refrigeration system	Day 14	T1 (Pg : 160-180)	https://nptel.ac.in/courses/112/107/112107208/ lect16	C1-C10	Should able to understand lithium bromide water system processes.	CO3
Unit 4: Refrigerant for Vapour Compression System									
17	17	17	Desirable Properties, Selection, Zeotrops and Azeotropes, Necessity for replacement of CFC refrigerants, natural refrigerants	Day 15	T1 (Pg : 201-210)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Should able to understand Refrigerants and its properties.	CO1
18	18	18	Air Conditioning: Psychometric, properties of moist air,	Day 16	T1 (Pg : 211-215)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Concept of psychrometry and its terms	CO1
19	19	19	Thermal comfort: Heat transfer from human body by sensible and latent heat transfer, metabolic heat generation	Day 17	T1 (Pg : 216-222)	https://nptel.ac.in/courses/112/107/112107208/ Lecture 49	C1-C10	Concept of air conditioning and its classification	CO2
20	20	20	steady state model for heat transfer, effect of clothing and definition of effective temperatures	Day 18	T1 (Pg : 225-232)	https://nptel.ac.in/courses/112/107/112107208/ Lecture 49	C1-C10	Concept of Heat load for designing air conditioning.	CO2
21	21	21	comfort conditions, human comfort, comfort chart.	Day 19	T1 (Pg : 235-239)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Analytical understanding of above concepts	CO2
Unit 5: Air Conditioning Process Calculation									
22	22	22	Sensible and latent heat loads, SHF, GSHF, RSHF	Day 20	T1 (Pg : 250-255)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Concept of Heat load for designing air conditioning	CO1
23	23	23	Sensible and latent heat loads, SHF, GSHF, RSHF	Day 21	T1 (Pg : 256-260)	https://nptel.ac.in/courses/112/107/112107208/ Lecture 50	C1-C10	Concept of Heat load for designing air conditioning	CO2

24	24	24	outside conditions, indoor conditions, estimation of coil capacity required,	Day 22	T1 (Pg : 261-268)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Concept of Heat load for designing air conditioning	CO3
24	24	24	outside conditions, indoor conditions, estimation of coil capacity required,	Day 22	T1 (Pg : 270-275)	https://nptel.ac.in/courses/112/107/112107208/ Lecture 53	C1-C10	Concept of Heat load for designing air conditioning	CO3
25	25	25	bypass factor, evaporative cooling	Day 23	T1 (Pg : 280-288)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Analytical understanding of above concepts	CO1
26	26	26	bypass factor, evaporative cooling	Day 24	T1 (Pg : 290-299)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Analytical understanding of above concepts	CO3
Unit 6: Distribution of Air									
27	27	27	Principle of air distribution, duct design methods	Day 25	T1 (Pg : 350-355)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Understanding the Concept of air washers	CO1
28	28	28	friction chart, duct materials, methods of noise control All air system	Day 26	T1 (Pg : 360-367)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Understanding the Concept of air coolers.	CO1
29	29	29	all water system, unitary systems; window air-conditioner, split airconditioner	Day 27	T1 (Pg : 368-370)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Understanding the Concept of air flow through the transmission system.	CO1
30	30	30	refrigeration and air-conditioning controls.	Day 28	T1 (Pg : 371-377)	https://nptel.ac.in/courses/112/107/112107208/	C1-C10	Understanding the Concept of air distribution and types of grilles, diffusers.	CO2

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 30 Total number of lectures as per planned: - 30

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Tutorial Plan			
Week	**Topic**	**No. Of Problems**	**Mapped With CO**
1	Numerical on VCRS	03	II

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2	Numerical on multistage	02	III
3	Design of air conditioning	04	V
4	Design of duct	01	VI

Assignment Plan

Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1	VCRS & VARS			
2	Air conditioning & Air washer			

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	Study of water cooler using VCRS		I, II, III, IV, V, VI
2	Use of virtual lab		I, II, III

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Refrigeration & air conditioning	Cp arora	Tata McGraw Hills	2nd Edition
T2	Principles of Refrigeration and Air Conditioning,	Stoeker, W.F. and Jones	McGraw Hill, New York, Second Edition, 1982.	

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	**Dinshaws**	https://www.dinshaws.co.in /contact-us.html	Spanning across India, Dinshaw's was a dream come true of two enterprising brothers, Dinshaw and Erachshaw Rana. Their constant emphasis on quality consciousness and

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			innovating with new flavours gave people ice creams that truly were delightful. This success led Dinshaw's to expand into several dairy products.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Experimental_Investigation_on_the_Effect_of_Capillary_Tube_Geometry_on_the_Performance_of_Vapor_Compression_Refrigeration_System	NirajRaja	Thermal engineering		
P2	Effect_of_Capillary_Tube_Geometry_on_the_Performance_of_Vapour_Compression_Refrigeration_System	NirajRaja	Thermal engineering		

Prof. D.A. Agrawal
Subject Teacher

Prof. S.S.GHOSH
Academic Incharge

Prof. S.A. REWATKAR
HOD (Mech)

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Department of Artificial Intelligence
"A Place to Learn, A Chance to Grow"
Session 2022-23

VISION	MISSION
To be recognized for excellent engineering, developing global leaders both in educational and research in the domain of computer science and wireless engineering.	1. To create self-learning environment by facilitating leadership qualities, team spirit and ethical responsibilities. 2. To improve department-industry collaboration, interaction with professional society through technical knowledge and internship program. 3. To promote research and development with current techniques through well qualified resources in the area of computer science and wireless engineering.

Teaching Plan

Semester/ Branch : - III Sem/ AI **Subject code:- AI3T001**

Subject Name : - Organization Behavior **In-charge: Prof. Anuja Ghasad**

Course	**:** B. Tech in Artificial Intelligence	**Year/Semester**	**:** 3rd Semester (2nd Year)
Name of the Teacher	**:** Prof. Anuja Ghasad	**Subject Code**	**:** AI3T001
Subject	**:** Organization Behavior	**Section**	**:** AI
Periods per Week (each 60 min)		**Lecture**	**2**
		Tutorial	
		Practical	**----**

Course Objective	Course Outcomes
• To understand Fundamentals of Behaviour dynamics in an organization. • To increase understanding of the important issues pertaining to individual and group behavior aspects in an organization. • To acquaint the students with the appropriate concepts, theories, models and other tools to make better understanding of behavioral dynamics. • To understand the latest developments and cultivate an understanding of organizational culture and structure. • To understand applications of organizational change, power and conflict.	1. Students will be able to remember various methods and terms used different organizational behaviour model. 2. Students will be able to understand Individual as well as Group Behaviour like attitude, perception, motivation, personality, misbehavior and emotions. 3. Student will able to apply the Principals of Organization Behaviour through leadership, Power &Politics. 4. Student will able to analyze the dynamics of organizational behaviour and managing change. 5. Student will be able to evaluate the importance of Advanced Communication tools and Techniques for decision making Process.

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Sr. No	Lec.No	Topic Code	Contents to beCovered	Planned Teaching Dates	Actual Teaching Date	Text Books (Page no)	Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	Mapping CO's
UNIT-I Introduction to Organization Behavior.											
1	1	1.1	Meaning, Fundamental concepts, Definition, Approaches to OB,	19/9/2022	19/9/2022	T1(3-14)	R1(2-40	1) https://nptel.ac.in/courses/110/105/110105033/(5:47 – 59:06) 2) https://www.youtube.com/watch?v=my1YfC_lVcw (12:24 min)	C1-C5	Students will able to understand the Fundamental Concepts of Organization Behavior	CO1
2	2	1.2	Characteristics andlimitations of OB Models of OB, Impact of technology	20/9/2022	20/9/2022	T1-55	R1-9	1) https://nptel.ac.in/courses/110/105/110105033/ (59:02)	C1-C5	Students will able to understand the Impact of technology on organizational	CO1

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			on organizational behavior					2) https://www.youtube.com/watch?v=4vmQtVgWMOk(23:33)		behavior	
3	3	1.3	Organizational Culture meaning anddimensions	22/9/2022	22/9/2022	T1-335	R1-58	1) https://nptel.ac.in/courses/110/105/110105033/(48:38 – 59:35) 2) https://www.youtube.com/watch?v=zOWsE-SqjEs(10:28 min Hindi)	C1-C5	Students will able to understand vision in creating and sustaining culture.	CO1
4	4	1.4	Types of organizatio nalcultures.	26/9/2022	26/9/2022	T1-337	R1-30	1) https://www.youtube.com/watch?v=MfL_0ko4T3o(27:13 min) 2) https://www.youtube.com/watch?v=XEk5XTkxLWk(13:13 min)(Hindi) 3) https://www.youtube.com/watch?v=crsX_UM-R9k(11:31 min Hindi)	C1-C5	Students will able to understand basic concept of organizational cultures.	CO1
UNIT-II : Organizational Design, Change and Innovation											
5	5	2.1	Designing an organizational structure, Division of labour, Delegation of authority,	27/9/2022	27/9/2022	T2-45	R1-116	1) https://nptel.ac.in/courses/110/105/110105033/ (2:17 – 57:11 min) 2) https://www.youtube.com/watch?v=ysxAphmOYSM (34:27 min Hindi)	C1-C5	Students will able to understand concept of organizational structure.	CO2

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6	6	2.2	Span of control, Dimensions of structure. Organizational design models,	29/9/2022	29/9/2022	T2-45	R1-123	1) https://www.youtube.com/watch?v=o-oUQr3Xb-Q&feature=emb_rel_pause (31:16 min) 2) https://www.youtube.com/watch?v=X3GXi3QN1AA(12:58 min)	C1-C5	Students will able to understand concept of Organizational design models.	CO2
7	7	2.3	Multinational Structure and Design, Virtual Organizations	3/10/2022	4/10/2022	T2-45	R3-129	1) https://nptel.ac.in/courses/110/105/110105033/ (Lec: 30(Part 2)) 2) https://www.youtube.com/watch?v=GwQz3-rmPOw (20:11 min Hindi)	C1-C5	Students will able to understand concept of communication process.	CO5
8	8	2.4	**Communication** The importance of communication, The communication process,	4/10/2022	5/10/2022	T2-45	R3-140	1) https://www.youtube.com/watch?v=9U_mqypKORw (11:37 min) 2) https://www.youtube.com/watch?v=NM53k7x_jjk (52:21 min) 3) https://www.youtube.com/watch?v=J49MKFdiZC0 (21.37 min)	C1-C5	Students will able to understand the importance of Technical Report Writing.	CO5

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9	9	2.5	communication, Interpersonal communication, Multicultural communication, Barriers to effective communication, Improving	6/10/2022	6/10/2022	T2-45	R3-140	1) https://www.youtube.com/watch?v=9U_mqypKORw (11:37 min) 2) https://www.youtube.com/watch?v=NM53k7x_jjk (52:21 min) 3) https://www.youtube.com/watch?v=J49MKFdiZC0 (21.37 min)	C1-C5	Students will able to understand the importance of Technical Report Writing.	CO5
10	10	2.6	**Technical Report Writing :** Characteristics of Technical Communication, Types of Technical Documents, Technical Writing Process.	10/10/2022	10/10/2022	T2-45	R3-140	1) https://www.youtube.com/watch?v=9U_mqypKORw (11:37 min) 2) https://www.youtube.com/watch?v=NM53k7x_jjk (52:21 min) 3) https://www.youtube.com/watch?v=J49MKFdiZC0	C1-C5	Students will able to understand the importance of Technical Report Writing.	CO5

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UNIT-III : Personality										
11	11	3.1	Meaning of personality, Nature and Determinants of Personality,	11/10/2022	13/10/2022	T1-60	R1(36-47)	1)https://www.youtube.com/watch?v=qW0TRsSF7LM (24:50 min Hindi)	C1-C5	Students will able to understand the concept of personality.	CO2
12	12	3.2	Personality Traits - Big Five, Locus of Control, Self-esteemType A/ Type B Personality,	13/10/2022	17/10/2022	T1-64	R1-52	`1)https://www.youtube.com/watch?v=WsEiyf6Rq1Q (8:10 min Hindi) 2)https://www.youtube.com/watch?v=XqQuqnWu5XY(5:07 min Hindi)	C1-C5	Students will able to understand different types of Personality.	CO2
13	13	3.3	Risk Taking, Machiavellian ism,Self Monitoring, Personality and OB.	17/10/2022	18/10/2022	T1-129	R1-54	1)https://www.youtube.com/watch?v=2H4ZQGOc3vA (22:18 min Hindi) 2)https://www.youtube.com/watch?v=PSvNg6VbPtk(15:03 min Hindi)	C1-C5	Students will able to understand Attributes of personality.	CO2

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14	14	3.4	**Attitude**, Attributesof personality-Transactional Analysis, Ego states	18/10/2022	20/10/2022	T1-129	R1-54	1)https://www.youtube.com/watch?v=2H4ZQGOc3vA (22:18 min Hindi) 2)https://www.youtube.com/watch?v=PSvNg6VbPtk (15:03 min Hindi)	C1-C5	Students will able to understand Attributes of personality.	CO2
15	15	3.4	Nature and dimensions of attitude. Developingthe right attitude,	20/10/2022	24/10/2022	T1-133	R1-58	1)https://www.youtube.com/watch?v=Id1YknjkSus (7:44 min Hindi) 2)https://www.youtube.com/watch?v=WUU4RXI3lmE (40:38 min,Hindi)	C1-C5	Students will able to understand concept of Attitude.	CO3
16	16	3.6	ABC model of Attitude, Managerial Implications of Attitude	24/10/2022	25/10/2022	T1-133	R1-58	1)https://www.youtube.com/watch?v=Id1YknjkSus (7:44 min Hindi) 2)https://www.youtube.com/watch?v=WUU4RXI3lmE (40:38 min,Hindi)	C1-C5	Students will able to understand concept of Attitude.	CO3
UNIT-IV: Groups and Organizations											
17	17	4.1	Groups and Teams,Group Dynamics -	25/10/2022	27/10/2022	T1-145	R3-91	1)https://nptel.ac.in/courses/110/105/110105033/ (Lec:22,57:13 min) 2)https://www.youtube.com/watch?v=CKllDxyBKp8&feature=emb_rel_pause (20:12 min)	C1-C5	Students will able to understand concept of Groups and Teams.	CO3

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18	18	4.2	Groups versus teams,Nature and types of groups and teams Five stages of group/team development,	27/10/2022	31/10/2022	T1-148	R1-106	1)https://nptel.ac.in/courses/110/105/110105033/ (13:55 – 19:21min) 2)https://www.youtube.com/watch?v=e_mgaaplQz0 (10:01 min) 3)https://www.youtube.com/watch?v=UcZQBUmTkW0 (6:11 min Hindi) 4)https://www.youtube.com/watch?v=VWGG3ue3wU8 (8:24 min , Hindi)	C1-C5	Students will able to understand stages of group/team development.	CO4
19	19	4.3	Leadership as a concept and its essence,	31/10/2022	01/11/2022	T1-244	R1-137	1)https://nptel.ac.in/courses/110/105/110105033/ (5:34 – 33:16 min) 2)https://www.youtube.com/watch?v=g1ae2WeKbEU (6:27 min Hindi) 3)https://www.youtube.com/watch?v=6ledbtRRqjw (6:02 min , Hindi)	C1-C5	Students will able to understand concept of Leadership.	CO4
20	20	4.4	Leaders versus managers, Blake and Mouton's managerial grid,	01/11/2022	03/11/2022	T1-235	R1-145	1)https://www.youtube.com/watch?v=lYMssQ3bY5w (5:13 min, Hindi) 2)https://www.youtube.com/watch?v=FXFENZfMOTM (19:25 min, Hindi)	C1-C5	Students will able to analyze the Transactional versus Transformational leadership.	CO4

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21	21	4.5	Hersey and Blanchard's situational leadership Transactional versus Transformatio nal leadership,	03/11/2022	04/11/2022	T1-235	R1-145	1)https://www.youtube.com/watch?v=lYMssQ3bY5w (5:13 min, Hindi) 2)https://www.youtube.com/watch?v=FXFENZfMOTM (19:25 min, Hindi)	C1-C5	Students will able to analyze the Transactional versus Transformational leadership.	CO4

UNIT-V : Motivation

22	22	5.1	Power and purpose of motivation, Theories of motivation	07/11/2022	07/11/2022	T1-99	R1-67	1)https://nptel.ac.in/courses/110/105/110105033/ (Lec:13,58:29 min) 2)https://www.youtube.com/watch?v=5JnN5elTYC0(2:50 min) 3)https://www.youtube.com/watch?v=kmoPg_L1vVc(32:55 min, Hindi 4)https://www.youtube.com/watch?v=VLUy38YTEng(7:18 min)	C1-C5	Student will able to understand the concept of Powerand purpose of motivation.	CO4

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23	23	5.2	- Locke's goal setting theory, Vroom's expectancy theory,	08/11/2022	10/11/2022	T1-105	R1-74	1)https://nptel.ac.in/courses/110/105/110105033/ (Lec 15,28:27-51:36 min) 2)https://www.youtube.com/watch?v=0h_diq4xIuc (8:05 min,Hindi) 3)https://www.youtube.com/watch?v=4YDFIk-hQj0 (17:12 min,Hindi)	C1-C5	Student will able to understand the Motivational Techniques in Organization Behavior.	CO4
24	24	5.3	Porter and Lawler's model, Motivational Techniques	10/11/2022	14/11/2022	T1-105	R1-74	1)https://nptel.ac.in/courses/110/105/110105033/ (Lec 15,28:27-51:36 min) 2)https://www.youtube.com/watch?v=0h_diq4xIuc (8:05 min,Hindi) 3)https://www.youtube.com/watch?v=4YDFIk-hQj0 (17:12 min,Hindi)	C1-C5	Student will able to understand the Motivational Techniques in Organization Behavior.	CO4
25	25	5.4	**Power and Politics**: The concept of power,Sources of power, Interdepartmental power.	14/11/2022	15/11/2022	T1-209	R2-256	1)https://nptel.ac.in/courses/110/105/110105033/ (Lec 26,51:44 min) 2)https://www.youtube.com/watch?v=AftH0CdSHSE (30:50 min)	C1-C5	Student will able to understand the concept of power.	CO4

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26	26	5.5	Illusion of power, Political strategies and tactics, Ethics, power and politics.	15/11/2022	21/11/2022	T1-209	R2-256	1)https://nptel.ac.in/courses/110/105/110105033/ (Lec 26,51:44 min) 2)https://www.youtube.com/watch ?v=AftH0CdSHSE (30:50 min)	C1-C5	Student will able to understand the concept of power.	CO4
27	27	5.6	**Empowerment and Participation**:The nature of empowerment and participation	17/11/2022	23/11/2022	T1-214	R2-256	1)https://nptel.ac.in/courses/110/105/110105033/ (Lec 27,1:02 Hrs) 2)https://www.youtube.com/watch ?v=w_hBSXiZtlc (5:59 min)	C1-C5	Student will able to understand the concept of the nature of empowerment and participation.	CO4
28		5.7	How participation works, Programs forparticipation,	21/11/2022	25/11/2022	T1-214	R2-256	1)https://nptel.ac.in/courses/110/105/110105033/ (Lec 27,1:02 Hrs) 2)https://www.youtube.com/watch ?v=w_hBSXiZtlc(5:59 min)	C1-C5	Student will able to understand the concept of the nature of empowerment and participation.	CO4

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Assignment Plan

Assignment No.	Topic	Given Date	Given Date	Mapped With CO
1	Assignment 1	09-11-2022	17-11-2022	CO1-CO5
2	Assignment 2	15-12-2022	26-12-2022	CO1-CO5

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Text Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Organization Behaviors	V.G.Kondalkar	New Age International Publisher	2007
T2	Organization Behaviors	Uma Sekaran	McGraw Hill Company, New Delhi	2011
T3	Organization Behavior	Nair, Banerjee, Agarwal	Prgathi Prakashan, New Delhi	2006

Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
R1	Organization Behavior	LM Prasad	S. Chand and Co. Ltd, New Delhi	2008.
R2	Organization Behavior	S.S. Khanka	S. Chand and Co. Ltd, New Delhi	2008.
R3	Organizational Behavior	Fred Luthans	McGraw Hill Book Co	2005

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Wipro	www.wipro.com	The key strategy deployed by post-bureaucratic organisations are the manufacture of a strong corporate culture in order to incorporate employees into the organization, thereby creating a self-motivated and committed workforce (Kunda, 1992).The 'Spirit of Wipro', encapsulates the values which are the guiding principles of the culture of Wipro. 'Spirit of Wipro' identifies core values like 'making customers success', 'Team', 'Innovate', 'excellence for individual' , 'thoughtful and responsible', 'Delivering on Commitments', 'honesty and fairness' (Wipro Limited 2012). The emphasis on teamwork, individual responsibility and commitment are, in reality, implementing a 'soft bureaucracy' instead of ideal flexibility.

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C2	Microsoft	www.microsoft.com	Microsoft Corporation's organizational culture ensures workforce resilience and capability to address business needs in the dynamic market for computer hardware and software products. A company's corporate culture refers to the values, traditions and behavioral expectations among employees. Microsoft uses its organizational culture to facilitate innovation and customer satisfaction. As one of the leading firms in the IBM PC-compatible operating system market, the company must maintain cultural characteristics that suitably promote innovation and high quality output. Microsoft's long-term success partly depends on this organizational culture and the corresponding competence of the company's human resources.
C3	Adobe	www.adobe.com	Adobe is a company that goes out of its way to give employees challenging projects and then provide the trust and support to help them meet those challenges successfully. While it offers benefits and perks like any modern creative company, Adobe's is a culture that avoids micromanaging in favor of trusting employees to do their best. For example, Adobe doesn't use ratings to establish employee capabilities, feeling that that inhibits creativity and harms how teams work. Managers take on the role of a coach, more than anything, letting employees set goals and determine how they should be assessed. Employees are also given stock options so that they know they have both a stake and reward in the company's success. Continual training and a culture that promotes risk taking without fear of penalty are part of Adobe's open company culture.
C4	Google	www.google.co.in	Google has been synonymous with culture for years, and sets the tone for many

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			of the perks and benefits startups are now known for. Free meals, employee trips and parties, financial bonuses, open presentations by high-level executives, gyms, a dog-friendly environment and so on. Googlers are known to be driven, talented and among the best of the best. As Google has grown and the organization has expanded and spread out, keeping a uniform culture has proven difficult between headquarters and satellite offices, as well as among the different departments within the company. The larger a company becomes, the more that culture has to reinvent itself to accommodate more employees and the need for management.
C5	Facebook	www.facebook.com	Facebook offers, as do many similar companies, lots of food, stock options, open office space, on-site laundry, a focus on teamwork and open communication, a competitive atmosphere that fosters personal growth and learning and great benefits. To meet these challenges, Facebook has created conference rooms, has separate buildings, lots of outdoor roaming space for breaks and has management (even CEO Mark Zuckerberg) working in the open office space alongside other employees. It's an attempt at a flat organizational culture using the buildings and space itself to promote a sense of equality among the competition.

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Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/ Page no/Year
P1	Organizational Behavior: A Study on Managers, Employees, and Teams (https://pdfs.semanticscholar.org/9b35/18555998024be5ca652e2150bd40b43b16aa.pdf)	Organizational Behavior: A Study on Managers, Employees, and Teams Organizational Behavior: A Study on Managers, Employees, and Teams Belal A. Kaifi	Journal of Management Policy and Practice		Vol 12(1) January 2011
P2	Organization citizenship behaviour: an examination of the influence of the workplace	David Turnipseed	Leadership & Organization Development Journal	https://doi.org/10.1108/01437739610111222	Vol. 17 No. 2, pp. 42-47.
P3	Existentialism and organizational behaviour: How existentialism can contribute to complexity theory and sense-making	Robert J. Bloome	Journal of Organizational Change Management	https://doi.org/10.1108/09534811211228120	Vol. 25 No. 3, pp. 405-421
P4	The science of organizational design: fit	Richard M. Burton	Springer	https://doi.org/10.1	Article 5

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	between structure and coordination			186/s41469-018-0029-2	(2018)
P5	The Role Of Communication In Enhancing Work Effectiveness Of An Organization	**George BUCĂŢA**	Land Forces Academy Review	10.1515/raft-2017-0008	Vol. XXII, No 1(85), 2017
P6	Review of the current status of the studies on personality traits	Kumaranayake AR	International Journal of Applied Research	https://www.researchgate.net/publication/329773642_Review_of_the_studies_on_personality_Traits	ISSN Print: 2394-7500 ISSN Online: 2394-5869
P7	How to write a technical report	Dobri Atanassov Batovski	American International Journal of Social Science Research	https://www.researchgate.net/publication/235985625_How_to_write_a_technical_report	April 2010
P8	Impact of Group Dynamics on Team	R.V. Naveenan	American International Journal of Social Science Research	DOI: 10.46281/aijssr.v2i2.175	Vol. 2, No. 2; 2018 ISSN 2576-103X E-ISSN 2576-1048
P9	Empowering Leadership in Management Teams: Effects on Knowledge Sharing, Efficacy, And Performance	Abhishek Srivastava , Kathryn M. Bartol and Edwin A. Locke	Academy of Management Journal	https://doi.org/10.5465/amj.2006.23478718	Vol. 45, No. 6

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P10	Theoretical Considerations on Motivation at the Work Place, Job Satisfaction and Individual Performance	Raluca GÎLMEANU (MANEA)	Valahian Journal of Economic Studies	https://search.proquest.com/openview/963de0c26e8ddba3aa64e8c155e13f4a/1?pq-origsite=gscholar&cbl=2029114	Vol. 6, Iss. 3, (2015): 69-80.

Prof. Anuja Ghasad
Subject In charge

Prof. Swati Raut
Dept. Academic Incharge

Dr. Supriya Sawwashere
Dept. Head AI

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Teaching Plan

Course: B. Tech in Artificial Intelligence	**Year/Semester:** 6th Sem 3rd Year
Name of the Teacher: Prof. Jolly R. Nikhade	**Subject Code: AI6T001**
Subject: Advanced Computer Vision	**Section:**
Periods per Week: (each 60 min)	**Lecture: 3** **Tutorial:** **Practical:**

Course Objective	Course Outcomes
The objective of the course is fourfold: 1. To build an Understanding on detailed models of image formation. 2. To expose the students to image feature detection and matching. 3. To introduce fundamental algorithm for pattern recognition. 4. To introduce various classification techniques. 5. To expose the students to various structural pattern recognition and feature extraction techniques.	Students will be able to: 1. Appreciate the detailed models of image formation. 2. Analyze the techniques for image feature detection and matching. 3. Apply various algorithms for pattern recognition. 4. Examine various objects recognition technique. 5. Analyze structural pattern recognition and feature extraction techniques. 6. Explain various image models.

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Sr. No	Lecture No.	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/ Online Material/ PPT / Video)	Applications (R&D/ Industry)	Learning Outcomes	Mapping Co's
UNIT 1 Image formation Models									
1	1	1	Image formation Models: Monocular imaging system,	02/01/2023	T1 (Pg: 67 to 70)	https://www.youtube.com/watch?v=3LaVxEX3F0o&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo	C1	Students will be able to understand what is Image formation.	Co1, Co2, Co3, Co4, Co5, Co6
2	2	2	Orthographic and perspective projection.	03/01/2023	T1 (Pg: 67 to 70)	https://www.youtube.com/watch?v=_EhY31MSbNM	C2	Students will be able to understand Orthographic and perspective projection.	Co1, Co2, Co3, Co4, Co5, Co6
2	2	2	Cameras-Lenses, Projections	04/01/2023	R2 (Pg. 45 to 55)	https://www.youtube.com/watch?v=_EhY31MSbNM	C3	Students will be able to understand Cameras-Lenses, Projections.	Co1, Co2, Co3, Co4, Co5, Co6
3	3	3	Sensors, radiometry-measuring Light	05/01/2023	T1 (Pg. 99 to 105)	https://www.youtube.com/watch?v=7LX-19v_9ns	C1	Students will be able to understand Sensors, radiometry-measuring Light.	Co1, Co2, Co3, Co4, Co5, Co6

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4	4	4	Light and surfaces	09/01/2023	R2 (Pg. 45 to 50)	https://www.youtube.com/watch?v=1I6kfkY4GyQ&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=3	C1	Students will be able to understand Light and Surfaces.	Co1, Co2, Co3, Co4, Co5, Co6
5	5	5	Representation – color, spaces	10/01/2023	R3 (Pg. 225 to 275)	https://www.youtube.com/watch?v=qRFwZD5jH1o&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=19	C2	Students will be able to understand Representation – color, spaces.	Co1, Co2, Co3, Co4, Co5, Co6
6	6	6	Camera Model and Camera Calibration, Binocular Imaging Systems,	11/01/2023	R3 (Pg. 300 to 325)	https://www.youtube.com/watch?v=Zgv-zQzMkUE&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=7	C1	Students will be able to understand Camera Model and Camera Calibration, Binocular.	Co1, Co2, Co3, Co4, Co5, Co6
7	7	7	Sources, shadows and Shading	12/01/2023	R3 (Pg. 300 to 325)	https://www.youtube.com/watch?v=qRFwZD5jH1o&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=19	C2	Students will be able to understand Sources, shadows and Shading.	Co1, Co2, Co3, Co4, Co5, Co6
UNIT 2 : 2D/3D Visions									
8	8	8	2D/3D Visions: Filters, Binary Images	16/01/2023	T1 (Pg. 100 to 120)	https://www.youtube.com/watch?v=WSMtkBkKQMw&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=18	C2	Students will be able to understand 2D/3D Visions: Filters, Binary Images.	Co1, Co2, Co3, Co4, Co5, Co6

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9	9	9	Features, Edge Detection, Texture	17/01/2023	R4 (Pg. 200 to 204)	https://www.youtube.com/watch?v=U-5x0L48LzE&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=22	C3	Students will be able to understand Features, Edge Detection, Texture.	Co1, Co2, Co3, Co4, Co5, Co6
10	10	10	Shape, Segmentation	21/01/2023	R5 (Pg. 250)	https://www.youtube.com/watch?v=bYWa7AuzIUQ&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=21	C2	Students will be able to understand Shape, Segmentation.	Co1, Co2, Co3, Co4, Co5, Co6
11	11	11	Clustering, model Fitting	23/01/2023	T1 (Pg: 145 - 150)	https://www.youtube.com/watch?v=WSMtkBkKQMw&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=18	C1	Students will be able to understand Clustering, model Fitting.	Co1, Co2, Co3, Co4, Co5, Co6
12	12	12	Probabilistic, 3D vision	25/01/2023	T1 (Pg. 87 to 89)	https://www.youtube.com/watch?v=GUbWsXU1mac	C2	Students will be able to understand Probabilistic, 3D vision.	Co1, Co2, Co3, Co4, Co5, Co6
13	13	13	Multiview Geometry, Stereo	27/01/2023	T2 (Pg. 125 to 150)	https://www.youtube.com/watch?v=IjPLZ3hjU1A	C2	Students will be able to understand Multiview Geometry, Stereo.	Co1, Co2, Co3, Co4, Co5, Co6
14	14	14	Shape from X	30/01/2023	R4 (Pg. 200 to 250)	https://www.youtube.com/watch?v=g0rPvQvTLGQ&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=5	C3	Students will be able to understand Shape from X.	Co1, Co2, Co3, Co4, Co5, Co6

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15	15	15	3D Data	31/01/2023	T1 (Pg. 100 to 120)	https://www.youtube.com/watch?v=OZeACDAl424&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=12	C1	Students will be able to understand 3D Data.	Co1, Co2, Co3, Co4, Co5, Co6
UNIT 3 Image Processing									
16	16	16	Image Processing and Feature Extraction	02/02/2023	R1 (Pg. 250 to 265)	https://www.youtube.com/watch?v=SCNDpDMKsRg&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=25	C2	Students will be able to understand Image Processing and Feature Extraction.	Co1, Co2, Co3, Co4, Co5, Co6
17	17	17	Image representation (Continues)	03/02/2023	R1(Pg. 300 to 350)		C1	Students will be able to understand Image representation.	Co1, Co2, Co3, Co4, Co5, Co6
18	18	18	Image Representation (Discrete)	06/02/2023			C1	Students will be able to understand Image representation.	Co1, Co2, Co3, Co4, Co5, Co6
19	19	19	Linear Filters	07/02/2023	R1 (Pg. 179 to 180)	https://www.youtube.com/watch?v=gMzW4JZ3X0U&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=17	C2	Students will be able to understand Linear Filters.	Co1, Co2, Co3, Co4, Co5, Co6

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20	20	20	Texture	08/02/2023	R1 (Pg. 185 to 190)	https://www.youtube.com/watch?v=SCNDpDMKsRg&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=25	C1	Students will be able to understand Texture.	Co1, Co2, Co3, Co4, Co5, Co6
21	21	21	Edge Detection Part 1	11/02/2023	R1 (Pg. 200 to 205)	https://www.youtube.com/watch?v=LZpd0JZ5Kmo&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=23	C1	Students will be able to understand Edge Detection Part 1.	Co1, Co2, Co3, Co4, Co5, Co6
22	22	22	Edge Detection part 2	13/02/2023	R1 (Pg. 200 to 205)	https://www.youtube.com/watch?v=LZpd0JZ5Kmo&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=23	C3	Students will be able to understand Edge Detection Part 1.	Co1, Co2, Co3, Co4, Co5, Co6
UNIT 4 Motion Estimation									
23	23	23	Motion Estimation: Regularization Theory, Optical Computation, Stereo Vision,	14/02/2023	R1 (Pg. 245 to 250)	https://www.youtube.com/watch?v=fLzhaY90ym4&list=RDCMUCf0WB91t8Ky6AuYcQV0CcLw&index=3	C1	Students will be able to understand Motion Estimation.	Co1, Co2, Co3, Co4, Co5, Co6

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24	24	25	Motion Estimation, Structure from Motion, Shape representation and Segmentation	17/02/2023	R1 (Pg. 253 to 261)	https://www.youtube.com/watch?v=fLzhaY90ym4&list=RDCMUCf0WB91t8Ky6AuYcQV0CcLw&index=3	C2	Students will be able to understand Motion Estimation.	Co1, Co2, Co3, Co4, Co5, Co6
25	25	25	Deformable curves and Surfaces, Snakes and active contours	20/02/2023	R1 (Pg. 263 to 279)	https://www.youtube.com/watch?v=vZQYlNivD6A&list=PLwdnzlV3ogoVsma5GmBSsgJM6gHv1QoAo&index=29	C3	Students will be able to understand Deformable curves.	Co1, Co2, Co3, Co4, Co5, Co6
26	26	26	Level Set Representation, Fourier and wavelet descriptors, Medial Representation,	22/02/2023	R1 (Pg. 121 to 123)	https://www.youtube.com/watch?v=1ZJ88JyLPZI	C1	Students will be able to understand Level Set Representation.	Co1, Co2, Co3, Co4, Co5, Co6
27	27	27	Multiresolution and analysis	25/02/2023	R1 (Pg. 105 to 111)	https://www.youtube.com/watch?v=yyQ29OgZEjg	C1	Students will be able to understand Multiresolution and analysis.	Co1, Co2, Co3, Co4, Co5, Co6

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UNIT 5: Object Recognition									
28	28	28	Object Recognition: Hough Transforms and Other Simple Object recognition methods	27/02/2023	R3 (Pg. 200 to 205)	https://www.youtube.com/watch?v=t1GXMvK9m84	C2	Students will be able to understand Hough Transforms and Other Simple Object recognition methods.	Co1, Co2, Co3, Co4, Co5, Co6
29	29	29	Shape Correspondence and shape matching Part 1	01/03/2023	R3 (Pg. 130 to 135)	https://www.youtube.com/watch?v=fk2OvVbsy2w	C3	Students will be able to understand Shape Correspondence and shape matching.	Co1, Co2, Co3, Co4, Co5, Co6
30	30	30	Shape Correspondence and shape matching Part 2	04/03/2023	R3 (Pg. 100 to 105)	https://www.youtube.com/watch?v=fk2OvVbsy2w	C1	Students will be able to understand Shape Correspondence and shape matching.	Co1, Co2, Co3, Co4, Co5, Co6
31	31	31	Principal Component Analysis Part 1	09/03/2023	R1 (Pg. 167 to 168)	https://www.youtube.com/watch?v=83x5X66uWK0	C2	Students will be able to understand Principal Component Analysis.	Co1, Co2, Co3, Co4, Co5, Co6
32	32	32	Principal Component Analysis Part 2	13/03/2023	R1 (Pg. 145 to 150)	https://www.youtube.com/watch?v=83x5X66uWK0	C1	Students will be able to understand Principal Component Analysis.	Co1, Co2, Co3, Co4, Co5, Co6
33	33	33	Shape priors for recognition 1	18/03/2023	R1 (Pg. 105 to 120)	https://www.youtube.com/watch?v=fk2OvVbsy2w	C1	Shape priors for recognition	Co1, Co2, Co3, Co4, Co5, Co6

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34	34	34	Shape priors for recognition 2	20/03/2023	R4 (Pg. 201 to 202)	https://www.youtube.com/watch?v=fk2OvVbsy2w	C3	Shape priors for recognition	Co1, Co2, Co3, Co4, Co5, Co6
35	35	35	Shape priors for recognition part 3	27/03/2023	R5 (Pg. 223 to 225)	https://www.youtube.com/watch?v=fk2OvVbsy2w	C1	Shape priors for recognition	Co1, Co2, Co3, Co4, Co5, Co6
36	36	36	Shape priors for recognition part 4	05/04/2023	R5 (Pg. 179 to 185)	https://www.youtube.com/watch?v=fk2OvVbsy2w	C2	Shape priors for recognition	Co1, Co2, Co3, Co4, Co5, Co6

*T=Text Book: R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 36 Total number of lectures as per planned: - 36

Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	UNIT 1, 2, 3	03/04/2023	10/04/2023	CO1, CO2, CO3, CO4, CO5, CO6
2	UNIT 4, 5	20/04/2023	27/04/2023	CO1, CO2, CO3, CO4, CO5, CO6

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's**
1	Introduction to how to build advanced computer vision applications using ML and DL	25/04/2023	CO1, CO2, CO3, CO4, CO5, CO6

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Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Computer Vison: A modern Approach	D. A. Forsyth and J. Ponce, Prentice Hall	Library of Congress Cataloging	2003/2011
T1	Computer Vision	Linda Shapiro and George Stockman	Prentice – Hall	2001
R2	Robot Vision	B. K. P. Horn	Mcgraw hill	2001
R3	Multiple view geometry in computer vision.	Richart Hartley and Andrew Zisserman	Cambridge University Press	2004

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Veritone	https://www.veritone.com/	Discover the possibilities of artificial intelligence with Veritone. As creators of the world's first AI Operating System, we are augmenting the human workforce by transforming use-case concepts into tangible, industry-leading applications and solutions.
C2	AMP Robotics	https://www.amprobotics.com/	AMP Robotics is modernizing the world's recycling infrastructure by applying AI and automation to increase recycling rates and economically recover recyclables reclaimed as raw materials for the global supply chain

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Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Human-Inspired Camera: A Novel Camera System for Computer Vision	Shubham Kumar	2021 18th International SoC Design Conference (ISOCC)	**10.1109/ISOCC53507.2021.9613914**	**Jeju Island, Korea, Republic of, 2021**
P2	A Survey on how computer vision can response to urgent need to contribute in COVID-19 pandemics	S. Gazzah and O. Bencharef	2020 International Conference on Intelligent Systems and Computer Vision (ISCV), Fez, Morocco, 2020	**doi: 10.1109/ISCV49265.2020.9204043.**	2020
P3	Real-Time Face Mask Detection using Computer Vision and Machine Learning	C. N. Kumar, E. Nithin Computer, C. S. Krishna and C. Bindhu Madhavi,	Second International Conference on Electronics and Renewable Systems (ICEARS)	**doi: 10.1109/ICEARS56392.2023.10085276.**	2023

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P4	Research on Image Processing Technology of Computer Vision Algorithm	Xin Zhang; Shuo Xu	2020 International Conference on Computer Vision, Image and Deep Learning (CVIDL),	**doi: 10.1109/CVIDL51233.2020.00030.**	2020
P5	Computer Vision enabled Adaptive Speed Limit Control for Vehicle Safety	A. Lad, P. Kanaujia, Soumya and Y. Solanki	2021 International Conference on Artificial Intelligence and Machine Vision (AIMV)	**doi: 10.1109/AIMV53313.2021.9670944**	2021

Prof. Jolly Nikhade
Subject In charge

Prof. Swati Raut
Dept. Academic Incharge

Dr. Supriya Sawwashere
Dept. Head AI

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Education to Eternity

VISION	MISSION
To be a center of excellence imparting professional education satisfying societal and global needs.	1. Transforming students into lifelong learners through, quality teaching, training and exposure to concurrent technologies. 2. Fostering conducive atmosphere for research and development through well-equipped laboratories and qualified personnel in collaboration with global organizations.

Teaching Plan

Course	**:** MBA	**Year/Semester**	**:** 1st Semester (1st Year)
Name of the Teacher	**:** Dr Surendra Jogi	**Subject Code**	**:** 1T8
Subject	**:** Managerial Skills for Effectiveness.	**Section**	**:** A & B
Periods per Week (each 60 min)		**Lecture**	**3**
		Tutorial	**1**
		Practical	**-**

Course Objective	Course Outcomes
1. To introduce the concept of Effective Verbal Communication and its importance. 2. To explain the methods of expression & Personnel Correspondence. 3. To discuss various Business Communication using Word Processor. 4. To acquaint the students with PowerPoint for Effective Presentation 5. To acquaint the student with functions of Spreadsheets and Excel	1. The student will be able to make proper use of group of words, synonyms and antonyms, phrases, idioms, proverbs for effective verbal communication. 2. The student will be able to write essays and CV using Word Processor 3. The student will be able to draft business letters for given situations using Word Processor 4. The student will be able to apply basic functions of PowerPoint and will also be able to create effective PowerPoint Presentations using templates 5. The student will be able to use various spreadsheet functions and will also be create useful spreadsheets

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO
Module I – Basics of Verbal Communication									
1	1	1.01	Course Overview	Day 1				Student will understand the COs	1
2	2	1.02	Basics of Verbal Communication	Day 2	R1 (Study I))	https://youtu.be/czzTuE5cxnc	C1-C4	Student will be able to understand importance of verbal communication	1
3	3	1.03	Using pairs & Group of words in communication	Day 3	R1 (Study I))	https://youtu.be/2Lkb7OSRdGE	C1-C4	Student will be able to use pair and group of words in verbal communication	1
4	4	1.04	Synonyms and Antonyms in verbal communication	Day 4	R1 (Study I)	https://youtu.be/-mLRoxWM8dI	C1-C4	Student will be able to use Synonyms and Antonyms in verbal communication	1
5	5	1.05	sentence construction and punctuation	Day 5	R1 (Study I)	https://youtu.be/zZslAVsBBGE	C1-C4	Student will be able to sentence construction and punctuation	1
6	6	1.06	Using phrases/ idioms , proverbs in Communication.	Day 6	R1 (Study I))	https://youtu.be/BEoyUdt7OlQ	C1-C4	Student will be able to Use phrases/ idioms , proverbs in Communication	1
7	7		Revision						
Module II– Essay Writing/Letter Writing									
8	8	2.01	Concept of Essay Writing	Day 8	R1 (Study II & V)	https://youtu.be/MD2upUW9HgI	C1-C4	Student will be able to understand Concept of Essay Writing	2
9	9	2.02	Methods of expression, style and tone	Day 9	R1 (Study II & V)	https://youtu.be/o_4MV5Tz7r4	C1-C4	Student will be able to understand Methods of expression, style and tone	2
10	10	2.03	synopsis and structure	Day 10	R1 (Study II & V)	https://youtu.be/OgNVUZvB9Ow	C1-C4	Student will be able to develop synopsis and structure of essay	2

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11	11	2.04	Concept of Letter Writing	Day 11	R1 (Study II & V)	https://youtu.be/zaDoAEQ8d9g	C1-C4	Student will understand Concept of Letter Writing	2
12	12	2.05	Business correspondence personnel	Day 12	R1 (Study II & V)	https://youtu.be/yKrxYLbFINU	C1-C4	Student will be able to understand Business correspondence personnel	2
13	13	2.06	Components of CV and Resume	Day 13	R1 (Study II & V)	https://youtu.be/BV8LJOIMKqo	C1-C4	Student will be able to understand Components of CV and Resume	2
Module III– Writing Business Letters and Quotations									
14	14	3.01	Writing Business Letters	Day 14	R1 (Study VI)	https://youtu.be/egeyiUpFsaw	C1-C4	Student will be able to Writing Business Letters	3
15	15	3.02	Writing Letter of Enquiry	Day 15	R1 (Study VI)	https://youtu.be/iQY2I9-lDmI	C1-C4	Student will be able to Writing Letter of Enquiry	3
16	16	3.03	Letter for Sales Promotion	Day 16	R1 (Study VII)	https://youtu.be/Obaa1Uc31TI	C1-C4	Student will be able to Writing business letter for Sales Promotion	3
17	17	3.04	Letter of complaint	Day 17	R1 (Study VIII)	https://youtu.be/2Fv_--NxBEo	C1-C4	Student will be able to Write business letter of complaint	3
18	18	3.05	Writing Letter for Placing Order,	Day 18	R1 (Study IX)	https://youtu.be/_UKEN9tyvyg	C1-C4	Student will be able to write to letter for placing Order	3
19	19	3.06	Writing Business letter for Quotations	Day 19	R2 Chapter 10 (10.4)	https://youtu.be/J2uruzzDwK4	C1-C4	Student will be able to Writing Business letter for Quotations	3
Module IV – PowerPoint									
20	20	4.01	Power point Auto Content Wizard, Design Templates,	Day 20	R 2 Chapter 10 (10.5)	https://youtu.be/CZjU7w0eiKY	C1-C4	Student will be able to learn use of Power point Auto Content Wizard, Design Templates,	4
21	21	4.02	Power Point Views, Working with slides,	Day 21	R 2 Chapter 10 (10.5)	https://youtu.be/2Ox3WkP60CU	C1-C4	Student will be able to use Power Point Views, Working with slides,	4
22	22	4.03	PowerPoint -, Page Setup, Animations,	Day 22	R 2 Chapter 10 (10.5)	https://youtu.be/3uJd-_JpG1w	C1-C4	Student will be able to learn Power Point , Page Setup & Animation	4
23	23	4.04	Power point Colour Schemes, Background,	Day 23	R 2 Chapter 10 (10.5)	https://youtu.be/3uJd-_JpG1w	C1-C4	Student will be able to use power point Colour Schemes and Background	4

24	24	4.05	Power Point Master Slide and issue	Day 24	R 2 Chapter 10 (10.5)	https://youtu.be/kHRc-3rMCg4	C1-C4	Student will be able to understand Power Point Master Slide and issue	4
Module V – Spreadsheets									
25	25	5.01	Spreadsheets - Spreadsheet basics, Standard Toolbar, Basic Functions,	Day 25	R2 Chapter 10 (10.6)	https://youtu.be/15aVozje2z0	C1-C4	Student will be able to understand basic use of Spreadsheet	5
26	26	5.02	Sorting and Filtering, Charts, Statistical Functions, Data Management in Spreadsheet:	Day 26	R2 Chapter 10 (10.6)	https://youtu.be/O28-xL5YGkE	C1-C4	Student will be able to use Sorting, Statistical Functions, Data Management in Spreadsheet	5
27	27	5.03	Data Entry, Tables, Conditional Formatting, Data Sorting and Filtering, Data Validation	Day 27	R2 Chapter 10 (10.6)	https://youtu.be/iHJPZrmZ2H8	C1-C4	Student will able to do Formatting, Data Sorting and Filtering, Data Validation	5
28	28	5.04	Formulas and Functions: Mathematical & Statistical Functions. Logical Functions in Spreadsheet: 'And', 'Or', 'If'. 'Lookup' functions and formula in spreadsheet	Day 28	R2 Chapter 10 (10.6)	https://youtu.be/hKrFDLC5jxo	C1-C4	Student will be able to understand Statistical Functions. Logical Functions in Spreadsheets	5
29	29	5.05	Data Visualization: Introduction to data visualization. Techniques of data visualization.	Day 29	R2 Chapter 10 (10.6)	https://youtu.be/MiiANxRHSv4	C1-C4	Student will be able to do Data Visualization: Introduction to data visualization. Techniques of data visualization.	5

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30	30	5.06	Charts, Dynamic Tables, Pivot Tables, Dashboards.	Day 30	R2 Chapter 10 (10.6)	https://youtu.be/2btS31AU3Iw	C1-C4	Student will able to use Charts, Dynamic Tables, Pivot Tables, Dashboards	5

*T=Text Book; R= Reference Book; C= Company name; R= Research Paper

Total number of lectures as per syllabus: - 30 Total number of lectures as per planned: - 30

Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	Make your Verbal Communication Effective by Preparing Question No. ! to 5 frm the syllabus & Write Essay on Black money and Indian Economy, Woman Entrepreneurs and Stock Exchanges and their role	13/12/2022	20/12/2022	CO1

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's not covered in TP**
1			

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
R1	Foundation programme English & Business Communication.	The Institute of company secretaries of India	The Institute of company secretaries of India	
R2	Computer Applications in Business	S. Sudalaimuthu and S. Anthony Raj	Himalaya Publication House.	
R3	Business Communication for Managers	, Payal Mehra	Pearson Education India	2nd Edition
R4	Business Communication	Asha Kaul	Prentice Hall India Learning Private Limited	2nd Edition
R5	Mastering MS Office: Computer Skill Development - Be Future Ready	Bittu Kumar	V&S Publishers	
R6	Microsoft Excel Power Pivot & Power Query For Dummies	Michael Alexander	Wiley Publication	

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Company/Industry:

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	The impact of managerial skills on employee outcomes: A cross cultural study	Richard C. Hoffman & Frank M. Shipper	The International Journal of Human Resource Management	10.1080/09585192.2011.581635	June 2018
P2	Managerial Skills for Managers in the 21st Century	Prof. Ruchi Tiwari And Dr Ritu Sharma	Researchgate		April 2012

Subject Teacher **Academic In-charge** **HOD-MBA**

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