JAIDEV EDUCATION SOCIETY'S

J D COLLEGE OF ENGINEERING AND MANAGEMENT

KATOL ROAD, NAGPUR

Website: www.jdcoem.ac.inE-mail: info@jdcoem.ac.in

An Autonomous Institute, with NAAC "A" Grade

Basic Science and Humanities Department

2020-21 (Odd Sem)

Education to Eternity

||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. all branches	**Year/Semester :** First Year/Sem I	
Name of the Teacher : Mr.S.S.Kathalkar	**Subject Code :** MA1T001	
Subject : Engineering Mathematics I	**Section :**ME/Civil/CSE/IT/EE/ETC/AI	
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. 3. To understand Computation of Jacobin of functions of several variables and their applications to engineering problems	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 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.

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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/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: Meaning of inverse, adjoint method, examples	Day 3	T1/492	R1/971-972	https://www.youtube.com/watch?v=Rcic2zJpSVs (6.11 min)	P2	Find inverse of matrix by adjoint method	CO3
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:	Day 6	T2/727-		https://nptel.ac.in/co	P3	Classify linear and non-linear equations	CO4

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			Classification , method to find the solution of linear equations, examples		729		urses/111/105/111105121/ (28.17 min)(0:00-15:00)		Solve system of linear equations	
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
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 factormethod	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

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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
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

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21	21	3.3	Rules for finding complementary function: Case I to Case IV	Day 21	T2/512-520	R1/73-74	https://nptel.ac.in/courses/111107098/14 (28.17 min)	P8	Classify the cases of C.F	CO4
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
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

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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
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

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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 functions of two variables: statement, history, meaning	Day 39	T4/8.2	R1/510	https://youtu.be/wMd4YRyBmjA (50.12 min)(0:00-25:00)	P10	Understand Taylor's theorems for functions of two variables	CO2
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	UnderstandMcLaren'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 McLaurin's theorem for solving examples	CO3

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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 multipliers,formula, method	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
45	45	5.9	Solving ProblemsLagrange's method of undetermined multipliers	Day 45	T3/421-423		https://youtu.be/xjUcaH6dCN0 (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: - 45Total 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

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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
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

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T3	Advance Engineering mathematics	Erwin Kreyszing	Wiley Publication,	8th edition
T4	Engineering Mathematics I	Dr.N.S.Mujumdar	Niral Publication	1th edition

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	GlobalLogic 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 information, perform search queries, and manage databases.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	ISSN no.	Issue/Volume /Page no/Year

Principal

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 Functions	FerhanAtici	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 poin	H. L. Turrittin	Acta Mathematica	ISSN: 0001-5962 (Print) 1871-2509 (Online)	December 1955, Volume 93, Issue 1, pp 27–66
P5	First order ordinary differential equations with several periodic solutions	Jean Mawhin	ZeitschriftfürangewandteMathematik und Physik	ISSN: 0044-2275 (Print) 1420-9039 (Online)	March 1987, Volume 38, Issue 2, pp 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 urRehma	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

Mr.S.S.Kathalkar
Subject Teacher

Mr.U.V.Rathod
Academic Incharge

Dr.A.N.Gupta
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An Autonomous Institute, with NAAC "A" Grade
Department of Basic science and Humanities
"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 Artifical Intelligence	**Year/Semester**	**:**IIndSemester (I Year)
Name of the Teacher	**:**Sweta Raut	**Subject Code**	**: HU2T002**
Subject	**:** Introduction to Computer programming	**Section**	**:MECH/CIVIL/EE**
Periods per Week (each 60 min)		**Lecture**	**2**
		Tutorial	**-**
		Practical	**1**

Course Objective	Course Outcomes
1. To understand the importance of Programming 2. To understand the application of C Programming. 3. To investigate the key concepts of C Programming. 4. To enable students build a applications based on C programming	CO1: Define the algorithms, flowcharts, array, pointer, structure ,function , python. CO2: Discuss and differentiate between variables, operators ,statements , loops, array dimensions. CO3:Demonstrate working programs using functions, loops ,conditional statements ,array ,pointer, structure and files in C and python language . CO4:Distinguish between different steps of programming and prioritize levels of programming. CO5:Find errors and predict outcome in C and python programming. CO6:Compose and develop any application using C and python programming.

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An Autonomous Institute, with NAAC "A" Grade
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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/Online Material/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	CO mapping
Unit I –Basic of Programming Language									
1	1	1	HLL, LLL	Day 1	T5(PG 15)	https://nptel.ac.in/noc/courses/noc19/SEM2/noc19-cs44/	C1-C10	Able to understandHigh level language and low level language and assembly language	C-1,2,3,5,6
2	2	2	Language Translator	Day 2	T5(pg 17)	https://nptel.ac.in/noc/courses/noc15/SEM2/noc15-cs15/	C1-C10	Able to understand what is language translator	C-1,2,4,6
3	3	3	Error checking debugging	Day 3	T5(pg preface xviii)	https://nptel.ac.in/courses/106/105/106105171/	C1-C10	Able to understand Error checking debugging	C-1,2,3,5,6
4	4	4	Programming process	Day 4	T5(pg 18)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Programming process	C-1,2,3,6
5	5	5	Flowchart	Day 5	T5(pg 30)	https://nptel.ac.in/courses/106/105/106105171/	C1-C10	Able to understandFlowchart	C-1,2,3,6

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6	6	6	Algorithm along with asymptotic notation	Day 6	T5(pg 29)	https://nptel.ac.in/courses/106/105/106105085/	C1-C10	Able to understandAlgorithm along with asymptotic notation	C-1,2,3,4
Unit II – Types, Operators and Expressions in C language									
7	7	7	Variablename, datatype,sizes	Day 7	T1(pg6-7)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understandVariablename,datatype,sizes	C-1,2,3,5,6
8	8	8	Constants,declaration,arithmetic,relational and logical operators	Day 8	T1(pg-6,24)	https://nptel.ac.in/courses/106/105/106105171/	C1-C10	Able to understandConstants,declaration,arithmatic,relational and logical operators	C-1,2,4,6
9	9	9	Type conversion, increment and decrement operators, bitwise operators	Day 9	T1(pg30-31)	https://nptel.ac.in/courses/106/105/106105151/	C1-C10	Able to understandType conversion, increment and decrement operators, bitwise operators	C-1,2,3,4,6
10	10	10	Assignment operators and	Day 10	T1(pg 30)	https://nptel.ac.in/courses/106/10	C1-C10	Able to understandAssign	C-1,2,3,4,6

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			expression			4/106104128/		ment operators and expression	
11	11	11	Conditional expression ,precedences	Day 11	T2(pg 47-48)	https://nptel.ac.in/courses/106/106/106106127/	C1-C10	Able to understand Conditional expression ,precedences	C-1,2,3,4,6
12	12	12	Order of evaluation	Day 13	T2(pg 48)	https://nptel.ac.in/courses/106/104/106104128/		Able to understand Order of evaluation	C-1,2,3,4,6
Unit III – Control Flow									
13	13	13	Statements and blocks	Day 14	T2(pg 50)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understandStatements and blocks	C-1,2,3,4,6
14	14	14	If….else, else…if	Day 15	T2(pg 50)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understandIf….else , else…if	C-1,2,3,4,6
15	15	15	Switch, loops while and for	Day 18	T2(pg52-556)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Switch, loops while and for	C-1,2,3,4,6
16	16	16	Do while ,break ,continue ,go to and labels	Day 20	T2(pg 56-57)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Do while ,break ,continue ,goto and labels	C-1,2,3,4,6
17	17	17	Initializing array ,	Day 22	T1(pg 283)	https://nptel.ac.in/c	C1-C10	Able to understand	C-

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			initializing character array			ourses/106/104/106104128/		Initializing array ,initializing character array	1,2,3,4,5,6
18	18	18	Multidimensional array , introduction to pointer	Day 24	T1(pg 298)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Multidimensional array , introduction to pointer	
Unit IV – Functions and Pointers in Python									
19	19	19	Function and program structure	Day 26	T2(pg 59)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to Function and program structure	C-1,2,3,4,6
20	20	20	Basics of functions	Day 27	T2(pg 59)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Basics of functions	C-1,2,3,4,6
21	21	21	Function returning non-zero integer external ,variable scope	Day 28	T2(pgt2 61-68)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Function returning non-zero integer external ,variable scope	C-1,2,3,4,6
22	22	22	Pointer to integer in python	Day 30	T1(pg 176)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Pointer to interger in python	C-2,3,4
23	23	23	Pointer to character and float in python	Day 32	T1(pg 176)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Pointer to character and	C-1,2,3,4,6

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								float in python	
24	24	24	Pointer to array in python	Day 34	T2(pg 89)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Pointer to array in python	
Unit V – Structures in Python and File handling in Python									
25	25	25	Basics of structure in python	Day 36	T2(pg 105)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Basics of structure in python	C-1,2,3,4,5,6
26	26	26	Structure with python	Day 38	T2(pg 106)	https://nptel.ac.in/courses/106/106/106106145/	C1-C10	Able to understand Structure with python	C-1,2,3,4,5,6
27	27	27	Array of structure	Day 39	T2(pg 109)	https://nptel.ac.in/courses/106/104/106104128/	C1-C10	Able to understand Array of structure	C-1,2,3,4,6
28	28	28	File handling	Day 40	T4(pg 285)	https://nptel.ac.in/courses/106/106/106106145/	C1-C10	Able to understand File handling	C-1,2,3,4,6
29	29	29	File handling in python	Day 41	T4(pg286)	https://nptel.ac.in/courses/106/106/106106145/	C1-C10	Able to understand File handling in python	C-1,2,3,4,6
30	30	30	Basics of file handling	Day 42	T4(pg 287)	https://nptel.ac.in/courses/106/106/106106145/	C1-C10	Able to understand Basics of file handling	C-1,2,3,4,6

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31	31	31	Basics of structure in python	Day 44	T4(pg 288)	https://nptel.ac.in/courses/106/106/106106145/	C1-C10	Able to understand Basics of structure in python	C-1,3,4,6

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

Total number of lectures as per syllabus: - 31 Total number of lectures as per planned: - 44

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Let Us C Solution	Yashavant Kanetkar	BPB publications	15th
T2	Programming Language	Brain W.Karnighan and Dennis M.Ritchie	HALL`s publications	2nd
T3	An Introduction To The C Programming Language And Software Design	Tim Bailey		1st
T4	**Learning Python**	**Mark Lutz**	**SPD**	**5th**
T5	Programming Logic and Design	Tony Goddis		3rd

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Msys Tech India Pvt.	Https://Www.Msystechnologies.Com	We Have A Unique Way Of Doing Things - The Msys Way. Its How We Innovate, Collaborate, Operate And Deliver Value For Our Clients. Msys Is

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	Ltd.		An Innovator In Offering It Services And Domain Specific Automation Software.
C2	Oracle India Pvt. Ltd.	Https://Www.Oracle.Com/In/Corporate	At Oracle, We Empower Businesses That Are Changing The World By Providing Them With The World¢¢S Most Complete Integrated Business Software, Systems And Cloud Technology. We Are A Global Company Focused On Helping Top Talent Reach Their Full Potential.
C3	Ansr Global Corporation Private Limited	Https://Www.Ansr.Com	Take Full Ownership Of The Solution And Be Responsible For Translating Functional Requirements Into A Product Solution Or Offering.
C4	Randstad India Pvt Ltd	Https://Www.Randstad.in	Randstad Is The Global Leader In The Hr Services Industry. By Serving As A Trusted Human Partner In Today's Technology-Driven World Of Talent, We Support People And Organizations In Realizing Their True Potential. Randstad Was Founded In 1960 And Is Headquartered In Diemen, The Netherlands.
C5	Moschip Technologies Limited	https://moschip.com	MosChip is a semiconductor and system design company with a focus on Turnkey ASICs, Mixed Signal IP, Semiconductor & Product Engineering and IoT solutions catering to Aerospace &Defence, Consumer Electronics, Automotive, Medical and Networking & Telecommunications.
C6	Sivalley Technologies Private Limited	http://www.sivalleytech.com	Mission: To provide highly sustainable consumer electronic services to markets in India and across the globe through diligent, innovative and highly integrated technological skills
C7	Percept web solution	http://www.perceptwebsolutions.com/	Percept Infosystem- Consultants is service provider Company. We are into Software Development,Training,Recruitment& Payroll Services.

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	private limited		Software Training in PHP,.NET,JAVA,Android,SEO,DigitalMarketing,SoftwareTesting,WebDesigning,Front End Development,Autocad , Catia & HR Training.
C8	Harman Connected Services Corporation	https://services.harman.com	HARMAN (harman.com) designs and engineers connected products and solutions for automakers, consumers, and enterprises worldwide, including connected car systems, audio and visual products, enterprise automation solutions; and services supporting the Internet of Things.
C9	NexWave Talent Management Solutions Pvt Ltd	http://www.nexwaveinc.com	Our presence spans 2 continents and many cities in USA & India. We achieve our objectives through committed efforts directed towards our clients, employees, vendors, society and thus becoming a niche software services provider in our chosen market.
C10	Hexaware solutions	https://hexaware.com	Hexaware Technologies Limited is a provider of information technology (IT), business process outsourcing (BPO) and consulting services. ... Its segments include Travel and Transportation, Banking and Financial Services, Insurance and Healthcare, and Manufacturing, Consumer and Others.

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Department of Basic science and Humanities
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2020-21 (Odd Sem)

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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	C Language , Programming	Kawalpreet Singh	International Journal Of Innovative Research In Technology	DOI: 10.1109/EDUCON.2017.7942865 ·	2017
P2	A Qualitative Study of Major Programming Languages: Teaching Programming Languages to Computer	Ghazala Shafi Sheikh1	Journal Of Information & Communication Technology	ISSN: 2319-9598	Volume-3 Issue-2, January 2015
P3	Application and Research of C Language Programming Examination System Based on B/S	Zhikao Ren	2010 Third International Symposium on Information Processing	10.1109/ISIP.2010.53	17 December 2010
P4	Four Steps to Teaching C Programming	D.Budny	32nd Annual Frontiers in Education	10.1109/FIE.2002.1158140	14 January 2003

Prof. Sweta Raut
Subject Teacher

Prof. U.V.Rathod
Academic Incharge

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Nagpur-441501

Prof. A.N.Gupta
HOD

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An Autonomous Institute, with NAAC "A" Grade
Affiliated to DBATU & RTMNU
Department of Civil Engineering
"Building Better Development"
Session 2020-2021 (Odd Sem)

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Teaching Plan

Course	**:** B. Tech in Civil Engineering	**Year/Semester**	**:** 5th Semester (3rd Year)
Name of the Teacher	**:** Prof. Shital Navghare	**Subject Code**	**:** BTCVC505
Subject	**:** TRANSPORTATION ENGINEERING	**Section**	**:** A
Periods per Week (each 60 min)		**Lecture**	**2**
		Tutorial	**-**
		Practical	**1**

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
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

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Unit II – Geometric Design									
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
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

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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 III – Highway Materials									
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
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

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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 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
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
Unit V – Pavement Design									
21	21	5.01	Basic Principles.	Day 21	T1 (Pg. 330)	**Video:**https://www.youtube.com/watch?v=exctAga2KXY **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to understand the Basic Principles of Pavement Design.	CO1
22	22	5.02	Methods for different Types of Pavements	Day 22	T1 (Pg. 331-332)	**Video:**https://www.youtube.com/watch?v=exctAga2KXY **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to identify Methods for different Types of Pavements	CO5
23	23	5.03	Design of flexible pavement using IRC: 37- 2012.	Day 23	T1 (Pg. 346)	**Video:**https://www.youtube.com/watch?v=uJntLOgEHD4 **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to design the flexible pavement using IRC: 37- 2012.	CO6
24	24	5.03	Design of flexible pavement using IRC: 37- 2012	Day 24					
25	25	5.04	Design of rigid pavement using IRC: 58-2011	Day 25	T1 (Pg. 371)	**Video:**https://www.youtube.com/watch?v=uJntLOgEHD4 **Notes:**https://nptel.ac.in/courses/105/101/105101087/	C1-C4	Students Should able to design the rigid pavement using IRC: 58-2011	CO6
26	26	5.04	Design of rigid pavement using IRC: 58-2011	Day 26					

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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 VI – Other Modes of Transport									
27	27	6.01	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	6.02	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	6.03	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	6.04	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

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	17/7/18	18/7/18	II, III, IV
2.	Design of Flexible and Rigid Pavement	16/8/18	17/8/18	IV, V, VI
Content Beyond Syllabus Topic – Planned				

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Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1.	Utilization of waste material in Road Construction	12/10/2020	I, II, III, IV
2.	Application of GIS in Civil Engineering	29/10/2020	III, V, VI

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.
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.

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

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Affiliated to DBATU & RTMNU
Department of Civil Engineering
"Building Better Development"
Session 2020-2021 (Even Sem)

VISION	MISSION
❖ To shape professional Leaders of Global Standards in Civil Engineering.	❖ To provide quality Education and Excellent Learning Environment for the overall development of students. ❖ Making sustainable efforts for integrating academics with industry.

TEACHING PLAN

Course	**:** B. Tech in Civil Engineering	**Year/Semester**	**:** 4th Semester (2nd Year)
Name of the Teacher	**:** Prof. Shital A. Navghare	**Subject Code**	**:** CE4T005
Subject	**:** Surveying and Geomatics	**Section**	**:** A
Periods per Week (each 60 min)		**Lecture**	**3**
		Tutorial	**-**
		Practical	**2**

Course Objective	Course Outcomes
1. Know the use of different surveying instrument and their use. 2. Understand the evaluation of ground parameters using different surveying methods. 3. Understand the use of different advanced surveying instruments, methods and techniques. 4. Survey the different Civil Engineering Projects.	Students should be able to, 1. Acquire the knowledge of basic surveying equipment used in basic and advanced surveying techniques. 2. Identify the various concepts involved in surveying to observe horizontal, vertical and angular measurements on the field using the latest surveying technology. 3. Evaluate Reduced Levels, Horizontal Distances, Vertical Distances, Offset for curve plotting and Parameters of Photogrammetry. 4. Analyze the data obtained from Compass Surveying, Leveling, Theodolite Survey, Tacheometry Survey, Plane Table Survey and Photogrammetry Survey. 5. Judge suitable method for a various surveying map and data required for further purpose in civil engineering projects.

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	6. Develop various types of Survey maps and suggest suitable methode according to the requirement of client and field conditions.

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 Introduction to Surveying & Compass Surveying										
1	01	1.1	Introduction to Surveying: Definition, Uses, Principles of Surveying, Classifications	Day 01	T2 1 - 4	R1: Pg No. 01 to 03	https://www.youtube.com/watch?v=p6ruuib1qsY https://www.youtube.com/watch?v=-JgCfsooiu0 https://youtu.be/XTaKUobVu8A	C1, C2	Student will able to know the principles of surveying, its classification, basic surveying equipment and its uses in surveying	CO1, CO2,
2	02	1.2	Signs, Equipment of survey, Scale, Representative Fraction.	Day 02	T2 8 - 20	R1: Pg No. 09 to 13	https://www.youtube.com/watch?reload=9&v=chhuq_t40rY https://youtu.be/1JfPeQzA62g https://www.youtube.com/watch?v=mnnQPTlyOIU	C1, C2		CO1, CO2, CO3,
3	03	1.3	Compass Surveying: Prismatic Compass, Surveyor's Compass	Day 03	T2 109 -133	R1: Pg No. 81 to 120	https://youtu.be/nAk1YBc_FAk	C1, C2	Student will able to know the suitability and application of compass surveying and various types of compass.	CO1, CO2, CO3,
4	04	1.3	Prismatic Compass, Surveyor's Compass	Day 04			https://youtu.be/nAk1YBc_FAk	C1, C2	Student will able to differentiate the prismatic and surveyor compass	CO1, CO4, CO5, CO6
5	05	1.4	Bearing Systems and Conversions	Day 05			https://youtu.be/nAk1YBc_FAk	C1, C2	Student will able to describe the bearing systems and also able to evaluate its	CO1, CO4, CO5,
6	06	1.4	Bearing Systems ar	Day 06			https://youtu.be/nAk1YBc_FAk	C1, C2		CO1,

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			Conversions						conversions.	CO4, CO5,
7	07	1.5	Local Attraction, Magnetic Declination	Day 07			https://youtu.be/2EYQDwcizcE	C1, C2	Student will bale to evaluate the true bearing from local attractions.	CO1, CO4,
8	08	1.5	Local Attraction, Magnetic Declination	Day 08			https://youtu.be/2EYQDwcizcE	C1, C3		CO1, CO4,
9	09	1.6	Traversing	Day 09			https://youtu.be/2EYQDwcizcE https://youtu.be/6d4mERJFPpI	C1, C3	Student will able to perform traversing using compass surveying and identify the error in traversing.	CO1, CO4, CO5, CO6
10	10	1.6	Traversing	Day 10			https://youtu.be/2EYQDwcizcE https://youtu.be/6d4mERJFPpI	C1, C3		CO1, CO4, CO5, CO6
Unit II Leveling and Contouring										
11	11	2.1	Levelling: - Introduction, Instrument used in leveling, Temporary and permanent adjustments.	Day 11	T2 193 - 252	R1: Pg No. 147 to 208	https://www.youtube.com/watch?v=_SiSn_tcXZA https://www.youtube.com/watch?v=Ghj654KptnQ	C3	Student will able to understand the leveling purpose and equipment.	
12	12	2.2	Types of leveling, Bench Marks & their Type, RL & Methods of calculating RL.	Day 12			https://www.youtube.com/watch?v=_SiSn_tcXZA https://www.youtube.com/watch?v=Ghj654KptnQ	C3	Student will bale to describe the types of leveling benchmark and calculation of RLs.	CO1, CO5, CO6
13	13	2.3	Methods of calculating RL.	Day 13			https://www.youtube.com/watch?v=eNyVaOjJZks	C3	Student will able to calculate the RL of various stations using all methods.	CO1, CO5, CO6
14	14	2.3	Methods of calculating RL.	Day 14				C3		CO1, CO5, CO6
15	15	2.4	Contouring: - Introduction, Methods - Characteristics and uses of contours – Plotting.	Day 15			https://www.youtube.com/watch?v=V1vptRT-Sjc	C3	Student will able to know the characteristics of contours and draw the contour lines from the leveling data.	CO1, CO2, CO6
16	16	2.4	Contouring: - Introduction, Methods - Characteristics and uses of contours – Plotting.	Day 16			https://www.youtube.com/watch?v=jIoj2oAR83k	, C3		CO1, CO3, CO6

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17	17	2.5	Planimeter: Types, Theory, concept of zero circle, Study of Digital Planimeter	Day 17	T2 291 - 305	R1: Pg No. 230 to 255	https://www.youtube.com/watch?v=XWMc0TYjTM4 https://www.youtube.com/watch?v=pvGuGaImTek	C3	Student will able to know the different components of planimeter and compute the area of irregular figures	CO1, CO3, CO4, CO6
18	18	2.6	Computation of Areas and Volumes	Day 18			https://www.youtube.com/watch?v=XWMc0TYjTM4 https://www.youtube.com/watch?v=pvGuGaImTek			CO1, , CO5,
Unit III Theodolite and Tachometric Survey										
19	19	3.1	Theodolite survey: Classifications, Components, Uses, Terms used in Theodolite, Temporary and permanent adjustments	Day 19	T2 137 - 177	R1: Pg No. 283 to 350	https://www.youtube.com/watch?v=6d4mERJFPpI&t=4s https://www.youtube.com/watch?v=ZkPcr5v7xP8 https://www.youtube.com/watch?v=Hl8lyV0op1U https://www.youtube.com/watch?v=MA-l1DqRtjI	C2, C3	Student will able to know the components, uses of theodolite and the temporary and permanent adjustments required for theodolite survey.	CO1, CO3, CO4, CO5,
20	20	3.1 , 3.2	Temporary and permanent adjustments, Measurement of horizontal, vertical angle and Deflection Angle	Day 20			https://www.youtube.com/watch?v=6d4mERJFPpI&t=4s	C2, C3	Student will able to measure the horizontal and vertical angles using theodolite.	CO1, CO2, CO3, CO4, CO5, CO6
21	21	3.3	Consecutive Co-ordinates and Independent Co-ordinates with Numerical, Gales's table	Day 21			https://www.youtube.com/watch?v=6d4mERJFPpI&t=4s	C2, C3	Student will bale to evaluate the independent coordinate using Gale's Table.	CO1, CO2, CO6
22	22	3.3	Consecutive Co-ordinates and Independent Co-ordinates with Numerical, Gales's table	Day 22						CO1, CO5, CO6

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23	23	3.4	Tachometric Survey: Definitions, Distinguish Theodolite and Tachometer, Constants in Tachometry,	Day 23	T2 468-469 T2 469-471	R1: Pg No. 435 to 476	https://www.youtube.com/watch?v=hZjGSVOO0kk https://www.youtube.com/watch?v=rqVgX-aje4Q	C2, C3	Student will able to distinguish the theodolite and tacheometer and its application.	CO1, CO4, CO5, CO6
24	24	3.5	Principle of Tachometry, Tachometric Methods, Numerical.	Day 24			https://www.youtube.com/watch?v=tYKvAvgxAEQ	C2, C3	Student will able to understand the principles of tacheometry and evaluate horizontal distances using tacheometric methods	CO1, CO4, CO5, CO6
25	25	3.6	Tachometric Methods, Numerical.	Day 25			https://www.youtube.com/watch?v=tYKvAvgxAEQ	C2, C3		CO1, CO2, CO6
26	26	3.6	Tachometric Methods, Numerical.	Day 26			https://www.youtube.com/watch?v=tYKvAvgxAEQ	C2, C3		
Unit IV Curves and Plane Table Survey										
27	27	4.1	Curves: Necessity of curve, Classification of curve, Notation of simple circular curve	Day 27	T2 102 - 159	R1: Pg No 356 to 432	https://www.youtube.com/watch?v=aqN8uDJoXFA https://www.youtube.com/watch?v=7UhaCqea7IY	C2, C3	Student will able to know the necessity of curves its classification and notations.	CO1, CO2, CO3, CO4,
28	28	4.2	Designation of curve, setting out simple circular curve by offsets from long chord.	Day 28			https://www.youtube.com/watch?v=uvWgn2aHdys https://www.youtube.com/watch?v=7UhaCqea7IY	C2, C3	Student will able to plot the curve using offset from long chord method	CO5, CO6
29	29	4.3	Setting out simple circular curve by offsets from long chord.	Day 29			https://www.youtube.com/watch?v=Aw5eYAOOgRc	C2, C3		
30	30	4.3	Setting Out Rankin's deflection angle method, Simple numerical problems.	Day 30			https://www.youtube.com/watch?v=52uyHStquUA	C2, C3	Student will able to plot the curve using Rankin's method	CO1, CO2, CO3, CO4, CO5, CO6
31	31	4.3	Setting Out Rankin's deflection angle method, Simple numerical problems	Day 31			https://www.youtube.com/watch?v=52uyHStquUA	C2, C3		

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32	32	4.4	Plane Table Survey: Plane table instruments and accessories	Day 32	T2 271 -289	R1: Pg No 126 to 142	https://www.youtube.com/watch?v=tn5nxOQfV9U	C2, C3	Student will able to memorize and understand the plane table survey, accessories required for plane table survey.	CO1, CO2, CO5, CO6
33	33	4.5	Merits and demerits, methods: Radiation.	Day 33			https://www.youtube.com/watch?v=tn5nxOQfV9U	C3	Student will able to know the merits and demerits of plane table survey and perform the plane table survey using radiation method.	CO1, CO2,
34	34	4.6	Intersection, Resection, Traversing.	Day 34			https://www.youtube.com/watch?v=xUwzJXFfH5c	C2, C3	Student will able perform the plane table survey using Intersection, Resection, Traversing method	CO1, CO2, CO3,
	Unit V Advanced Surveying Instruments & Photogrammetry Surveying									
35	35	5.1	Advanced Surveying Instruments: Basic introduction of Speedometer	Day 35	T2 471-475 T2 476-531	R1: Pg No 250 to 264	https://www.youtube.com/watch?v=0VB1G15EqXI	C1, C2	Student will able to know the advanced surveying techniques and speedometer.	
36	36	5.2	EDM, Laser Tape, Total Station	Day 36			https://www.youtube.com/watch?v=d_DoEB4zWEQ https://www.youtube.com/watch?v=Xg-IDbMfmdw	C1, C2	Student will able to understand the uses and need of EDM, Laser Tape, Total Station	CO1, CO2, CO3, CO4,
37	37	5.3	Total Station	Day 37			https://www.youtube.com/watch?v=hKWFieP941Y https://www.youtube.com/watch?v=2ZtXGAGObP4	C1, C2		CO1, CO2, CO3, CO4,
38	38	5.4	Remote sensing & GIS, Drone Survey				https://www.youtube.com/watch?v=1zwg-siuvuc	C1, C2	Student will able to understand the	

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39	39	5.4	Remote sensing & GIS, Drone Survey	Day 39			https://www.youtube.com/watch?v=MsWKwfU2LNE https://www.youtube.com/watch?v=hV0-PUKHb68	C1, C2	application of Remote sensing & GIS, Drone Survey	CO1, CO2, CO3, CO4,
40	40	5.5	Photogrammetry Surveying: Introduction, Basic concepts, Numerical.	Day 40	T1 523 – 597	R1: Pg No 540 to 564	https://youtu.be/2-t-Ws2rQPg https://youtu.be/sjgX2Sfh9PA	C1, C2	Student will able to understand the purpose and concept of Photogrammetry Surveying	CO1, CO3, CO4, CO6
41	41	5.6	Numerical.	Day 41			https://youtu.be/2-t-Ws2rQPg https://youtu.be/sjgX2Sfh9PA	C1, C2	Student will able to calculate the parameters involved in photogrammetry.	CO5, CO6
42	42	5.6	Numerical.	Day 42			https://youtu.be/2-t-Ws2rQPg https://youtu.be/sjgX2Sfh9PA	C1, C2		CO5, CO6

*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

Tutorial Plan			
Week	**Topic**	**No. Of Problems**	**Mapped With CO**
1	Area Calculation Method	01	II
2	Chain and Tape Correction	04	III
3	Calculation of True bearing and included angles.	04	IV
4	Reciprocal Leveling	01	V
5	Tacheometric Survey	02	V
6	Thedolite Survey	04	VI

Text Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher
T1	"Surveying And Leveling", Volume I And II	Kanetkar, Kulkarni,	Pune Vidyarthi Prakashan.
T2	"Surveying", Volume I And II	Punmia B C; Jain Ashok; Jain Arun	Laxmi Publication.

Reference Books:

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Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
R1	"Surveying And Leveling", Volume I and II	Basak N N	Tata McGraw-Hill.	
R2	"Surveying", Volume I And II	Duggal S. K.	Tata McGraw-Hill.	

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Carl Zeiss AG	www.zeiss.com	Carl Zeiss , branded as ZEISS, is a German manufacturer of optical systems and optoelectronics
C2	Nplus solutions	info@nplussolution.com	Provide wide range of services and different areas such as Construction, Architecture, Planning With Topographical Survey, Geophysical Survey, Contour Survey, GPS Survey, Total Station Survey, DGPS Survey, LIDAR Survey, GPR Survey, Land Survey, GIS Survey etc.
C3	Infycons Creative Software Pvt. Ltd.	sales@infycons.com	Surveying, road , Irrigation Construction software

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Surveying mountain pine beetle damage of forests: A review of remote sensing opportunities	Michael A. Wulder Caren C. Dymond Joanne C. White Donald G.Leckie Allan L.Carroll	Forest Ecology and Management		Volume 221, Issues 1–3, 10 January 2006, Pages 27-41

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

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VISION	MISSION
" To be recognized for excellent innovative 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 and 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 : 7th Semester (FourthYear)**	
Name of the Teacher : Prof. Rohan Kokate		**Subject Code : BTCOE702 Elective - VII**	
Subject : Distributed System		**Section : CSE**	
Periods per Week (each 60 min)		**Lecture**	**3**
		Tutorial	**1**
		Practical	**1**

Course Objective	Course Outcomes
1)To provide hardware and software issues in modern distributed systems. 2)To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems. 3)To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed.	CO1: To provide hardware and software issues in modern distributed systems. CO2: To get knowledge in distributed architecture, naming, synchronization, consistency and replication, fault tolerance, security, and distributed file systems. CO3: To analyze the current popular distributed systems such as peer-to-peer (P2P) systems will also be analyzed. CO4: To know about Shared Memory Techniques. CO5: Have Sufficient knowledge about file access. CO6: Have knowledge of Synchronization and Deadlock

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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] Introduction									
1	1	1	Introduction to Distributed Computing System, Evolution of Distributed Computing System,	Day 1	T1 (Pg : 5-10)	https://www.youtube.com/watch?v=AWryELkUwow&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Syllabus Discussion and introduction	1,2,3,4,5,6
2	2	2	Distributed Computing System models, Distributed Computing System Gaining Popularity,	Day 2	T1 (Pg : 20-25)	https://www.youtube.com/watch?v=kqTkbEgREYk&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=2 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the Distributed Computing System models	1,2,3,4,5,6
3	3	3	Distributed Operating System, Introduction to Distributed Computing Environment (DCE)	Day 3	T2 (Pg : 41 - 45)	https://www.youtube.com/watch?v=LRUcPNet6i4&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=3 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand Distributed Operating System, Introduction to Distributed Computing Environment	1,2,3,4,5,6
4	4	4	Desirable Features of a Good Message-Passing System, Issues in IPC by Message-Passing,	Day 4	T1 (Pg : 30-32)	https://www.youtube.com/watch?v=wBrjiQXduJY&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=4 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand Desirable Features of a Good Message-Passing System, Issues in IPC by Message-Passing,	1,2,3,4,5,6
5	5	5	Synchronization, Buffering, Multidatagram	Day 5	T1 (Pg : 33-37)	https://www.youtube.com/watch?v=Gr1EF_CUUQA&list=PLn0UTNtgXJLZD	R1-R3/ C1-C6	Able to understand Synchronization, Buffering,	1,2,3,4,5,6

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			message,			_fY4zZ78X-YHM1V5-m8m&index=5 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.		Multidatagram message,	
6	6	6	Encoding and Decoding of message data, Process addressing,	Day 6	T1 (Pg : 38-39	https://www.youtube.com/watch?v=0eiWCDRaGZ4&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=6 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand Encoding and Decoding of message data, Process addressing.	1,2,3,4,5,6
7	7	7	Failure Handling, Group Communication, Case Study: BSD UNIX IPC Mechanism.	Day 7	T1 (Pg : 39 - 42)	https://www.youtube.com/watch?v=0eiWCDRaGZ4&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=7 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand 6 and 7 Layered IoT Architecture	1,2,3,4,5,6
[Unit 2] Remote Procedure Calls									
8	8	8	Introduction, the RPC model, Transparency of RPC	Day 8	T2 (Pg : 56 - 60)	https://www.youtube.com/watch?v=uasV7DyblKk&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=8 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to learn concept of RPC model,	1,2,3,4,5,6
9	9	9	Implementing RPC Mechanism, Stub Generation,	Day 9	T2 (Pg : 66 - 72)	https://www.youtube.com/watch?v=RgQPDyumFCM&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=9 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to learn concept Implementing RPC Mechanism, Stub Generation,	1,2,3,4,5,6
10	10	10	RPC messages, Marshaling arguments and Results, Server Management,	Day 10	T2 (Pg : - 42-44)	https://www.youtube.com/watch?v=srcMQk8F3FQ&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=10	R1-R3/ C1-C6 R1-R3/ C1-C6	Able to learn concept of RPC messages, Marshaling arguments and Results, Server Management,	1,2,3,4,5,6

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						NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.			
11	11	11	Parameter Passing Semantics, Call Semantics, Communication Protocols for RPCs	Day 11	T2 (Pg : - 50-53)	https://www.youtube.com/watch?v=LrLqMZzS6KA&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=11 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to learn concept of Parameter Passing Semantics, Call Semantics, Communication Protocols for RPCs	1,2,3,4,5,6
12	12	12	Complicated RPCs, Client- Server Binding, Exception Handling	Day 12	T2 (Pg : - 56-59)	https://www.youtube.com/watch?v=LrLqMZzS6KA&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=11 https://www.youtube.com/watch?v=LrLqMZzS6KA&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=11 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to learn concept of Complicated RPCs, Client- Server Binding, Exception Handling	1,2,3,4,5,6
13	13	13	Security, Some Special Types of RPCs, RPC in Heterogeneous Environments, Lightweight RPC	Day 13	T2 (Pg : - 60-62)	https://www.youtube.com/watch?v=drj5zwhawiY&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=12 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to learn concept of Types of RPCs, RPC in Heterogeneous Environments,	1,2,3,4,5,6
14	14	14	Optimization for Better Performance, Case studies: Sun RPC, DCE, RPC.	Day14	T2 (Pg : - 63-64)	https://www.youtube.com/watch?v=drj5zwhawiY&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=12 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.			

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[Unit 3] Distributed Shared Memory									
15	15	15	Introduction, general Architecture of DSM Systems	Day 15	T1 (Pg : 55-58)	https://www.youtube.com/watch?v=drj5zwhawiY&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=12 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand general Architecture of DSM Systems	1,2,3,4,5,6
16	16	16	Design and Implementation Issues of DSM,	Day 16	T2 (Pg : 41 - 43)	https://www.youtube.com/watch?v=q_zvw0323uA&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=13 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand Design and Implementation Issues of DSM,	1,2,3,4,5,6
17	17	17	Granularity, Structure of Shared Memory Space	Day 17	R1 (Pg : 41 - 47)	https://www.youtube.com/watch?v=q_zvw0323uA&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=13 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand Granularity, Structure of Shared Memory Space	1,2,3,4,5,6
18	18	18	Consistency Models, Replacement Strategy	Day 18	R1 (Pg : 48-55)	https://www.youtube.com/watch?v=q_zvw0323uA&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=13 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand Consistency Models, Replacement Strategy	1,2,3,4,5,6
19	19	19	Thrashing, Other Approaches to DSM, Heterogeneous DSM,	Day 19	R1 (Pg : 56-60)	https://www.youtube.com/watch?v=ipm5hDz9zG0&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=14 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand Thrashing, Other Approaches to DSM	1,2,3,4,5,6
20	20	20	Advantages of Synchronization	Day 20	R1 (Pg : 61-66	https://www.youtube.com/watch?v=ipm5hDz9zG0&	R1-R3/ C1-C6	Able to understand Heterogeneous DSM,	1,2,3,4,5,6

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			Introduction, Clock Synchronization, Event Ordering, Mutual Exclusion, Deadlock, Election Algorithms.		)	list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=14 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Advantages of Synchronization	
[Unit 4] Resource Management									
21	21	21	Introduction, Desirable Features of a Good Global Scheduling Algorithm	Day 21	T1 (Pg : 211-214)	https://www.youtube.com/watch?v=ipm5hDz9zG0&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=14 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand Scheduling Algorithm	1,2,3,4,5,6
22	22	22	Introduction, Desirable Features of a Good Global Scheduling Algorithm continue	Day 22	T1 (Pg : 215-216)	https://www.youtube.com/watch?v=9wR-XRju5NM&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=15 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the Scheduling Algorithm	1,2,3,4,5,6
23	23	23	Task assignment Approach.	Day 23	T1 (Pg : 216-222)	https://www.youtube.com/watch?v=9wR-XRju5NM&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=15 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the Task assignment Approach	1,2,3,4,5,6
24	24	24	Load-Balancing Approach	Day 24	T1 (Pg : 223-228)	https://www.youtube.com/watch?v=9wR-XRju5NM&list=PLn0UT	R1-R3/ C1-C6	Able to understand the , Load Balancing Approach	1,2,3,4,5,6

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						NtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=15 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.			
25	25	25	load Sharing Approach	Day 25	T1 (Pg : 229-235)	https://www.youtube.com/watch?v=9wR-XRju5NM&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=15 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the load Sharing Approach	1,2,3,4,5,6
26	26	26	load Sharing Approach Continue	Day 26	T2 (Pg :255-256)	https://www.youtube.com/watch?v=Nvg5ulwjngc&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=16 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand A load Sharing Approach	1,2,3,4,5,6
27	27	27	Threads.	Day 27	T1 (Pg : 236-239)	https://www.youtube.com/watch?v=Nvg5ulwjngc&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=16 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand Threads.	1,2,3,4,5,6
[Unit 5] Distributed File System									
28	28	28	Introduction, Desirable Features of a Good Distributed File System	Day 28	NPTEL lecture by Prof Sudip Mishra	https://www.youtube.com/watch?v=Nvg5ulwjngc&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=16 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the Desirable Features of a Good Distributed File System	1,2,3,4,5,6
29	29	29	File Models, File Accessing Models	Day 29	NPTEL lecture by Prof Sudip Mishra	https://www.youtube.com/watch?v=Nvg5ulwjngc&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-	R1-R3/ C1-C6	Able to understand the File Models, File Accessing Models	1,2,3,4,5,6

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						m8m&index=16 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.			
30	30	30	File Replication, Fault Tolerance	Day 30	NPTEL lecture by Prof Sudip Mishra	https://www.youtube.com/watch?v=Nvg5ulwjngc&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=16 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the File Replication, Fault Tolerance	1,2,3,4,5,6
31	31	31	Atomic Transactions	Day 31	NPTEL lecture by Prof Sudip Mishra	https://www.youtube.com/watch?v=Ifeoyhn7t9U&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=17 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the Atomic Transactions	1,2,3,4,5,6
32	32	32	Atomic Transactions	Day 32	NPTEL lecture by Prof Sudip Mishra	https://www.youtube.com/watch?v=Ifeoyhn7t9U&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=17 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the Atomic Transactions	1,2,3,4,5,6
33	33	33	Design Principles	Day 33	NPTEL lecture by Prof Sudip Mishra	https://www.youtube.com/watch?v=Ifeoyhn7t9U&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=17 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the Design Principles	1,2,3,4,5,6
34	34	34	Design Principles	Day 34	NPTEL lecture by Prof Sudip Mishra	https://www.youtube.com/watch?v=mDPeUeR6OEQ&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=18 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand the Design Principles	1,2,3,4,5,6

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35	35	35	Case Study: DCE Distributed File Service	Day 35	NPTEL lecture by Prof Sudip Mishra	https://www.youtube.com/watch?v=mDPeUeR6OEQ&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=18 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand DCE Distributed File Service	1,2,3,4,5,6
36	36	36	Case Study: DCE Distributed File Service	Day 36	NPTEL lecture by Prof Sudip Mishra	https://www.youtube.com/watch?v=mDPeUeR6OEQ&list=PLn0UTNtgXJLZD_fY4zZ78X-YHM1V5-m8m&index=18 NPTEL Lecture by Prof. Rajiv Mishra, IIT Patna.	R1-R3/ C1-C6	Able to understand DCE Distributed File Service	1,2,3,4,5,6

*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 I and Unit II	10/2/2020	20/2/2020	I, II
2	Unit III and Unit IV	20/3/2020	30/3/2020	II , III
3	Unit V	22/4/2020	30/4/2020	IV , V

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	Real Time Distributed system in an IoT	22/13/2020	I, II, III, IV, V,
2	Design Principal for Real Time system	23/4/2020	I, II, III, IV, V,

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Code	Title of the Book	Author Name/Designation/ Organization	Publisher Text Books / Reference Books:	Edition/ Publication Year
T1	P. K. Sinha, *Distributed Operating System*, PHI Publication.	P. K. Sinha	PHI Publication.	2nd Edition
T2	Colorouis, *Distributed Systems*, Addison Wesley Publication.	Colorouis	Addison Wesley Publication.	5th Edition
T3	M. L. Liu, *Distributed Computing: Principles and Applications*, Addison-Wesley, 2004.	M. L. Liu	Addison-Wesley, 2004	2nd Edition
R1	Distributed systems: Principles and Paradigms	Andrew S. Tanenbaum	Pearson Education.	2nd Edition

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Netflix Industry: Distributed System Location: America	https://ir.netflix.net/	Netflix is one of the world's leading entertainment services with 214 million paid memberships in over 190 countries enjoying TV series, documentaries, feature films and mobile games across a wide variety of genres and languages. "Much like the Cloud, the Netflix microservices ecosystem has grown and matured over the recent years. With hundreds of microservices running to support our global members, we have to re-evaluate many assumptions all the way from what databases and communication protocols to use, to how to effectively deploy and test our systems to ensure greatest availability and resiliency, to what UI paradigms work best on different devices." Ruslan Meshenberg, Ex Netflix Developer
C2	UBER Industry: Distributed	www.uber.com	"Having one codebase seemed "clean" at the time, and solved our core business problems, which included connecting drivers with riders, billing, and

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	System Location: San Francisco		payments. It was reasonable back then to have all of Uber's business logic in one place. As we rapidly expanded into more cities and introduced new products, this quickly changed." Einas Haddad, Senior Software Engineer at Uber Uber is an interesting case study. Its infrastructure powers multiple solutions across literally hundreds of cities, dealing with trip planning, messaging, billing, passenger and driver notifications, and more. All of these tasks contributed to a colossal workload for its monolithic system.
C3	eBAY Industry:Distributed System Location: America	https://en.wikipedia.org/	"In a natural evolution from a services architecture, we at eBay have adopted microservices to help us drive faster and more productive development cycles." Ramesh Mahadevan, eBay Engineer eBay has nearly 200 million users and faces a set of challenges that are unfamiliar to many online retailers. Along with offering typical features like product catalogs, payment processing, and user accounts, eBay also has to run a complex bidding system and associated marketplace comprised of millions of third-party sellers.
C4	ZALANDO Industry: Distributed System Location: Berlin, Germany	https://corporate.zalando.com/	Before moving over to a distributed system, Zalando relied on a monolithic tech stack based largely on Java, Spring, and Postgres, which caused a variety of problems, particularly in relation to team coordination and app deployment.
C5	AMAZON Industry Distributed System Location: USA Washington	https://www.amazon.com/	"The giant, monolithic "bookstore" application and giant database that we used to power Amazon.com limited our speed and agility. Whenever we wanted to add a new feature or product for our customers, like video streaming, we had to edit and rewrite vast amounts of code on an application that we'd designed specifically for our first product—the bookstore. This was *a long, unwieldy process requiring complicated coordination, and it limited our ability to innovate fast and at scale." Werner Vogels, Amazon CTO*

C6	Sound Cloud Industry: Distributed System . Location: : Berlin, Germany	https://soundcloud.com/	"Building and operating services distributed across a network is hard. Failures are inevitable. The way forward is having resiliency as a key part of design decisions." Argha Chattopadhyay, SoundCloud Developer Around 2012, SoundCloud began transitioning to a distributed architecture. It enabled its dev teams to build discrete apps in Scala, Clojure, and JRuby while shifting functionality from its monolithic Rails system. SoundCloud initially went through a polyglot phase, allowing developers to code in their language of choice. But the risks and challenges associated with this approach eventually led to the consolidation of languages – favouring Scala for its general-purpose applicability.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
R1	Cognified Distributed Computing	Ozalp Babaoglu	IEEE Access	https://www.researchgate.net/publication/32425967	Volume: 76, Issue: 11, Nov 2020)
R2	Optimal control of spatially distributed systems	N Motee, A Jadabaie	IEEE Access	http://dx.doi.org/10.1109/ITechA.2015.7317398	Volume: 53, Issue: 7, Aug. 2020
R3	The influence of distributed systems and networks	Prabhu Prasad	Springer (Journal of BiG Data)	:https://www.researchgate.net/publication/343324020	Volume 111, December 2020

Prof. Rohan Kokate
Subject Incharge

Prof. Milind Tote
Academic Incharge

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2020-21 (Even Sem)

VISION	MISSION
" To be recognized for excellent innovative 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 and 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 :** 6th Semester (3rd Year)	
Name of the Teacher : Mr.Milind Tote	**Subject Code :CSE6T007**	
Subject : Intellectual Property Rights	**Section :**CSE	
Periods per Week (each 60 min)	**Lecture**	**3**
	Tutorial	**-**
	Practical	**-**

Course Objective	Course Outcomes
1. To recognize the importance of IP and to educate the pupils on basic concepts of Intellectual Property Rights. 2. To identify the significance of practice and procedure of Patents. 3. To make the students to understand the statutory provisions of different forms of IPRs in simple forms 4. To learn the procedure of obtaining Patents, Copyrights, Trade Marks &Industrial Design 5. To enable the students to keep their IP rights alive.	1. Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP 2. Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development. 3. Develop understanding on various kinds of Agreement and Act like TRIPS Agreement, PCT Agreement, Patent Act of India, Patent Amendment Act, Design Act 4. Analyze rights and responsibilities of holder of Patent, Copyright, Trademark, Industrial Design etc. 5. Identify protectable content under trademarks,register for trademarks, understand and resolve trademark infringement cases.

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Execution 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	Introduction to IPRs,	18/02/2021	18/02/2021	T1 (Pg : 2–12)	https://www.youtube.com/watch?v=WvduZOWoft0	P1-P4	Able to understand basics of IPR	**CO1, CO2, CO5**
2	2	2	Basic concepts and need for Intellectual Property - Patents, Copyrights, Geographical Indications,.	18/02/2021	20/02/2021	T1 (Pg : 13-18)	https://www.youtube.com/watch?v=p8ZQlDao7ME	P1-P4	Able to understand basics of IPR and its type	**CO1, CO2, CO4, CO5**
3	3	3	IPR in India and Abroad Function of IPR.	20/02/2021	25/02/2021	T2 (Pg :20-24)	https://archive.nptel.ac.in/courses/110/105/110105139/	P1-P4	Able to understand IPR in India and Abroad Function of IPR.	**CO1, CO2, CO5**
4	4	4	Public good. Incentive theory,	25/02/2021	26/02/2021	T2 (Pg :85-90)	https://www.youtube.com/watch?v=kwto3Ti5Yew	P1-P4	Able to understand Incentive theory,	**CO1, CO2, CO5**
5	5	5	different forms of IPR , Industrial Property,	26/02/2021	27/02/2021	T1 (Pg :132-142)	https://www.youtube.com/watch?v=avSdoMz6OuA	P1-P4	Able to understand different forms of IPR	**CO1, CO2, CO5**
6	6	6	technological Research, Inventions and Innovations –	27/02/2021	04/03/2021	T1 (Pg :143-149)	https://www.youtube.com/watch?v=kg8WjcC2KTw	P1-P4	Able to understand the difference between Inventions and Innovations	**CO1, CO2, CO5**
7	7	7	Important examples of IPR	04/03/2021	05/03/2021	T1 (Pg : 110-114)	https://www.youtube.com/watch?v=YjdMt9YTuW4&t=434s	P1-P4	Able to study Important examples of IPR	**CO1, CO2, CO5**
8	8	8	Important examples of IPR	05/03/2021	06/03/2021	T1 (Pg 116-118)	https://www.youtube.com/watch?v=YjdMt9YTuW4&t=434s	P1-P4	Able to study Important examples of IPR	**CO1, CO2**
			Unit II							

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9	9	9	Practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications,	06/03/2021	11/03/2021	T2 (Pg :107-110)	https://www.youtube.com/watch?v=YjdMt9YTuW4&t=434s	P1-P4	Able to understand Practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications,	**CO1, CO2**
10	10	10	Practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications,	11/03/2021	12/03/2021	T1 (Pg :192-195)	https://www.youtube.com/watch?v=YjdMt9YTuW4&t=434s	P1-P4	Able to understand Practical aspects of registration of Copy Rights, Trademarks, Patents, Geographical Indications	**CO1, CO2, CO5**
11	11	11	Trade Secrets and Industrial Design registration in India and Abroad. ,	12/03/2021	13/03/2021 18/03/2021	T2 (Pg :120)	https://www.youtube.com/watch?v=XJOstWgJdi0	P1-P4	Able to understand Trade Secrets and Industrial Design registration in India and Abroad.	**CO1, CO2, CO5**
12	12	12	Registration Procedure, Term of protection, Ownership of copyright, Assignment and license of copyright -	13/03/2021	19/03/2021	T1 (Pg : 157-165)	https://www.youtube.com/watch?v=ApXdisOShTQ	P1-P4	Able to understand Registration Procedure	**CO1, CO2, CO5**
13	13	13	Introduction to competition Law, Anti-competitive agreements,	18/03/2021	20/03/2021	T1 (Pg :239-246)	https://www.youtube.com/watch?v=x6Tam7GufhE	P1-P4	Able to understand Anti-competitive agreements	**CO1, CO2**
14	14	14	. Anti-competitive agreements,	19/03/2021	25/03/2021	T1 (Pg : 165-167)	https://www.youtube.com/watch?v=Dgi8G1h6-Kg	P1-P4	Able to understand Anti-competitive agreements	**CO1, CO2**
15	15	15	Abuse of dominance,	20/03/2021	26/03/2021	T2 (Pg :42-45)	https://www.youtube.com/watch?v=0T8PpVewQu0	P1-P4	Able to understand Abuse of dominance	**CO1, CO2**

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16	16	16	Regulation of combinations	25/03/2021	27/03/2021	T2 (Pg :46-48)	https://www.youtube.com/watch?v=l0QLNeD33ng&feature=emb_imp_woyt	P1-P4	Able to understand Regulation of combinations	**CO1, CO2**
					Unit III					
17	17	17	International Treaties and Conventions on IPRs,	26/03/2021	01/04/2021	T2 (Pg : 48-54)	https://www.youtube.com/watch?v=OtsGM3zoz0I	P1-P4	Able to understand International Treaties and Conventions on IPRs,	**CO1, CO2, CO3**
18	18	18	International Treaties and Conventions on IPRs,	27/03/2021	02/04/2021	T1 (Pg :170-182)	https://www.youtube.com/watch?v=OtsGM3zoz0I	P1-P4	Able to understand International Treaties and Conventions on IPRs,	**CO1, CO2**
19	19	19	TRIPS Agreement,	01/04/2021	03/04/2021	T2 (Pg :206-212)	https://www.youtube.com/watch?v=a0HjmR_pOR8	P1-P4	Able to understand TRIPS Agreement,	**CO1, CO2**
20	20	20	PCT Agreement,	02/04/2021	08/04/2021	T2 (Pg : 97-103)	https://www.youtube.com/watch?v=a757qQYLVvU	P1-P4	Able to understand PCT Agreement	**CO1, CO2, CO3, CO5**
21	21	21	Patent Act of India,	03/04/2021	09/04/2021	T2 (Pg : 205-206)	https://www.youtube.com/watch?v=5h2_ACYCmhA	P1-P4	Able to understand Patent Act of India	**CO1, CO2, CO3, CO5**
22	22	22	Patent Amendment Act, Design Act,	08/04/2021	10/04/2021	T2(Pg :206-209)	https://www.youtube.com/watch?v=0tljpdegha4	P1-P4	Able to understand Patent Amendment Act, Design Act	**CO1, CO2, CO3, CO5**
23	23	23	Trademark Act, Geographical Indication Act .	09/04/2021	15/04/2021	T2 (Pg :232-235)	https://www.youtube.com/watch?v=e2_BAcGq42U	P1-P4	Able to understand Trademark Act,	**CO1, CO2, CO3, CO5**
					Unit IV					
24	24	24	The relationship and Interaction between IPR and competition law	10/04/2021	16/04/2021	T1 (Pg :227)	https://www.youtube.com/watch?v=HgtdqGXGDWM	P1-P4	Able to understand The relationship and Interaction between IPR and competition	**CO1, CO2, CO5**

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									law	
25	25	25	The economics of US Antitrust law,	15/04/2021	17/04/2021	T1 (Pg : 228)	https://www.youtube.com/watch?v=8tQa92BWjvM	P1-P4	Able to understand The economics of US Antitrust law,	**CO1, CO2, CO5**
26	26	26	IP and competition issues,	16/04/2021	08/10/2020	T1 (Pg : 230)	https://www.youtube.com/watch?v=lvUPQ3ersw0	P1-P4	Able to understand IP and competition issues,	**CO1, CO2, CO5**
27	27	27	Technology transfer agreements.	17/04/2021	22/04/2021	T1 (Pg :296-306)	https://www.youtube.com/watch?v=y6fTtFNsFFY	P1-P4	Able to understand Technology transfer agreements	**CO1, CO2, CO5**
28	28	28	The EU experience with IP and Competition Law	18/04/2021	23/04/2021	T1 (Pg :332-335)	https://www.youtube.com/watch?v=GITBEQU7CDQ	P1-P4	Able to understand The EU experience with IP and Competition Law	**CO1, CO2, CO5**
29	29	29	The EU experience with IP and Competition Law	22/04/2021	06/05/2021	T1 (Pg :314-320)	https://www.youtube.com/watch?v=GITBEQU7CDQ	P1-P4	Able to understand The EU experience with IP and Competition Law	**CO1, CO2, CO5**
			Unit V							
30	30	30	Market allocation, Horizontal agreements, Vertical agreements, licensing issues.	23/04/2021	07/05/2021	T2 (Pg :301)	https://www.youtube.com/watch?v=rcDd7A2k7ng	P1-P4	Able to understand Market allocation, Horizontal agreements, Vertical agreements, licensing issues.	**CO1, CO2, CO4**
31	31	31	Market allocation, Horizontal agreements, Vertical agreements, licensing issues	06/05/2021	08/05/2021	T2 (Pg : 318)	https://www.youtube.com/watch?v=rcDd7A2k7ng	P1-P4	Able to understand Market allocation, Horizontal agreements, Vertical agreements, licensing issues.	**CO1, CO2, CO4**
32	32	32	Indian Competition Act and IPR protection.	07/05/2021	13/05/2021	T2 (Pg : 295)	https://www.youtube.com/watch?v=HgtdqGXGDWM	P1-P4	Able to understand Indian Competition Act and IPR protection	**CO1, CO2, CO4**

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33	33	33	Digital Innovations and Developments as Knowledge Assets – IP Laws,	08/05/2021	20/05/2021	T2(Pg : 309)	https://www.youtube.com/watch?v=zmemhcELAls	P1-P4	Able to understand Digital Innovations and Developments as Knowledge Assets – IP Laws,	**CO1, CO2, CO4**
34	34	34	Cyber Law and Digital Content Protection	13/05/2021	20/05/2021 21/05/2021	T2(Pg : 311)	https://www.youtube.com/watch?v=-FyDsc5hqMI	P1-P4	Able to understand Cyber Law and Digital Content Protection	**CO1, CO2, CO4 CO5**
35	35	35	Unfair Competition – Meaning and Relationship between Unfair Competition and IP Laws – Case Studies.	14/05/2021	27/05/2021	T2(Pg : 315-317)	https://www.youtube.com/watch?v=rPzlfgDAI5w	P1-P4	Able to understand Unfair Competition	**CO1, CO2, CO4**
36	36	36	Case Studies.	15/05/2021	28/05/2021	T2(Pg : 315-317)	NA	P1-P4	Able to understand IPR case studies	**CO1, CO2, CO4**

*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: -36

Tutorial Plan			
Week	**Topic**	**No. Of Problems**	**Mapped With CO**
1	Anti-competitive agreements, Abuse of dominance	02	CO1,CO2
2	Industrial Property, technological Research, Inventions and Innovations	02	CO1,CO2
3	PCT Agreement, Patent Act of India,	01	CO1,CO3
4	The relationship and Interaction between IPR and competition law	02	C02,CO5
5	Digital Innovations and Developments as Knowledge Assets – IP Laws,	01	CO1,CO4

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Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	UNIT I, II	15/02/2022	25/02/2022	CO1, CO2
2	UNIT III, IV, V	28/03/2022	10/04/2022	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	CopyRight case studies	08/04/2022	CO1,CO2,CO3,CO4,CO5	
2	IPR –Case studies	16/04/2022	CO1,CO2,CO3,CO4,CO5	

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Fundamentals of IP for Engineers	K.Bansl& P.Bansal	BS Publications	2013
T2	Intellectual property right	Deborah, E. BoDcboux	Cengage leam'ng	2004
T3	Intellectual property right - Unleashing the knowledge economy	Pmbuddha Ganguli	Tata Mcgraw Hill Publishing Company Ltd.	2010
T4	Managing Intellectual Property	V. Scople Vinod	Prentice Hall of India pvt Ltd,	2012
T5	Intellectual Property Rights and Copy Rights	S. V. Satakar	Ess Publications, New Delhi	2002

Research Papers:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	The link between intellectual property rights, innovation, and growth: A meta-analysis	PC Neves,	Elsevier	https://doi.org/10.1016/j.econmod.2021.01.019	Volume 97, April 2021, Pages 196-209
P2	Intellectual Property Rights and Access in Crisis	Karen Walsh	Springer	https://doi.org/10.1007/s40319-021-01041-1	09 March 2021

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P3	Sustainable innovation and intellectual property rights: Friends, foes or perfect strangers?	Carolina Castaldi	LEM Working Paper Series	ISSN(ONLINE) 2284-0400	April 2021
P4	New Dimensions of Entrepreneurship in terms of Intellectual Property policy of India	Dr. Pooja Aggarwal	GIIRJ	https://doi.org/10.1007/s40319-021-01041-1	ISSN (E): 2347-6915 Vol. 9, Issue 9, Sep. (2021)

Prof. Milind Tote
Subject Incharge

Prof. Milind Tote
Academic Incharge

Prof. Supriya Sawwashere
HOD, CSE

HOD
Computer Science & Engineering
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An Autonomous Institute, with NAAC "A" Grade
Department Of Electrical Engineering
"Igniting minds to illuminate the world"
2020-21

VISION	MISSION
"To develop competent and committed Electrical Engineers to serve the society"	1. To impart quality education in the field of Electrical Engineering. 2. To be excellent learning center through research and industry interaction.

Teaching Plan

Course : B. Tech in Electrical Engineering	**Year/Semester** : 3rd Semester (2nd Year)	
Name of the Teacher :Prof. A.V.Joshi	**Subject Code** : EE3T005	
Subject : Electrical Machines-I	**Section** :A	
Periods per Week (each 60 min)	**Lecture**	**3**
	Tutorial	**-**
	Practical	**2**

Course Objective	Course Outcomes
1. Understand basic principles, construction, of transformers, induction motors & dc machines.	1. **Remember** basic principles, construction, of transformers, induction motors & dc machines.
2. Understand the operation, performance and characteristics of transformers, induction motors and dc motors.	2. **Understand** the operation, performance and characteristics of transformers, induction motors and dc motors.
3. Understand the different issues related to the speed control and torque improvement in ac & dc machines.	3. To **identify** the different issues related to the speed control and torque improvement in ac & dc machines.
4 Understand the performance indices of ac & dc machines during motoring , generating and braking conditions.	4. **Analyze** the performance indices of ac & dc machines during motoring , generating and braking conditions.
5. Understand the operation of ac and dc machines along with the testing of machines.	5. **Evaluate** the operation of ac and dc machines along with the testing of machines.
6. Understand the different problems related to operation , supply conversion & performance indices of ac and dc machines.	6. **Solve** the different problems related to operation ,supply conversion & performance indices of ac and dc machines.

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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
1	1	1.02	Transformer construction Ideal and practical transformer		T1 (Pg:1) R2 (Pg:2-3)	**Videos:**https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr https://www.youtube.com/watch?v=eolT3AqXy6E Time: 55:54 min to 1 hr **Notes:**https://nptel.ac.in/courses/108/105/108105017/IT, Guwahati)	-	A student completing the course will be able to remember basic principles of Single Phase transformers.	CO1
	2	1.03	Exact and approximate Equivalent circuits, no load and on load operation, phasor diagrams		T1 (Pg:3) R2 (Pg:3)	https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student completing the course will be able to remember phasor diagrams of Single Phase transformers.	CO1,CO2
	3	1.04	Power and energy efficiency, voltage Regulation, parallel operation, effect of load on power factor, per unit system		T1 (Pg:7) R2 (Pg:4-10)	https://nptel.ac.in/courses/108/105/108105155/		A student completing the course will be able to remember basic principles of Single Phase transformers.	CO1,CO2

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	4	1.05	Excitation phenomenon in Transformers, switching transients,		T1 (Pg:9)	**Videos:**https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr https://www.youtube.com/watch?v=eolT3AqXy6E Time: 55:54 min to 1 hr **Notes:**https://nptel.ac.in/courses/108/105/108105017/)	--	A student completing the course will be able to understand transients in single Phase transformers.	CO1,CO2
	5	1.06	Auto transformers, Variable frequency transformer, voltage and current Transformers,		T1 (Pg:12)	https://nptel.ac.in/courses/108/105/108105155/	--	A student completing the course will be able to remember basic principles of Autotransformers .	CO1,CO2
	6	1.07	Welding transformers, Pulse transformer and applications		T1 (Pg:22)	https://nptel.ac.in/courses/108/105/108105155/	--	A student completing the course will be able to remember basic principles of Single Phase transformers.	CO1,CO2
2	7	2.01	Constructional features of three phase transformers, Cooling methodology		T1 (Pg:135)	**Videos:**https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr https://www.youtube.com/watch?v=eolT3AqXy6E Time: 55:54 min to 1 hr **Notes:**https://nptel.ac.in/courses/108/105/1081050	--	A student completing the course will be able to remember basic principles of Three Phase transformers.	CO1,CO2

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					17/)			
8	2.02	Standard and special transformer connections		T1 (Pg:135)	https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student completing the course will be able to remember connections of Three Phase transformers.	CO3,CO4
9	2.03	Phase conversion		T1 (Pg:138)	https://nptel.ac.in/courses/108/105/108105155/	--	A student completing the course will be able to remember connections of Three Phase transformers.	CO3,CO4
10	2.04	Parallel operation of three phase transformers		T1 (Pg:138)	https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student completing the course will be able to remember basic principles of parallel operation..	CO1,CO2
11	2.05	Three Winding transformers and its equivalent circuit		T1 (Pg:142)	https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student completing the course will be able to understand equivalent circuit	CO3,CO4
12	2.06	On load tap changing of transformers		T1 (Pg:144)	https://nptel.ac.in/courses/108/105/108105155/	--		CO4,CO5
13	2.07	Modern trends in transformers		T1 (Pg:145)	https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student completing the course will be able to understand modern trends.	CO1,CO2
14	2.08	Type and routine		T1	https://nptel.ac.in/courses	--	A student	CO5,CO6

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			tests, Standards,Numericals		(Pg:179)	/108/105/108105155/		completing the course will be able to understand tests on transformers.	
3	15	3.01	Construction of armature and field systems		T1 (Pg:267)	**Videos:**https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr https://www.youtube.com/watch?v=eolT3AqXy6E Time: 55:54 min to 1 hr **Notes:**https://nptel.ac.in/courses/108/105/108105017/)	--	A student completing the course will be able to understand construction of DC generators.	CO1,CO2
	16	3.02	Working, types, emf equation		T1 (Pg:267)	https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student completing the course will be able to understand working of DC generators.	CO1,CO2
	17	3.03	Armature windings		T1 (Pg:270)	https://nptel.ac.in/courses/108/105/108105155/	--	A student completing the course will be able to understand construction of DC generators.	CO1,CO2
	18	3.04	Characteristics and applications		T1 (Pg:277)	https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student completing the course will be able to understand characteristics of DC generators.	CO1,CO2
	19	3.05	Building of emf		T1	https://nptel.ac.in/courses		A student	

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					(Pg:280)	/108/105/108105017/ Time: 59:54 min to 1 hr		completing the course will be able to understand emf buildup of DC generators.	
	20	3.06	Armature reaction - Demagnetizing and Cross magnetizing mmfs and their estimation		T1 (Pg:289)	https://nptel.ac.in/courses/108/105/108105155/	--	A student completing the course will be able to understand basics of DC generators.	CO3,CO4
	21	3.07	Remedies to overcome the armature reaction		T1 (Pg:290)	https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student completing the course will be able to understand basics of DC generators.	CO3,CO4
	22	3.08	Commutation process		T1 (Pg:290)	https://nptel.ac.in/courses/108/105/108105155/	--	A student completing the course will be able to understand commutation of DC generators.	CO3,CO4
	23	3.09	Causes of bad commutation and remedies		T1 (Pg:293)	https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student completing the course will be able to understand commutation of DC generators.	CO3,CO4
	24	4.01	Principles of working		T1 (Pg:297)	**Videos:**https://nptel.ac.in/courses/108/105/108105017/ Time: 59:54 min to 1 hr	--	A student who successfully completes the course will be	CO1,CO2
	25	4.02	Significance of back emf		T1 (Pg:299)	https://www.youtube.com/watch?v=eolT3AqXy6		able to understand the operation, of DC	CO3,CO4

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4						E		Motors.	
	26	4.03	Torque Equation, Types, Characteristics and Selection of DC Motors		T1 (Pg:305)	Time: 55:54 min to 1 hr **Notes:**https://nptel.ac.in/courses/108/105/108105017/)	--		CO5,CO6
	27	4.04	Starting of DC Motors		T1 (Pg:300)		--	A student who successfully completes the course will be able to understand starting of DC Motors.	CO1,CO2
	28	4.05	Speed Control, Losses and Efficiency		T1 (Pg:329)		--	A student who successfully completes the course will be able to understand speed control.	CO3,CO4
	29	4.06	Condition for Maximum Efficiency		T1 (Pg:333)		--	A student who successfully completes the course will be able to understand characteristics & applications of DC Motors.	CO3,CO4
	30	4.07	Braking of DC Motors		T1 (Pg:348)		--		CO3,CO4
	31	4.08	Effect of saturation and armature reaction on losses		T1 (Pg:353)		--		CO5,CO6
	32	4.09	Applications, Permanent Magnet DC Motors, Type and Routine tests.		T1 (Pg:358)				CO1,CO2
	33	5.01	Types of 3-		T1	Videos:https://nptel.ac.in/	--	A student who	CO1,CO2

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5			Ø induction motor and production of torque		(Pg:69)	courses/108/105/108105155/		successfully completes the course will be able to understand basics of Induction motors	
	34	5.02	Torque-slip characteristics, Torque-speed characteristics & Applications,		T1 (Pg:87)		--	A student who successfully completes the course will be able to understand characteristics of Induction motors	CO3,CO4
	35	5.03	NO load blocked rotor test, Losses & efficiency, Double cage motor,		T1 (Pg:91)		--	A student who successfully completes the course will be able to understand tests on Induction motors	CO3,CO4
	36	5.04	Operating characteristics & Influence of machine parameter on the performance of motor,		T1 (Pg:103)		--		CO3,CO4
	37	5.05	Various methods of starting of 3 phase I.M,		T1 (Pg:132)		--	A student who successfully completes the course will be able to understand characteristics of Induction motors	CO5,CO6
	38	5.06	Methods of speed control of I.M.,		T1 (Pg:164			A student who successfully	CO5,CO6

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					)			completes the course will be able to understand concept of speed control.	
	39	5.07	Braking Methods-Braking regenerative braking, Plugging, Dynamic braking, Crawling& cogging.		T1 (Pg:185)			A student who successfully completes the course will be able to understand concept of speed control.	CO5,CO6
6	40	6.01	Construction, principle and		T1 (Pg:397)	Videos:https://nptel.ac.in/courses/108/105/108105155/		A student who successfully completes the course will be able to understand basics of single phase induction motors.	CO1,CO2
	41	6.02	operation of Single phase induction motor,		T1 (Pg:399)				CO1,CO2
	42	6.03	Various types-Split phase induction motor		T1 (Pg:405)			A student who successfully completes the course will be able to understand special types of single phase IM.	CO1,CO2
	43	6.04	Capacitor start inductor motor		T1 (Pg:400)				CO1,CO2
	44	6.05	Capacitor start capacitor run induction motor		T1 (Pg:429)	Videos:https://nptel.ac.in/courses/108/105/108105155/			CO1,CO2
	45	6.06	two value capacitor method), Permanent split capacitor (PSC) motor,		T1 (Pg:433)				CO1,CO2
	46	6.07	Shaded pole		T1			A student who	CO1,CO2

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			induction motor, Phasor diagrams		(Pg:448)			successfully completes the course will be able to understand shaded pole induction motors.	
	47	6.08	Losses and Efficiency		T1 (Pg:453)			A student who successfully completes the course will be able to understand basics of single phase induction motors.	CO1,CO2
	48	6.09	Load characteristics& Applications		T1 (Pg:457)				CO1,CO2

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

Total number of lectures as per syllabus: - 40 Total number of lectures as per planned: - 48

Tutorial Plan			
Week	**Topic**	**No. Of Problems**	**Mapped With CO**
1	Numericals on Single phase Transformers.	04	II
2	Numericals on Three phase Transformers	02	III
3	Numericals on DC generators	04	IV
4	Numericals on DC motors	03	V
5	Numericals on Three phase Induction Motors	03	VI
6	Numericals on Single phase Induction Motors.	01	V
Assignment Plan			

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Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1	Single phase Transformers.	16/09/2020	23/09/2020	I, II
2	Numericals on DC generators	24/10/2020	01/11/2020	III, IV

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's
1	Permanent magnet Synchronous Motors(PMSM)	21/10/2020	I, II, III, IV

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Electrical Machines:	Dr. P.S. Bimbhra	Tata Mcgraw Hill	10th Edition, 2011
T2	Electrical Machines	Ashfaq Hussian -	DhanpatRai Publication	3rd Edition, 2011
T3	A Text Book of Electrical Technology:	B. L. Theraja (Vol. II)	S.Chand	Revised, 2014

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	**Siemens**	https://www.siemens.com/	This company is considered to be the best leading manufacturer and supplier of cost efficient ,safe and sustainable electrical infrastructure. It also supplies other devices like Electrical products involving Transformers ,motors etc.
C2	**ABB India**	https://www.new.abb.com /	This company is engaged in the production and supply of Drives,Low voltage Products and systems,PLC,Automation ,Motors Generators etc.

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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	C. Liu, "Emerging Electric Machines and Drives — An Overview	Ziqiang Wang ; Jie Wang	*IEEE Transactions on Energy Conversion*,	Doi: 10.1109/TEC.2018.2852732.	Vol. 33, no. 4, pp. 2270-2280, Dec. 2018,
P2	B.Zang, "Recent Trends in Electric Machines and Drives ‘	Shenzen Sang	*IEEE Transactions on Machines & Drives*	Doi: 11.1229/TEC.2019.275243.	Vol. 42, no. 1, pp. 2870-2880, Dec. 2019,

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

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Department of Electronics&TelecommunicationEngineering

"RectifyingIdeas,AmplifyingKnowledge"

Session 2020-21(Odd Semester)

VISION	MISSION
"To beaDepartment providinghigh quality&globallycompetent knowledgeofconcurrent technologiesin thededicatedfaculties. field of ElectronicsandTelecommunication."	1. Toprovidequalityteachinglearningprocessthroughwell-developededucationalenvironmentand 2. Toproducecompetent technocratsof high standardssatisfyingtheneedsof allstakeholders.

TeachingPlan

CourseB. Tech in Electronics &Telecommunication **YEAR/SEMESTER**2nd Year/3rdSemester

NAME OF THETEACHER Mr. Shailesh M. Sakhare **SUBJECTCODE**ET3T003

SUBJECT: Analog Communication System **SECTION:**A

Periodsperweek	**Lecture**	2
	Practical	2
	Tutorial	1

Sr. No.	Lec. No.	Topic Code	Contents tobecovered	Proposed Teaching Dates	ActualTeachingDates	TextBook PgNo.	Ref. BookPg No.	URL's (NPTEL/OnlineMaterial/PPt/Video)	Applications (R&D/Industry)	LearningOutcomes
Module-1: AM Transmission										
1	1	1.1	Introduction Overview:Signalsand theirclassifications	Day-1		T1(Pg. 51)		https://nptel.ac.in/courses/108/104/108104100/	C1, C2, C3	Students will beabletoclasssifythesignals
2	2	1.2	Fourier analysis of SignalsandSystems	Day-2		T1(Pg. 51)		https://youtu.be/r18Gi8lSkfM	C1, C4, C5	Students will beableto performthefourier analysis of signals.
3	3	1.3	Elementsofa CommunicationSystem,	Day-3		T3(Pg. 5)		https://nptel.ac.in/courses/112104172/1(IIT,Kanpur),Time:5:10min to25:13min	C1, C5, C3	Students shouldable to know the need ofmodulation
4	4	1.4	Channel,Noise	Day-4		T3(Page 441)	R1 (Pg423)	https://nptel.ac.in/courses/108/104/108104091/	C1, C2, C6	Students will beabletodefine the noise

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5	5	1.5	Band passtransmission: Complex low passrepresentation of narrowband	Day-5		T3(Page 441)		https://nptel.ac.in/courses/108/104/108104091/	C1, C2, C3	Students will beabletounderstand thebandpass transmission
6	6	1.6	Equivalent low passtransmission	Day-6		T3(Page 441)		https://nptel.ac.in/courses/108/104/108104091/	C1, C2, C3	
Module-2: AM Reception										
7	7	2.1	Amplitudemodulation DSB-FC,DSB-SC,SSB,VSB andISB transmissions	Day-7		T2(Pg:264-271, 297-307, 71-74)	R1 (Pg.429, 432)	https://youtu.be/oRMfN0K9cWU	C1, C2, C5	Classify ofAM wave, Generate the SSBandIdentify the use of ISB&VSB
8	8	2.2	Mathematical Analysis-timeand frequencydomainanalysis	Day-8		T1(Pg:35-42)	R2 (Pg:2-3)	https://youtu.be/oRMfN0K9cWU	C1, C3, C5	Tounderstand theconcept ofAM
9	9	2.3	Modulation index,generationand	Day-9		T2(Pg:253-256)	R2 (Pg:2-3)	https://youtu.be/oRMfN0K9cWU	C1, C2, C3	Students will come to know about thefrequencyspectrum
10	10	2.4	Power requirement of thesesystems,Comparison ofAMmodulation schemes	Day-10		T2(Pg: 255)		https://youtu.be/oRMfN0K9cWU	C1, C2, C3	Able to calculate thepower requirement
11	11	2.5	QuadratureCarrier Multiplexing(QAM)	Day-11		T1(Pg. 217)		https://youtu.be/oRMfN0K9cWU	C1, C2, C3	Students will beableto explain the QAM
12	12	2.6	Frequency DivisionMultiplexi	Day-12		T1(Pg:563-565)		https://youtu.be/oRMfN0K9cWU	C1	Students shouldknow the howmodulation
Module-3: FMTransmission										
13	13	3.1	Angle Modulation FrequencyModulation (FM)Single ToneFrequency	Day-13		T1(Page 75)		https://nptel.ac.in/courses/108/104/108104091/		Students will beabletoanalysethe FM
14	14	3.2	SpectrumAnalysis,Narrowband FM,Wideband FM	Day-14		T1(Page 75)	R1(Pg:213)	https://nptel.ac.in/courses/108/104/108104091/		Analyze frequencyspectrum& BW andcompare narrowband
15	15	3.3	Transmission Bandwidth of FMWaves, Generationof FMwaves:Direct and IndirectMethods	Day-15		T3(Page 182)		https://nptel.ac.in/courses/108/104/108104091/		

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16	16	3.4	Demodulationof FM,PhaseLockedLoops	Day-16		T3(Page 186)		https://youtu.be/oRMfN0K9cWU		
17	17	3.5	Limiting of FM waves,comparison between	Day-17		T3(Page 192)		https://nptel.ac.in/courses/108/104/108104091/		
18	18	3.6	PhaseModulation, Relationbetween FMand	Day-18		T3(Page 203)		https://nptel.ac.in/courses/108/104/108104091/		
Module-4: FMReception										
19	19	4.1	Radio Receivers andperformance	Day-19		T3(Page 100)		https://nptel.ac.in/courses/117/102/117102059/		Analysethe characteristics of
20	20	4.2	Basicreceiver (TRF), Superheterodyne receiver for AMand FM	Day-20		T3(Page 98)		https://freevideolectures.com/course/2314/communication-engineering/4		Understand andAnalysetherec eiver
21	21	4.3	Performance parametersforreceiver suchas sensitivity,selectivity,fidelity,	Day-21		T3(Page 100)	R2 (Pg151)	https://freevideolectures.com/course/2314/communication-engineering/4		Understand andcompare thecharacteristi cs
22	22	4.4	AGC technique,Sources ofnoise,Signal toNoiseRatios,Figure ofMerit Calculations,Noise inAM	Day-22		T3 (Page 122)		https://freevideolectures.com/course/2314/communication-engineering/4		
23	23	4.5	Pre emphasis and De-emphasisinFM	Day-23		T3 (Page 176)		https://www.youtube.com/watch?v=TqNKC5OQyeg		Analyze the Pre and DeEmphasis
24	24	4.6	Comparison of Noise Performance of differentmodulation	Day-24				https://youtu.be/oRMfN0K9cWU		
Module-5:Applicationsof AM and FM										
25	25	5.1	Applications ofAM andFM AMRadio	Day-25		T1 (Page 461)		https://youtu.be/NeRdsWYqWFU		
26	26	5.2	Television:VideoBandwidth,Choice of Modulation	Day-26		T1 (Page 466)		https://youtu.be/IMVJNDs2ptU		
27	27	5.3	Colour Television	Day-27		T3 (Page 276)		https://youtu.be/EAybxdgS2T4		

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28	28	5.4	HDTV	Day-28		T3 (Page 179)		https://nptel.ac.in/courses/108/104/108104091/		
29	29	5.5	FM Radio, FMStereoMultiplexing	Day-29		T2 (Page 176)		https://nptel.ac.in/courses/108/104/108104091/		
Module-6:Acoustics										
30	30	6.1	Acoustics:Introduction toacoustictransducers	Day-30			R1 (Page 461)	https://nptel.ac.in/courses/117/105/117105133/		
31	31	6.2	Microphoneand Loud speakers	Day-31			R1 (Page 466)	https://nptel.ac.in/courses/117/105/117105133/		
32	32	6.3	Construction,Types, Characteristicsand Applications	Day-32			R3 (Page 276)	https://nptel.ac.in/courses/117/105/117105133/		
33	33		Block schematic of Publicaddresssyste	Day-33		T3 (Page 179)		https://nptel.ac.in/courses/117/105/117105133/		
34	34	6.4	High qualityaudiosuch as stereophonic, Dolby, surround 3-D etc	Day-34		T2 (Page 176)		https://nptel.ac.in/courses/117/105/117105133/		

*T=Text Book; R= Reference Book; C=Companyname; P= Research Paper

Total number of lecturesas persyllabus: - 30 Total numberof lectures as perplanned: -34

FinalOutcome of the Subject(Maximum 6 Outcome):

On completionof thecourse, students will beable to

CO1.	Explain signal tonoiseratio, noisefigureandnoise temperatureforsingle andcascaded stagesina communicationsystem.
CO2.	Distinguishbetween differenttypesof analog modulation techniquesbased on bandwidthOccupied andpowertransmitted.
CO3.	Analyze theperformance of analog communications inthe presenceof noisebyevaluating thefigureofmerit fordifferentschemes ofmodulation
CO4.	Evaluatedifferent componentsof analog communication systems such asmodulator, demodulator,mixer, receiver etc intime and frequencydomain.
CO5.	Design themodulators, demodulators for amplitudeand frequencymodulated systems.

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CO6.	Develop theability tocompare andcontrast the strengths andweaknesses ofvarious communication systems.

Text/Reference Books:

Code	Title of theBook	AuthorName/ Designation/Organizatio	Publisher	Edition/Publication Year
T1	Communication systemengineering	J. G.ProakisandM. Salehi	Pearson Education	Second/2002
T2	Principles of Communications:Systems, Modulation, andNoise	R. E. Ziemer, W. H. Tranter	John Wiley&Sons	Fifth/2001
T3	Communication Systems	Simon Haykins and Michael Moher	John Wiley&Sons	Fifth/2014
T4	Communication Systems - Analog anddigital	Singh andSapre	Tata McGraw Hill	Second/2007
R1	ElectronicCommunications Systems – Fundamentals Through advanced	Wayne Tomasi	Pearson Education	Fifth/2012
R2	Principles of Communication Systems	H. TaubandD. L. Schilling	Tata McGraw Hill	3rdReprint/2006
R3	Electronic Communication systems	GeorgeKennedyand BernardDavis	Tata McGraw Hill	Fourth/2008
R4	Modern digitaland analog Communication systems	B.P.Lathi	OxfordUniversity Press	Third/2015
R5	Electronic Communication Systems	Roddy andCoolen	Pearson Education	
R6	Electronic Communication Systems	Frank R. Dungan	Delmar Publishers	

Company/Industry:

Code	Company/IndustryName	Website	Detailed Information
C1	Bosch	www.bosch.in	Bosch isa leadingsuppiler of technology and services inteareas of Mobilitysolutions,industrial technology,consumer goodsandenergyandbuilding technology.
C2	Mathworks	www.mathworks.com	Itis the leadingdeveloper ofmathematical computingsoftware for engineers andscientists.Analyzedata,develop algorithms andcreatemathematicalmodel
C3	IndianSpace Research Organization	www.isro.gov.in	Harnessspacetechnology fornational development, whilepursuingspace science researchandplanetaryexploration. Designs anddevelops ofLaunch vehiclesand satellites andrelated technologies.

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C4	Defence Researc & DevelopmentOrganization	www.drdo.gov.in	Designs,develops andlead toproduction statr-of-the-art sensors, weapon systems,platforms andallied equipment for defenceservices in India.Providestechnologysolutions totheservicesandbuild
C5	Hindustan Aeronautics Limited	www.hal-india.co.in	Itis a significantglobalplayer intheaerospaceindustry. Achievs self reliance indesign,development,manufacture,upgradeandmaintenanceof aerospaceequipment diversifyingjnto relatedareas.
C6	Mahindra Aerospace	www.mahindraaerospace.com	Manufactures a utility andversatile aircraft inits class.
C7	AMD	www.amd.com	Develops computerprocessors andrelated technologies like chipsets, Embedded andGraphic processors etc.
C8	XILINX	www.xilinx.com	Primary supplier of Programmablelogic devices
C9	Qualcomm	www.qualcomm.com	Invent mobile technologybreakthroughs.
C10	BharatElectronics Ltd.	www.bel-india.in	Indianstate owned aerospaceand defencecompany. Manufacturesadvanced electronic produtsfortheindianarmedforces.
C11	Bharat Heavy Electricals Ltd.	www.bhel.com	BHEL is one of thelargeatengineering and manufacturing company , engaged indesign,engineering,construction,testing,commissioning andservicing ofa widerange of products and services inthefieldof power.

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Subject Teacher

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Department of Electronics and Telecommunication Engineering
"Rectifying Ideas, Amplifying Knowledge"
2020-21 (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 AND TELECOMMUNICATION ENGINEERING	**Year/Semester :** 4th Semester (2nd Year)	
Name of the Teacher : Prof. Tushar S.Muratkar	**Subject Code : ET4T006**	
Subject : Electromagnetic Fields	**Section :-**	
Periods per Week (each 60 min): 4	**Lecture**	**3**
	Tutorial	**1**
	Practical	**0**

Course Objective	Course Outcomes
1. To learn basic coordinate system, significance of divergence, gradient, curl and its applications to EM Waves. 2. To understand the boundary conditions for different materials /surfaces. 3. To get insight on finding solution for non-regular geometrical bodies using Finite 4. Element Method, Method of Moments, Finite Difference Time Domain. 5. To get the basics of microwave, transmission lines and antenna parameters. 6. Students get acquainted with different physical laws and theorems and provide basic platform for upcoming communication technologies.	1. Understand characteristics and wave propagation on high frequency transmission lines 2. Carryout impedance transformation on TL 3. Use sections of transmission line sections for realizing circuit elements 4. Characterize uniform plane wave 5. Calculate reflection and transmission of waves at media interface 6. Analyze wave propagation on metallic waveguides in modal form 7. Understand principle of radiation and radiation characteristics of an antenna

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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 – Maxwell's Equations									
1	1	1.1	Basics of vector	Lecture 1	T1:1,T2:105	https://www.youtube.com/watch?v=pGdr9WLto4A Lecture 1	P1, C1-C10	Able to understand general structure of vector calculus system	CO1
2	2	2.1	vector calculus	Lecture 2	T1:4-38,T2:105	https://www.youtube.com/watch?v=ma1QmE1SH3I Lecture 17	P1,C1-C10	Able to understand general structure of vector calculus system	CO1
3	3	3.1	Basic laws of Electromagnetics	Lecture 3	R1:104,R2:2.1,R3:26,R4:120	https://www.youtube.com/watch?v=xVLzZMUB1iU Lecture 18	P2, C1-C10	Able to understand different basic laws of Electromagnetics	CO1
4	4	4.1	Maxwell's Equations-I	Lecture 4	R1:369,R2:9.12,R3:268,R4:77,129	https://www.youtube.com/watch?v=XUR-dnDa7eI Lecture 19	P2,C1-C10	Able to understand the time varying fields	CO1
5	5	5.1	Maxwell's Equations-II	Lecture 5	R1:369,R2:9.12,R3:268,R4:77,129	https://www.youtube.com/watch?v=XUR-dnDa7eI Lecture 19	P3, C1-C10	Able to understand the Maxwell Equations	CO1
6	6	6.1	Boundary conditions at Media Interface	Lecture 6	R2:9.17	https://www.youtube.com/watch?v=rPbx-1uGSOo Lecture 20	P3,C1-C10	Able to understand boundary conditions at different media interface.	CO1
Unit II – Uniform Plane Wave									
7	7	7.1	Uniform plane wave, Propagation of wave	Lecture 7	T1:472,T2:149	https://www.youtube.com/watch?v=uC1W_1eyjPk Lecture 21	P4,C1-C10	Able to understand propagation of uniform plane wave	CO1, CO2
8	8	8.1	Wave polarization, Poincare"s Sphere,	Lecture 8	T1:545,T2:154	https://www.youtube.com/watch?v=_nL6a21q1a4	P5, C1-C10	Able to understand wave polarization	CO2
9	9	9.1	Wave propagation in conducting medium	Lecture 9	T1:502T2:172	https://www.youtube.com/watch?v=duHfEqSYL64	P6,C1-C10	Able to understand wave propagation in conducting medium	CO2

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10	10	10.1	phase and group velocity	Lecture 10	T1:483,T2:180	https://www.youtube.com/watch?v=EIqKG5TiSYs	P7,C1-C10	Able to understand phase and group velocity	CO1,CO2
11	11	11.1	Power flow and Poynting vector	Lecture 11	T1:516,T2:183	https://www.youtube.com/watch?v=1ugT6anEWAY	P8,C1-C10	Able to understand Poynting vector	CO1,CO2
12	12	12.1	Surface current and power loss in a conductor.	Lecture 12	T2:191	https://www.youtube.com/watch?v=fh2MLGVtb0U	P8,C1-C10	Able to understand Surface current and power loss in a conductor.	CO1,CO2
Unit III – Transmission Lines									
13	13	13.1	Equations of Voltage and Current on TX line	Lecture 13	T1:573,T2:10	https://www.youtube.com/watch?v=KbJ0islui7c	P9 C1-C10	Able to understand derive the voltage and current equations on TX line	CO3
14	14	14.1	Propagation constant and characteristic impedance	Lecture 14	T1:578,T2:10	https://www.youtube.com/watch?v=Nn7_3lHhtpI	P9 C1-C10	Able to understand propagation constant and characteristic impedance.	CO3
15	15	15.1	reflection coefficient and VSWR,	Lecture 15	T1:597,T2:19	https://www.youtube.com/watch?v=4Ibmue9S1XE	P9 C1-C10	Able to describe VSWR	CO3
16	16	16.1	Impedance Transformation on Loss-lessand Low loss Transmission line	Lecture 16	T1:579,T2:25	https://www.youtube.com/watch?v=_tVMTjJQQV4	P10, C1-C10	Able to understand impedance transformation	CO3
17	17	17.1	Power transfer on TX line	Lecture 17	T1:579,T2:25	https://www.youtube.com/watch?v=5RxL5pMo2T8	P10, C1-C10	Able to understand power transfer on TX line	CO3
18	18	18.1	Smith Chart, Admittance Smith Chart, Applications of transmission lines	Lecture 18	R1:492,R3:334	https://www.youtube.com/watch?v=6CChYOK75-Y	P11,C1-C10	Able to understand Smith Chart.	CO2,CO3
19	19	19.1	Impedance Matching, use transmission line	Lecture 19	R4(3.32)	https://www.youtube.com/watch?v=7Xe2xmEAH7M	P11,C1-C10	Able to understand Impedance Matching	CO2,CO3

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			sections as circuit elements.						
Unit IV – Plane Waves at a Media Interface									
20	20	20.1	Plane wave in arbitrary direction	Lecture 20	T2:202	https://www.youtube.com/watch?v=yvuiuyiVrMQ	P9 C1-C10	Able to understand Plane wave in arbitrary direction	CO4
21	21	21.1	Reflection and refraction at dielectric interface	Lecture 21	T1:554, T2212	https://www.youtube.com/watch?v=BdR3mvvqFuQ	P9 C1-C10	Able to understand Reflection and refraction at dielectric interface	CO4, CO5
22	22	22.1	Total internal reflection	Lecture 22	T2:232	https://www.youtube.com/watch?v=RoK6ZaaJA2Y	P9 C1-C10	Able to understand total internal reflection	CO4, CO5
23	23	23.1	wave polarization at media interface-I	Lecture 23		https://www.youtube.com/watch?v=PUIp6idNeII	P10, C1-C10	Able to understand wave polarization at media interface	CO4
24	24	24.1	wave polarization at media interface-II	Lecture 24	T1:557T2:237	https://www.youtube.com/watch?v=PUIp6idNeII	P21, C11-C13	Able to understand wave polarization at media interface	CO4
25	25	25.1	Reflection from a conducting boundary.	Lecture 25	T1:554T2:251	https://www.youtube.com/watch?v=8TaXF6dfurM	P21, C11-C13	Able to understand reflection from a conducting boundary.	CO4
Unit V – Wave propagation									
26	26	26.1	Wave propagation in parallel plane waveguide	Lecture 26	T2:264,	https://www.youtube.com/watch?v=QjPwxAL5Cso	P22, C14-C15	Able to understand wave propagation in parallel plane waveguide.	CO5
27	27	27.1	Analysis of waveguide general approach	Lecture 27	T2:279	https://www.youtube.com/watch?v=qaMnqHsZhjo	P22, C14-C15	Able to understand analysis of waveguide.	CO5
28	28	28.1	Rectangular waveguide	Lecture 28	T2:283	https://www.youtube.com/watch?v=-SUZ-w-CRbs	P22, C14-C15	Able to understand rectangular waveguide	CO5
29	29	29.1	Modal propagation in rectangular	Lecture 29	T2:283	https://www.youtube.com/watch?v=Z7nUI36a	P22, C14-C15	Able to understand modal propagation in	CO5

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			waveguide			TBc		rectangular waveguide	
30	30	30.1	Surface currents on the waveguide walls	Lecture 30	T2:303	https://www.youtube.com/watch?v=g8NhAPILWdY	P24, C16	Able to understand surface currents on the waveguide walls	CO5
31	31	31.1	Field visualization, Attenuation in waveguide	Lecture 31	T2:296	https://www.youtube.com/watch?v=-4cUv92FCqM	P24, C16	Able to understand attenuation in waveguide	CO5
Unit VI – Radiation									
32	32	32.1	Solution for potential function	Lecture 32	T2:353	https://www.youtube.com/watch?v=Tuv7CTs8FDE	P25, C16	Able to understand solution for potential function	CO6
33	33	33.1	Radiation from the Hertz dipole	Lecture 33	T2:359	https://www.youtube.com/watch?v=AIXqboBRFQs	P25, C16	Able to understand Hertz dipole radiation	CO6
34	34	34.1	Power radiated by hertz dipole	Lecture 34	T2:359	https://www.youtube.com/watch?v=8oMgg6impzQ	P25, C16	Able to understand power radiated by hertz dipole	CO6
35	35	35.1	Radiation Parameters of antenna	Lecture 35	T2:388	https://www.youtube.com/watch?v=AIXqboBRFQs	P27, C16	Able to understand radiation parameters of antenna	CO6
36	36	36.1	Radiation Parameters of antenna	Lecture 36	R3:511,R4:716	https://www.youtube.com/watch?v=AIXqboBRFQs	P26-27, C16	Able to understand radiation parameters of antenna	CO6
37	37	37.1	Monopole and Dipole antenna	Lecture 37	T2:403	https://www.youtube.com/watch?v=Y1RBxyk9Cow	P26-27, C16	Able to understand Monopole and Dipole antenna	CO6

*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: - 36

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Tutorial Plan

Week	Topic	No. Of Problems/Programs	Mapped With CO
1	Numericals on Divergence theorem	04	2
2	Numericals on Wave Propagation	04	5
3	Numericals on Radiation	03	6

Assignment Plan

Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1	Basic vector calculus			2,3
2	Wave Propogation			4,5

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	Case Study Effects of **Electromagnetic** Fields (EMF) Near High Voltage Transmission Line		
2	Electromagnetic Pollution: Case Study of Energy Transmission Lines and Radio Transmission Equipment		

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Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Electromagnetic Fields	A.U Tinguria	Denett	3rd/2011
T2	Electromagnetic waves	R.K Shevgaonkar	Tta McGraw Hill	2005
R1	Elements of Electromagnetics	Sadiku	Oxford	2014

R2	Electromagnetics	Krauss	Tata McGraw Hill Publications	1991
R3	Engineering Electromagnetics	W. H. Hayt	Tata McGraw Hill Publications	1991

Prof. Tushar S.Muratkar
Subject Teacher

Prof. A.K.Ikhar
Academic Incharge

Dr.P.R.Kshirsagar
HOD (ETC)

HOD, Dept. of ETC/ETC
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Department of Electronics and Telecommunication Engineering

"Rectifying Ideas, Amplifying Knowledge"

2020-21 (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**	: 5th Semester (3rd Year)
Name of the Teacher	: Prof. Avinash K. Ikhar	**Subject Code**	: BTEXC505
Subject	: Microcontroller & its Applications	**Section**	:ETC - A

Periods per Week (each 60 min)	Lecture	**3**
	Practical	**2**
	Tutorial	**-**

Course Objective	Course Outcomes
1. To understand the applications of Microcontrollers and need of microcontrollers in embedded system. 2. To understand architecture and features of typical Microcontroller and learn interfacing of real world input and output devices. 3. To study various hardware and software tools for developing applications. 4. After learning Microprocessor course, students will get advantage to pursue higher studies in Embedded Systems or employment in core industries. 5. The learner can do microcontroller design based systems and thus can become successful entrepreneur and meet needs of Indian and multinational industries. 6. The students can design and develop processor which can be used in Robotics, Automobiles, Space and many research areas.	1. **Remember** importance of microcontroller in designing embedded application and use of hardware and software tools. 2. **Understand** modern tools like Programmers, Debuggers, cross compilers and current IDE i.e. integrated development environment tools. 3. **Apply** knowledge of microcontroller to interface mechanical system to function in multidisciplinary system like robotics, Automobiles. 4. **Analyze** and formulate control and monitoring systems using microcontrollers. 5. **Evaluate** experiments based on interfacing of devices to real world applications. 6. **Design** real time cost effective controllers using microcontroller based system and develop interfacing to real world devices to serve engineering solution for Global, social and economic context.

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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
Unit I –Fundamentals of Microcontrollers								
1	1	1	Introduction to the general structure of 8 and 16 bit Microcontrollers Harward & Von Neumann architecture, RISC & CISC processors	Day 1	T1 (Pg : 19 – 22)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 23 8051 Microcontroller	C1-C10	Able to understand general structure of 8 and 16 bit Microcontrollers Harward & Von Neumann architecture, RISC & CISC processors
2	2	2	Role of microcontroller in embedded system, Selection criteria of microcontroller Block diagram and explanation of 8051	Day 2	T1 (Pg : 23 –26)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 23 & 24 : 8051 Microcontroller	C1-C10	Able to understand Role of microcontroller in embedded system, Selection criteria of microcontroller Block diagram and explanation of 8051
3	3	3	Port structure, memory organization	Day 3	T1 (Pg : 75 –80)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 24 8051 Microcontroller (1-15.10) Lecture 25 (17.01-24.56)	C1-C10	Able to understand Port structure, memory organization
4	4	4	Interrupt structure, timers and its modes, serial communication modes	Day 4	T1 (Pg :272 – 275)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 26 Lecture 33	C1-C10	Able to understand Interrupt structure, timers and its modes, serial communication modes
5	5	5	Overview of Instruction set, Sample programs (assembly)	Day 5	T1 (Pg : 29 – 43)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 27 Lecture 28 Lecture 29	C1-C10	Able to understand Instruction set, Sample programs (assembly)
6	6	6	Delay using Timer	Day 6	T1	https://nptel.ac.in/cours		Able to understand

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			and interrupt, Programming Timer 0&1, Data transmission and reception using Serial port.		(Pg : 201 – 217) T1 (Pg : 271– 275)	es/108/105/108105102/ Lecture 30 Lecture 31 Lecture 32 Lecture 34 Lecture 35	C1-C10	Delay using Timer and interrupt, Programming Timer 0&1, Data transmission and reception using Serial port.
Unit II – Interfacing with 8051 PART I								
7	7	7	Software and Hardware tools for development of microcontroller-based systems such as assemblers, compliers	Day 7	T1 (Pg : –)	https://www.youtube.com/watch?v=dC4ddn4AU1M	C1-C10	Able to understand Software and Hardware tools for development of microcontroller-based systems such as assemblers, compliers,
8	8	8	IDE, Emulators, debuggers, programmers	Day 8	T1 (Pg : –)	https://www.youtube.com/watch?v=4wmDsd53ibE	C1-C10	Able to understand IDE, Emulators, debuggers, programmers
9	9	9	development board, DSO,Logic Analyzer	Day 7	T1 (Pg : –)	https://www.youtube.com/watch?v=Tndjcd2Ii9k	C1-C10	Able to understand development board, DSO,Logic Analyzer
10	10	10	Interfacing LED with and without interrupt, Keypads	Day 8	T1 (Pg :300 –311)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 53 Lecture 58 https://www.youtube.com/watch?v=LjBOfxxziEk	C1-C10	Able to understand Interfacing of LED with and without interrupt, Keypads
11	11	11	Seven Segment multiplexed Display, LCD	Day 9	T1 (Pg :300 –311)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 58	C1-C10	Able to understand Seven Segment multiplexed Display, LCD
12	12	12	ADC Interfacing. All Programs in assembly language and C	Day 10	T1 (Pg : 331 – 344)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 56		Able to understand ADC Interfacing. All Programs in assembly language

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Unit III – Interfacing with 8051 PART II								
13	13	13	8051 timer programming, serial port and its programming	Day 11	T1 (Pg :255 – 261)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 33 Lecture 39	C1-C10	Able to understand 8051 timer programming, serial port and its programming,
14	14	14	interrupt programming, LCD and keyboard interfacing	Day 12	T1 (Pg : 271 – 290)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 53 Lecture 54(0-20.05) Lecture 57 (22.40-26.44) Lecture 58	C1-C10	Able to describe interrupt programming, LCD and keyboard interfacing
15	15	15	ADC and DAC interfacing	Day 13	T1 (Pg : 321 – 344)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 56 Lecture 57	C1-C10	Able to understand ADC and DAC interfacing, interfacing to external memory Interfacing of DAC
16	16	16	interfacing to external memory Interfacing of DAC	Day 14	T1 (Pg :321 – 344)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 57	C1-C10	Able to understand interfacing to external memory Interfacing of DAC
17	17	17	Temperature sensors, Stepper motor, Motion detectors	Day 15	T1 (Pg : –)	TS- https://www.youtube.com/watch?v=-9Jz7H0r-4s SM- https://www.youtube.com/watch?v=mP-NHtD0PNs https://www.youtube.com/watch?v=RxIINJXNWT0	C1-C10	Able to understand Temperature sensors, Stepper motor, Motion detectors,

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18	18	18	Relay, Buzzer, Optoisolators. All programs in assembly and C	Day 16	T1 (Pg : –)	R- https://www.youtube.com/watch?v=OSKZ5MIsc-0 B- https://www.youtube.com/watch?v=z4VHQxOaQDM O- https://www.youtube.com/watch?v=clIrRVsdfaQ	C1-C10	Able to understand Relay, Buzzer, Optoisolators. All programs in assembly and C
Unit IV – PIC Microcontroller Architecture								
19	19	19	PIC 10, PIC12, PIC16, PIC18 series comparison, features and selection as per application	Day 17	T1 (Pg : –)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 49	C1-C10	Able to understand PIC 10, PIC12, PIC16, PIC18 series comparison, features and selection as per application
20	20	20	PIC18FXX architecture, registers, memory Organization and types	Day 18	T1 (Pg : –)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 49 (0-25.57)	C1-C10	Able to understand PIC18FXX architecture, registers, memory Organization and types
21	21	21	stack, oscillator options	Day 19	T1 (Pg : –)	https://www.youtube.com/watch?v=E-UMOx7qv2k https://www.youtube.com/watch?v=Cqjt98HXQg	C1-C10	Able to understand stack, oscillator options
22	22	22	BOD, power down modes and configuration bit settings, timer and its programming	Day 20	T1 (Pg : –)	https://www.youtube.com/watch?v=4QdOuG0TZic https://www.youtube.com/watch?v=k7ek3rXdl7k	C1-C10	Able to understand BOD, power down modes and configuration bit settings, timer and its programming
23	23	23	Brief summary of	Day 21	T1 (Pg : –)	https://nptel.ac.in/cours	C1-C10	Able to understand Brief summary of

			Peripheral support, Overview of instruction set			es/108/105/108105102/ Lecture 50		Peripheral support, Overview of instruction set
24	24	24	MPLAB IDE & C18 Compiler	Day 22	T1 (Pg : –)	https://www.youtube.com/watch?v=kOWjRUujm4E	C1-C10	Able to understand MPLAB IDE & C18 Compiler
Unit V – Real World Interfacing Part I								
24	24	24A	Port structure with programming	Day 22	T1 (Pg : –)	https://nptel.ac.in/courses/108/105/108105102/ Lecture 53	C1-C10	Able to understand Port structure with programming
25	25	25	Interrupt Structure (Legacy and priority mode) of PIC18F with SFRS	Day 23	T1 (Pg : –)	https://www.youtube.com/watch?v=3u1ofvmAWHg	C1-C10	Able to understand Interrupt Structure (Legacy and priority mode) of PIC18F with SFRS
26	26	26	Interfacing of switch, LED, LCD (4&8 bits), and Key board	Day 24	T1 (Pg : –)	LED- https://www.youtube.com/watch?v=Jhb5SnVB-3s LCD- https://www.youtube.com/watch?v=tOhA4IxWJ58	C1-C10	Able to understand Interfacing of switch, LED, LCD (4&8 bits), and Key board
27	27	27	Interfacing of Key board	Day 25	T1 (Pg : –)	https://www.youtube.com/watch?v=VuvGyRsHLI4	C1-C10	Able to understand Interfacing of Key board
28	28	28	Use of timers with interrupts	Day 26	T1 (Pg : –)	https://www.youtube.com/watch?v=VAk72VVzf8k	C1-C10	Able to understand Use of timers with interrupts
29	29	29	CCP modes: Capture, Compare and PWM generation	Day 27	T1 (Pg : –)	https://www.youtube.com/watch?v=L2LFSa0Lfww	C1-C10	Able to understand CCP modes: Capture, Compare and PWM generation
30	30	30	DC Motor speed control	Day 28	T1 (Pg : –)	https://www.youtube.com/watch?v=x5cclC_ncfs	C1-C10	Able to understand DC Motor speed control

Unit VI – Real World Interfacing Part II								
31	31	31	Basics of Serial Communication Protocol: Study of RS232, RS 485, I2C	Day 29	T1 (Pg : –)	https://www.youtube.com/watch?v=guWfrS8xBug https://www.youtube.com/watch?v=m3hu_D4eHIY	C1-C10	Able to understand Basics of Serial Communication Protocol: Study of RS232, RS 485, I2C
32	32	32	SPI, MSSP structure (SPI &I2C), UART	Day 30	T1 (Pg : –)	https://www.youtube.com/watch?v=IyGwvGzrqp8 https://www.youtube.com/watch?v=sTHckUyxwp8	C1-C10	Able to understand SPI, MSSP structure (SPI &I2C), UART
33	33	33	Sensor interfacing using ADC, RTC (DS1306) with I2C and EEPROM with SPI	Day 31	T1 (Pg : –)	https://www.youtube.com/watch?v=qx_pr8YFYKU https://www.youtube.com/watch?v=BiWoA81fgTE	C1-C10	Able to understand Sensor interfacing using ADC, RTC (DS1306) with I2C and EEPROM with SPI
34	34	34	Design of PIC test Board	Day 32	T1 (Pg : –)	https://www.youtube.com/watch?v=pAdht5ZziUE	C1-C10	Able to understand Design of PIC test Board
35	35	35	Home protection System	Day 33	T1 (Pg : –)	https://www.youtube.com/watch?v=qdfo2bk0eBk	C1-C10	Able to understand Home protection System
36	36	36	All programs in embedded C.	Day 34	T1 (Pg : –)		C1-C10	Able to understand All programs in embedded C.

*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

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

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Assignment Plan				
Assignment No.	**Topic**	**Given Date**	**Submission Date**	**Mapped With CO**
1	Fundamentals of Microcontrollers	17/08/2020	19/08/2020	I, II
2	Interfacing with 8051 PART I	09/09/2020	11/09/2020	III, IV

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's not covered in TP**
1	Fundamentals of Arduino	10/10/2020	I, II, III, IV, V, VI
2	Use of virtual lab	10/09/2020	I, II, III

Unit wise Marks and Question distribution					
Unit-1	**Unit-2**	**Unit-3**	**Unit-4**	**Unit-5**	**Unit-6**
12 Mark	12 Mark	12 Mark	12 Mark	12 Mark	12 Mark
2 Question	2 Question	2 Question	2 Question	2 Question	2 Question

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Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	The 8051 microcontroller & embedded system, using assembly and C	Mazidi & Mazidi	Pearson	2nd Edition
T2	Microprocessor and interfacing 8085	Douglas V Hall	Tata Mc Gram Hill	
T3	Microprocessor-Architecture, programming and application with 8085	Gaonkar	Penram International	
T4	Introduction to microprocessor & microcontrollers	Crisp	2e Elsevier	
T5	ARM system-on-chip architecture		2e Pearson Education	
T6	8051 microcontrollers: Applications based introduction	Calcut	Elsevier	
T7	8085-86 microprocessors Architecture progg and interfaces	D V kodavade, S. Narvadkar	Wiley	
T8	8051 microcontroller	Udyashankara V., Mallikarjunaswamy	TMH	
T9	The MCS-51 microcontroller	Han-way Huang	Oxford university press.	

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	**Texas Instruments**	https://www.ti.com/	This company is considered to be the best leading manufacturer and supplier of MSP430, which is a low power 16-bit Flash microcontroller. It also supplies other devices like telecom products involving RF, wireless, and analog integrated circuits.
C2	**Microchip Company**	http://www.microchip.com/	This company is engaged in the production and supply of several varieties of 8-microcontroller families consisting of configurations like PIC18, PIC16, and PIC12. It also offers the most popular PIC24, which is 16-bit microcontrollers.
C3	**Silicon Labs**	https://www.silabs.com/	It is found that the product C8051Fxxx offered by this company belongs to family of quick, flash type mixed signal of 8051 microcontrollers.
C4	**Renesas Technology Corp**	https://www.renesas.com/	This Japanese company is a leading producer of microcontroller products. Its collection of microcontroller products comprises R32C, M16C, R8C, SuperH and H8. In addition, the company offers smart card type microcontrollers to the global

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			market.
C5	**Intel Corporation**	https://www.intel.in	Intel is one of the popular manufacturers engaged in the production and supply of Pentium personal computer micro processers. It also produces microcontrollers and is a leading supplier of PC chipsets, mother boards and several other computer peripherals.
C6	**Dallas Semiconductor**	https://www.maximintegrated.com	A high performance flash type 8051 microcontroller device is manufactured by Dallas Semiconductor Company. It also offers secure type of 8051 microcontrollers containing a watch battery in order to keep alive SRAM function.
C7	**Fujitsu Semiconductor Europe**	https://www.fujitsu.com/uk/microsite/feeu/	This company acts as an important and leading supplier of semiconductor products comprising microcontroller's devices throughout the regions of Africa, the Middle East and Europe. It offers several varieties of microcontroller devices with advanced design parameters.
C8	**STMicroelectronics**	https://www.st.com	A 32bit arm based microcontrollers, 8-bit ST6 and STM8 microcontroller devices and the uPSD3200 8051-compatible microcontroller are some of the products manufactured and supplied by this company. In addition, the company provides adequate customer support through online training courses. The products are especially designed to meet the requirements of broadcasting industry.
C9	**ZiLog Company**	https://www.zilog.com/	This company is a pioneer in the production and supply of microcontroller devices. Its entire product portfolio of flash microcontrollers include Z8 low power microcontroller containing a rich peripheral configuration, eZ80 embedded Ethernet group of microcontrollers accompanied by flash and free RTOs.
C10	**Freescale Semiconductor Company**	http://www.freescale.com/	This is one among the world's best producers and suppliers of both analog and digital semiconductor devices. The company's entire product portfolio of microcontrollers ranges from 8 bit to 32 bit configuration. The list of microcontroller products includes DSP56800, PowerPC, MCore, Coldfire, 68040, 68030, 68020, 68000, 68HC11 and 68HC908.

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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	A Competitive Study of Cryptography Techniques over Block Cipher	Ashwak M. AL-Abiachi	UKSim 13th International Conference on Modelling and Simulation	DOI 10.1109/UKSIM.2011.85	978-0-7695-4376-5/11 $26.00 © 2011 IEEE
P2	Real-time implementation of model predictive control on a 16-bit microcontroller for speed control of a dc motor	Mujtaba Jaffery	Journal of Engineering Technology		Volume 6, Issue 1, Jan. 2018, PP. 415-434

Prof. Avinash K. Ikhar

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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 & Tele. Engineering	**Year/Semester** :6th Semester (3rd Year)
Name of the Teacher :Prof. Shyam D. Bawankar	**Subject Code** :BTETC601
Subject :Antenna & Wave Propagation	**Section** :ETC

Periods per Week (each 60 min)	Lecture	**3**
	Practical	**-**
	Tutorial	**-**

Course Objective	Course Outcomes
1. To understand the applications of electromagnetic engineering. 2. To formulate and solve the Helmholtz wave equation and solve it for Uniform Plane Wave. 3. To analyze and understand the Uniform plane wave propagation in various media. 4. To solve the electric field and magnetic fields for a given wire antenna.	1.**Formulate** the wave equation and solve it for uniform plane wave. 2. **Understand** the various fundamentals and terminology of antenna. 3. **Analyze** the given wire antenna and its radiation characteristics. 4. **Evaluate** antenna arrays for given specifications. 5. **Identify or Design**the suitable antenna for a given communication system.

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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
UNIT-I: UNIFORM PLANE WAVES									
1	1	1.1	Maxwell Equations in phasor form, Wave Equation	Day 1	R1 (166-173) R2(358-359) R2(361-364)	https://youtu.be/XUR-dnDa7eI https://youtu.be/n6mVIX7yNws	C1-C10, P1, P10	Students will be able to solve the problems on Maxwell equation.	1
2	2	1.2	Uniform Plane wave in Homogeneous, free space,Dielectric, conducting medium	Day 2	R2(360-365) R2(374-376)	https://nptel.ac.in/content/storage2		Students will be aware about free space, dielectric and conducting medium.	1
3	3	1.3	Polarization: Linear, circular & Elliptical polarization, unpolarized wave	Day 3	R2(397-400) R2(400)	https://youtu.be/x9vcHOsn9hE https://nptel.ac.in/content/storage2/courses/117101057		Students will be aware about polarized and unpolarized wave.	1
4	4	1.4	Reflection of plane waves, Normal incidence, oblique incidence	Day 4	R1 (180-185)	https://nptel.ac.in/courses/108/104/108104130/		Students will be attentive about ray theory transmission.	1
5	5	1.5	Electromagnetic Power	Day 5	R2(395-398)	https://nptel.ac.in/courses/108/104/108104130/		Students will be aware about generation of electromagnetic power.	1
6	6	1.6	Poynting theorem and vector	Day 6	R2(401-408)	https://nptel.ac.in/courses/108/104/108104130/		Students will be prepared activity on this topic.	1
UNIT-II: WAVE PROPAGATION									
7	7	2.1	Fundamental equations for free space propagation	Day 7	R2 (116-120)	https://youtu.be/Q5fRmZzgEpU	C1-C10	Students will be able to understand free space propagation.	1

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8	8	2.2	Friis Transmission equation	Day 8	R1 (94-103)	https://youtu.be/3oXJq1x_iJ4		Students will be aware about perfectly and nonperfectly transmission.	1
9	9	2.3	Attenuation over reflecting surface, Effect of earth's curvature	Day 9	R1 (105-110)	https://youtu.be/n1CJZx4llto	C1-C10	Students will be alert about attenuation.	1
10	10	2.4	Ground, sky & space wave propagations, Structure of atmosphere	Day 10	R2(1106-1112) R2(1114-1115)	https://youtu.be/voh5UcC5wVM?list=PLgwJf8NK-2e7tzLIDL4aXUbtRFY3ykmkT		Students will be attentive about structure of atmosphere and various layers of it.	1
11	11	2.5	Characteristics of ionized regions, Effects of earth‟s magnetic field	Day 11	R2(1117-1119) R2(1125-1125)	https://youtu.be/voh5UcC5	C1-C10	Students will be aware about ionized region and it's effects.	1
12	12	2.6	Virtual height, MUF, Skip distance, Ionospheric abnormalities. Multi-hop propagation	Day 12	R2(1136-1144) R2(1146-1152)	https://youtu.be/JoV6IAyOxEA?list=PLgwJf8NK-2e7tzLIDL4aXUbtRFY3ykmkT	C1-C10	Students will be awake about various terms related to effects of earth magnetic field.	1
13	13	2.7	Space link geometry, Characteristics of Wireless Channel: Fading, Multipath delay spread	Day 13	R2(1183-1185)	https://youtu.be/2WH6NTciV2Q	C1-C10	Students will be conscious about geostationary satellites.	1
14	14	2.8	Coherence Bandwidth, and Coherence Time	Day 14	R2(1187-1188)	https://youtu.be/9ujT1upyWVg	C1-C10	Students will be able to justify need of wireless channel.	1
UNIT-III: ANTENNA FUNDAMENTALS									
15	15	3.1	Introduction, Types of Antenna	Day 15	R1 (1-6) R2(529)	https://nptel.ac.in/courses/117106086/23,26		Students will knows about antenna & it's types	2
16	16	3.2	Radiation Mechanism, Antenna Terminology:	Day 16	R1 (7-27) R2(530-533)	https://www.digimat.in/nptel/courses/video/108101092/L01.html	C1-C10	Students will be aware of various parameters of antenna design.	2

			2Radiation pattern						
17	17	3.3	Radiation power density, Radiation intensity, Directivity, Gain, Antenna efficiency	Day 17	R1 (38-41) R2(534-538) R1 (44-57,65,64) R2(544-548)	https://youtu.be/rCisiEMAvro		Students will know for designing purpose the various parameters.	2
18	18	3.4	Half power beam width, Bandwidth, Antenna polarization, Input impedance, Antenna radiation efficiency	Day 18	R1 (42-43,70,70) R2(574-576) R1 (80-84,85-86)	https://youtu.be/F2zhcfyrr2o		Students will be aware about various values of for design of antenna.	2
19	19	3.5	Effective length, Effective area, Reciprocity, Far field radiation	Day 19	R1 (87-91) R1 (142-143)	https://nptel.ac.in/content/storage2/nptel		Students will be aware effect of various parameters.	2
20	20	3.6	Radiation Integrals: Vector potentials A for an Electric Current Source J	Day 20	R1 (133-136)	https://nptel.ac.in/content/storage2/courses/117101057	C1-C10, P8	Students will be attentive about electric field & generation of current.	2
21	21	3.7	Radiation Integrals: Vector potentials F for a Magnetic Current Source M	Day 21	R1 (137-138)	https://nptel.ac.in/content/storage2/nptel		Students will be attentive about magnetic field & generation of current.	2
22	22	3.8	Electric and Magnetic fields Electric (J) and Magnetic (M) current sources, Solution of inhomogeneous vector potential wave equation	Day 22	R1 (138-141)	https://nptel.ac.in/content/storage2/nptel_data3/html		Students will be know about sources of J & M.	2
UNIT-IV: WIRE ANTENNAS									

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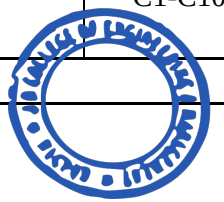
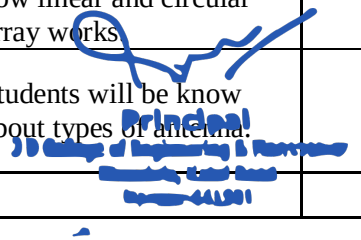
23	23	4.1	Analysis of Linear and Loop antennas, Infinitesimal dipole	Day 23	R1 (151-161)	https://youtu.be/pWRcD7PgR1Q	C1-C11, P8, P9	Students will be able to compare linear and loop antenna.	3
24	24	4.2	Small dipole, Finite length dipole	Day 24	R1 (162-164) R1 (170-181)	https://youtu.be/QWq5CAmIM98		Students will be aware about dipole.	3
25	25	4.3	Half wave length dipole, Small circular loop antenna	Day 25	R1 (182-183) R1 (232-245)	https://youtu.be/E3nzs2IjEXQ		Students will be able to justify how the length plays an important role for design the antenna.	3
UNIT-V: ANTENNA ARRAYS									
26	26	5.1	Antenna Arrays: Two element array, Pattern multiplication N-element linear array	Day 26	R1 (284-289)	https://nptel.ac.in/content	C1-C10	Students will be able to understand the concept of arrays.	4
27	27	5.2	Uniform amplitude and spacing, Broad side and end-fire array	Day 27	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 types of array.	4
28	28	5.3	N-element array: Uniform spacing, Nonuniform amplitude, Array factor	Day 28	R1 (324-327)	https://youtu.be/89Ow7FrYeIQ	C1-C10	Students will be able to understand effect of spacing & amplitude on N-element array.	4
29	29	5.4	Binomial array, DolphTchebyshev array	Day 29	R1 (328-343)	https://youtu.be/sZObIhzAjUk	C1-C10, P5, P6	Students will be aware about working of array.	4
30	30	5.5	Planar Array, Circular Array	Day 30	R1 (349-362) R1 (365-369)	https://youtu.be/AIsZqFT03C4	C1-C10	Students will be aware how linear and circular array works.	4
31	31	5.6	Log Periodic Antenna, Yagi Uda Antenna Array	Day 31	R1 (619-636) R2(826-827) R2(777-781)	https://nptel.ac.in/courses/108/101/108101092/	C1-C10	Students will be know about types of antenna.	4
UNIT-VI: ANTENNAS AND APPLICATIONS									





32	32	6.1	Structural details, dimensions, radiation pattern, specifications, features and applications of following Antennas: Hertz antennas, Marconi antennas, V- Antenna	Day 32	R2(689-689) R2(707-708)	https://youtu.be/FhirfLrqTGE?list=PLgwJf8NK-2e7tzLIDL4aXUbtRFY3ykmkT	C1-C10	Students will be able to design antenna using various parameters.	5
33	33	6.2	Rhombic antenna, TW antennas, Loop antenna, Whip antenna	Day 33	R1(549-565) R2(710-716) R2(718-727, 749-750)	https://youtu.be/DHBvqFKEryA	C1-C10	Students will be aware about various antenna and it's usefulness.	5
34	34	6.3	Biconical antennas, Helical antennas, Horn antennas, Slot antennas	Day 34	R1(500-505) R2(781-785, 791-796) R1(739-805) R2(797-805)	https://nptel.ac.in/courses/108/101/108101092/	C1-C10	Students will be aware about various antenna and it's usefulness.	5
35	35	6.4	Microstrip antennas, Turnstile antennas, Super turnstile antennas, Lens antennas	Day 35	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 this antenna by using various software.	5
36	36	6.5	Antennas with parabolic reflectors	Day 36	R1(893-933) R2(829-830)	https://youtu.be/v3qDI5mWWuI	C1-C10, P3	Students will be aware about how the rays are reflected.	5

*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 II (Wave Propagation)	24/03/21	27/03/21	I, II
2	Unit III (Antenna Fundamentals)			III
3				

Content Beyond Syllabus Topic – Planned			
Sr. No.	**Content Beyond Syllabus Topic**	**Date Given**	**Mapped with CO's not covered in TP**
1	Use of Virtual Lab		3,5,6
2			

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
R1	Antenna Theory - Analysis and Design	C. A. Balanis	John Wiley	3rd / 2014
R2	Antenna & Wave Propagation	K. D. Prasad	Satya Prakashan, New Delhi	3rd / 2015
R3	Antenna & Wave Propagation	John D Kraus	McGraw Hill	4th / 2010
R4	Antenna & Wave Propagation	John D Kraus, Ronald J Marhefka, Ahmad S Khan	McGraw Hill Companies	3rd Edition
R5	Wireless Communications and Networking	Vijay K Garg	Morgan Kaufmann	Imprint of Elsevier, 2008.

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R6	Elements of Electromagnetics	Mathew N O Sadiku	Oxford University Press	3rd Edition

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Integrative Solutions Pvt Ltd.	http://www.integrativeindia.com/	The company is focused to become leading manufacturers of RF and Microwave Products. Ever-expanding product range and commitment to deliver quality has placed integrative in the favored list of telecom industry.
C2	India Network Solutions	https://www.indianetworksolutions.co.in/	India Network Solutions, are one of the leading Manufacturer, Supplier, Distributor, Wholesaler, Service Provider and Importer. of a qualitative range of world-class Air Fiber Antenna, Video Camera, Air Max Antenna, Ubiquiti Rocket Dish, Tough Switch, Ubiquiti UniFi, Edge Router, Air Grid, Rocket Airmax, Nano Beam, Nano Station etc.
C3	OMEGA ELECTRONICS	http://www.omegaelectronics.net/	Omega is the pioneer and leader in World Didac market with more than 1800 products in its portfolio. Exhaustive range includes Antenna Trainers, GPS Trainer, Radar Trainer, RFID Trainer, Instrumentation Trainers, Communication Trainers, LAN Trainer, VLSI Trainers, Microprocessor, Microcontroller & Interfaces Trainers, Consumer Electronics Demonstration Trainers, Test and Measuring Instruments, Microwave Test Benches.
C4	Spectrum Antenna & Avionics Systems (P) Ltd.	http://spectrumantennas.com/	Spectrum Antenna provides unique solutions for a broad range of needs with antenna and systems for airborne applications. Spectrum could act as a design & manufacturing hub for standard & customized products.
C5	Verdant Telemetry & Antenna Systems Pvt Ltd	http://www.verdanttelemetry.com/	Verdant has an in-house facility for design, manufacture & testing, constructed with a focus on RF as well as on Composites, to enhance efficiency in product development and production. The RF & Composites divisions of the facility stretch across a building designed to maximise collaboration between teams, and contains co-located spaces for fabrication and integration with a view to minimise the time taken in repeated design-build-test cycles.
C6	Twin Antenna	http://www.twinantennas.com/	Twin Engineers has developed as highly reputed manufacturer and exporter of varieties of world-class antennas under brand name of "Twin antennas" for Telecom, WIFI, 4G LTE,

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			WIMAX, wireless automation & broadcast applications.
C7	Lambdoid Wireless Communication	http://www.lambdoid.net/	Lambdoid Wireless Communications, founded in 2008 by highly innovative team is an Indian privately owned hardware Technology Company based in Bangalore, India, that designs, manufactures and supports RF & Solar products. The company is a fast growing technological corporation in India and look forward to have a global brand shortly.
C8	HTL Ltd.	http://www.htlchennai.com	HTL has been into digital switching, transmission, data and access products. Forte areas include small / medium / large telephone exchanges with indigenous C-DOT technology, large switching exchange with Siemen's know-how, Main Distribution Frames and Line Jack Units.
C9	e-Wave Networks	http://e-wavenetworks.com	e-Wave Networks was primarily engaged in the Telecom installations and operations support for fixed and Wireless operators. It was inspired to diversify into RF services & in building solutions to Wireless providers. Now beyond these services, it has expanded to cover Turnkey solutions, RF Planning and Optimization, Network Performance Services, Switch Planning, IP Planning and Project management.
C10	Zenusgroup	http://zenusgroup.in	ZENUS-GROUP offers quality services for BTS installation & Commissioning and Microware installation & Commissioning. BTS Installation & Commissioning BTS Installation activities are carried out according to site specific installation plan and includes: Installation and termination of radio feeder cables, antennas.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	On wave equation: review and recent results	Salim A. Messaoudi ·Ala A. Talahmeh	Arabian Journal of Mathematics	DOI 10.1007/s40065-017-0190-4	1-Nov-17
P2	Design of a parabolic reflector antenna with a compact splash-plate feed	Chuan Liu ; Shiwen Yang ; ZaipingNie	IEEE	10.1109/CSQRWC.2013.6657398	21-25 July 2013

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P3	A New Type of Turnstile Antenna	Ivana Radnović ; AleksandarNešić ; BratislavMilovanović	IEEE	10.1109/MAP.2010.5687522	Oct. 2010
P4	Atmospheric structures in the troposphere as revealed by high-resolution backscatter images from MU radar operating in range-imaging mode	Lakshmi Kantha, Hubert Luce, Hiroyuki Hashiguchi	Springer	Open Access	29-Mar-19
P5	Antenna Array Synthesis with Dolph-Chebyshev Method	N. Fadlallah1 ,L.Gargouri2, A. Hammami2, R.Ghayoula2, A.Gharsallah2 and B. Granado	11TH MEDITERRANEAN MICROWAVE SYMPOSIUM		Sep-11
P6	Biconical Linear Array Analysis For Non-Uniform Amplitude Excitation Methods	C. Subba Rao1 and A. Sudhakar2	ARPN Journal of Engineering and Applied Sciences	ISSN 1819-6608	Apr-11
P7	Radiation Pattern for Broad Side Array and End Fire Array Antennas	H. Gangadhar	International Journal of New Technologies in Science and Engineering	ISSN 2349-0780	2018
P8	Theory and Applications of Infinitesimal Dipole Models for Computational Electromagnetics	Said M. Mikki and Ahmed A. Kishk	IEEE Transactions on Antennas and Propagation	Open Access	June 2007
P9	Comparative Analysis of Circuit and Finite Element Models for a Linear Wire Dipole Antenna	Sanjeev Kumar, John L. Buckley, Adolfo Di Serio, Brendan O'Flynn	Irish Signals and Systems Conference	Open Access	June 2018
P10	Four Poynting theorems	Paul Kinsler,AlbertoFavaro, and Martin W. McCall	European Journal of Physics	10.1088/0143-0807/30/5/007	Aug-09
P11	Horn Antenna Design: The Concepts And Considerations	LanreDaniyan Opara F.E. Okere B. I.	International Journal of Emerging Technology and Advanced	ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 4, Issue 5	May 2014

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			Engineering		
P12	The Radiation Problem from a Vertical Hertzian Dipole Antenna above Flat and Lossy Ground: Novel Formulation in the Spectral Domain with Closed-Form Analytical Solution in the High Frequency Regime	K. Ioannidi,[1] Ch. Christakis,[1] S. Sautbekov,[2]	International Journal of Antennas and Propagation	Volume 2014 |ArticleID 989348 | https://doi.org/10.1155/2014/989348	2014
P13	Compact Multielement Marconi–Franklin Type Printed Antennas for Millimeter Wireless Systems	George Mitropoulos Nikolaos Uzunoglu	IEEE Transactions on Antennas and Propagation 54(6):16 18 – 1623	DOI: 10.1109/TAP.2006.875519	July-2006
P14	A study on V-shaped microstrip patch MIMO antenna	C.M. Thomas H. A. Majid Zuhairiah Zainal Abidin	Research gate	DOI: 10.11591/ijeecs.v5.i3.pp606-611	March-2017
P15	Combination Of Log-Periodic And Rhombic Antenna For Bandwidth Improvement	W.R.W Abdullah S.I.s. Hassan	Research gate		Dec.-2002
P16	Design of microstrip TV antenna for in-campus digital broadcast system at 479 MHz	Jennifer C. Dela Cruz ; Alejandro H. Ballado ; Flordeliza L. Valiente ;	2016 IEEE Region 10 Conference (TENCON)	**DOI:** 10.1109/TENCON.2016.7848279	2016
P17	Theory of Antennas, Its Advantage & Applications in Communication Systems	1Dr. Sumit Kumar Gupta, 2Harish Kumar Jangam, 3Nipun Sharma	International Journal of Engineering Development and Research	Volume 6, Issue 1 | ISSN: 2321-9939	2018
P18	An overview of helix antenna and its design	Tariq Rahim	Research gate		Feb.-2015
P19	Helical Antenna Performance in Wideband Communications	Maja Sekelja Zoran Blazevic Marino Maslac	Conference: Software, Telecommunications and Computer Networks, 2008.	DOI: 10.1109/SOFTCOM.2008.4669445	Oct-2008

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P20	STUDY AND DESIGN OF A LOOP ANTENNA FOR MEDICAL TELEMETRY APPLICATION	Mohamed Salah KAROUI GharianiHamadi MounirSamet	Conference: Third International Conference on Systems, Signals & Devices, SSD05 At: Sousse, Tunisia Volume: 4	DOI: 10.13140/2.1.4004.9929	March 2005
P21	Analysis of Vertical Loop Antenna and Its Wide and Flat Variant Performance in Wearable Use	Markus Berg , (Member, Ieee), Jiangcheng Chen, (Student Member, Ieee), And AarnoPärssinen, (Senior Member, Ieee)	IEEE Access		April 9, 2018
P22	A broadband VHF/UHF double-whip antenna	Xiao Ding Bing-Zhong Wang Guang-Ding Ge Duo Wang	IEEE Transactions on Antennas and Propagation	DOI: 10.1109/TAP.2011.2173141	Feb.-2012
P23	A Survey Paper on Slot Antenna	Manivasagam Srinivasan and 2Sridevi Annadurai	International Journal of Trend in Research and Development,	Volume 4(1), ISSN: 2394-9333	Feb.-2017
P24	Design and Analysis of Microstrip Patch Antenna for Wireless Communication	Ranjan Mishra, Raj Gaurav Mishra, R. K. Chaurasia, Amit Kumar Shrivastava	International Journal of Innovative Technology and Exploring Engineering (IJITEE)	ISSN: 2278-3075, Volume-8 Issue-7	May, 2019
P25	Rectangular Microstrip Patch Antenna at ISM Band	SalaiThillaiThilagam J. ; Ganesh Babu T.R	IEEE, 2018 Second International Conference on Computing Methodologies and Communication (ICCMC)		

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Prof. Shyam D. Bawankar
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Department of Electronics and Telecommunication Engineering

"Rectifying Ideas, Amplifying Knowledge"

2020-21 (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. Gayatri Bhoyar	**Subject Code :**BTEXPE704C	
Subject : Fiber Optic Communication	**Section :**EN	
Periods per Week (each 60 min)	**Lecture**	**3**
	Tutorial	**-**
	Practical	**2**

Course Objective	Course Outcomes
1. To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures. 2. To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors. 3. To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes 4. Understand the functionality of each of the components that comprise a fiber-optic communication system: transmitter, fiber, amplifier, and receiver. 5. Understand the properties of optical fiber that affect the performance of a communication link. 6. Understand basic optical amplifier operation and its effect on signal power and noise in the system. 7. Apply concepts listed above to the design of a basic communication link.	1.**Illustrate** light propagation in optical fibers based on fundamental characteristics of fiber. 2. **Demonstrate** the basic concept of degradation, fabrication and measurement techniques employed in fibers. 3. **Apply** the knowledge of different models of light for the concept of optical fiber analysis. 4. **Analyze** the performance of different optical amplifiers and integrated optical devices 5. **Select** electronic components for Optical link designand **Estimate** different types of losses. 6. **Design** Optical fiber link and optical networks.

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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	Introduction to vector nature of light ,propagation of light	Day 1	T1(30-33) T2(65-66)	https://nptel.ac.in/content/storage2/courses/117101002/downloads/Lec02.pdf/	C1-C15	Students will be able to understand the vector nature of light and explain refraction , reflection and the working principle of propagation of light.	CO1
2	2	2	propagation of light in a cylindrical dielectric rod	Day 2	T2(66-71)	https://nptel.ac.in/content/storage2/courses/117101054/downloads/lect2.pdf	C1-C15	Students will be able to demonstrate the propagation of light in a cylindrical dielectric rod	CO1
3	3	3	propagation of light in a cylindrical dielectric rod	Day 3	T1(45-46)	https://nptel.ac.in/content/storage2/courses/117101054/downloads/lect2.pdf	C1-C15	Students will be able to demonstrate the propagation of light in a cylindrical dielectric rod	CO1
4	4	4	Ray model of light	Day 4	T2(68-71)	https://nptel.ac.in/courses/117/101/117101002/ Lecture 3	C1-C15	Students will be able to analyze Ray model of Light	CO1, CO3
5	5	5	Wave model of light	Day 5	T2(75-81)	https://nptel.ac.in/courses/117/101/117101002/ Lecture 5	C1-C15	Students will be able to analyze Wave model of Light	CO1, CO3
6	6	6	Wave model of light	Day 6	T2(83-91)	https://nptel.ac.in/courses/117/101/117101002/ Lecture 6	C1-C15	Students will be able to analyze Wave model of Light	CO1, CO3
Unit II – Types of Optical fibers									
7	7	7	Different types of optical fibers	Day 7	T1(41-42)	https://nptel.ac.in/content/storage2/courses/117101054/downloads/lect2.pdf	C1-C15	Students will be able to classify different types of optical fibers	CO1, CO2,CO3
8	8	8	Modal analysis of a step index fiber	Day 8	T2(43-45)	http://www.digimat.in/nptel/courses/video/1081	C1-C15	Students will be able to perform modal	CO1, CO2,CO3

						04113/L18.html		analysis of step index fiber.	
9	9	9	Modal analysis of a step index fiber	Day 9	T2(43-45)	http://www.digimat.in/nptel/courses/video/108104113/L18.html	C1-C15	Students will be able to perform modal analysis of step index fiber.	CO1, CO2,CO3
10	10	10	Signal degradation on optical fiber due to dispersion	Day 10	T1(91-109)	https://www.youtube.com/watch?v=BGUhTDWkwx8	C1-C15	Students will be able to analyze fiber degradation mechanisms like dispersion	CO1, CO2,CO3
11	11	11	Signal degradation on optical fiber due to attenuation	Day 11	T1(91-109)	https://nptel.ac.in/courses/117/101/117101002/	C1-C15	Students will be able to analyze fiber degradation mechanisms like attenuation	CO1, CO2,CO3
12	12	12	Fabrication of fibers	Day 12	T2(170-182)	https://www.youtube.com/watch?v=aEkF-Or5xGc	C1-C15	Students will be able to understand different fiber fabrication methods	CO1, CO2,CO3
13	13	13	Fabrication of fibers	Day 13	T2(170-182)	https://www.youtube.com/watch?v=aEkF-Or5xGc	C1-C15	Students will be able to understand different fiber fabrication methods	CO1, CO2,CO3
14	14	14	Measurement techniques like OTDR	Day 14	T2(952-954)	https://nptel.ac.in/content/storage2/courses/117101002/downloads/Lec11.pdf	C1-C15	Students will be able to analyze fiber measurements techniques like OTDR	CO1, CO2,CO3
Unit III – Optical Sources									
15	15	15	LEDs	Day 15	T1(140-145)	https://www.youtube.com/watch?v=Yk57t0VDTg8	C1-C15	Students will be able to Explain the working principle of LED	CO4, CO5
16	16	16	Lasers	Day 16	T1(152-157)	https://www.youtube.com/watch?time_continue=1&v=YvrwVK9ZqQY&feature=emb_logo	C1-C15	Students will be able to Explain the working principle of Laser and Classify optical sources	CO4, CO5
17	17	17	Photo-detectors - pin-diodes, APDs	Day 17	T2(456-457&470-472)	https://www.youtube.com/watch?v=1X2Xt7wlcbA	C1-C15	Students will be able to Classify optical	CO4, CO5

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								detectors	
18	18	18	Detector responsivity, noise	Day 18	T2(451-452)	https://www.youtube.com/watch?v=Y-dbh5UdNqk	C1-C15	Students will be able to explain detector responsivity and different noises in detectors	CO4, CO5
19	19	19	Optical receivers	Day 19	T1(249-253)	https://www.youtube.com/watch?v=mvmFHZO58nA	C1-C15	Stuents will be able to analyze optical receiver circuit	CO4, CO5, CO6
20	20	20	Optical link design	Day 20	T1(284-286)	https://www.youtube.com/watch?v=15WulWvjWEg	C1-C15	Students will be able to design optical Fiber link	CO4, CO5, CO6
21	21	21	BER calculation, quantum limit, power penalties.	Day 21	T1(255-262,293)	https://www.youtube.com/watch?v=9oYuk66fjiY	C1-C15	Students will be able to calculate BER, Quantum Limit and Power Penalties	CO4, CO5, CO6
Unit IV – Optical switches									
22	22	22	Coupled mode analysis of directional couplers	Day 22	T1(346-348)	https://nptel.ac.in/content/storage2/courses/117101002/downloads/Lec29.pdf	C1-C15	Students will be able to perform coupled mode analysis of directional couplers	CO4, CO5
23	23	23	Coupled mode analysis of directional couplers	Day 23	T2(668-672)	https://nptel.ac.in/content/storage2/courses/117101002/downloads/Lec29.pdf	C1-C15	Students will be able to perform coupled mode analysis of directional couplers	CO4, CO5
24	24	24	Electro-optic switches.	Day 24	T2(667-679)	https://www.youtube.com/watch?v=fXEA1NRDrrU	C1-C15	Students will be able to study different electro optical switches	CO4, CO5
25	25	25	Coupled mode analysis of directional couplers	Day 25	T1(346-348)	https://nptel.ac.in/content/storage2/courses/117101002/downloads/Lec29.pdf	C1-C15	Students will be able to perform coupled mode analysis of directional couplers	CO4, CO5
Unit V – Optical Amplifiers									

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26	26	26	EDFA	Day 26	T1 -400-401	https://www.youtube.com/watch?v=dsBbqp2skLA&feature=emb_logo		Students will be able to Explain the working principle of EDFA	CO4, CO5
27	27	27	Raman amplifier	Day 27	T1(418-419)	https://www.youtube.com/watch?v=iYscyYD0R9w&feature=emb_logo		Students will be able to analyze and Classify different optical amplifiers	CO4, CO5
28	28	28	WDM Systems	Day 28	T1(341-345),T2(771-773)	https://nptel.ac.in/content/storage2/courses/117101054/downloads/lect19.1.pdf		Students will be able to demonstrate WDM Systems	CO4, CO5
29	29	29	DWDM systems	Day 29	P5	https://www.youtube.com/watch?v=Yt1eCuIPhOM	C1-C15	Students will be able to explain DWDM Systems	CO4, CO5
30	30	30	Principles of WDM networks	Day 30	T2(976-978)	https://nptel.ac.in/content/storage2/courses/117101054/downloads/lect20.pdf	C1-C15	Students will be able to design different WDM networks	CO4, CO5
Unit VI – Nonlinear Effects in fiber optic links									
31	31	31	Nonlinear effects in fiber optic links	Day 31	T1(428-431)	https://nptel.ac.in/content/storage2/courses/117101054/downloads/lect23.pdf	C1-C15	Students will be able to analyze different nonlinear effects in fibe optic links	CO4, CO5
32	32	32	Nonlinear effects in fiber optic links	Day 32	T1(432-435)	https://nptel.ac.in/content/storage2/courses/117101054/downloads/lect23.pdf	C1-C15	Students will be able to analyze different nonlinear effects in fibe optic links	CO4, CO5
33	33	33	Concept of self-phase modulation	Day 33	T1 (435-437)	https://www.youtube.com/watch?v=4bPYAYiXJCc	C1-C15	Students will be able to understand the concept of Self phase modulation	CO4, CO5
34	34	34	Group velocity Dispersion	Day 34	R4(51-76)	https://www.youtube.com/watch?v=DbbFUM4asKA&feature=emb_logo	C1-C15	Students will be able to illustrate the GVD Phenomenon	CO4
35	35	35	Group velocity Dispersion	Day 35	R4(51-76)	https://www.youtube.com/watch?v=DbbFUM4asKA&feature=emb_logo	C1-C15	Students will be able to illustrate the GVD Phenomenon	CO4
36	36	36	Solition based communication	Day 36	T1(442-444) R5(411-416)	https://nptel.ac.in/content/storage2/courses/117	C1-C15	Students will be able to understand	CO4

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						101054/downloads/lect 23.pdf		soliton based communication	

*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

Tutorial Plan

Week	Topic	No. Of Problems	Mapped With CO
1			

Assignment Plan

Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1				
2				
3				
4				

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	Synchronous Optical Networks (SONET)		CO 4 ,CO 6
2	Multiplexing techniques in fiber-optic communications		CO 4 ,CO 6

Principal

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Fibre Optic communication	Gerd Keiser	McGraw-Hill	5th Ed. 2013 (Indian

				Edition)
T2	Optical Fiber Communications, Principles and Practices	J. M. Senior	Pearson Education	3rd Edition, 2010
Reference Books				
R1	Integrated optics	T. Tamir	Topics in Applied Physics Vol.7 Springer-Verlag, .	1975
R2	Optical communication systems	J. Gowar	Prentice Hall India	1987
R3	Optical fibres telecommunications	S.E. Miller and A.G. Chynoweth	Academic Press	1979
R4	Nonlinear fibre optics	G. Agrawal	Academic Press	2nd Ed. 1994
R5	Fiber optic Communication Systems	G. Agrawal	John Wiley and sons, New York	Third Edition, 2002

Company/Industry:

Code	Company / Industry Name	Website	Detailed Information
C1	OFS	www.ofsoptics.com	OFS is a world-leading designer, manufacturer and provider of optical fiber, optical fiber cable, connectivity, FTTx and specialty photonics solutions.
C2	HFCL	www.hfcl.com	The company specializes in manufacturing of telecommunication equipments, optical cables and intelligent power systems.
C3	Corning Technologies India Private Limited	https://www.corning.com/in/en.html	Optical fiber Manufacturing Company .It has been a leader in the field since inventing low-loss optical fiber 40 years ago. With 16.3% of market share, it continues to lead the industry.
C4	Mouser Electronics, Inc.	www.mouser.com	The company offers fiber optic cables and cable assemblies, as well as switches, connectors, transmitters, development tools, receivers, and transceivers.
C5	Colonial Teltek	www.colonialteltek.com	Distributor of underground communication and aerial hardware, bridge support, and cabling products. Offers conduits, fiber optic cables, racks, cable lashers, and cleaners. Serves the outside plant, telecommunications, and utility industries.
C6	Robeck fluid power company	www.robeckfluidpower.com	The company offers fiber optics products for automation applications. Additionally, it offers pneumatics, hydraulics, electronics, fabrication, fluid conveyance, and aluminum structural framing products.
C7	Leoni Fiber Optics	https://www.leoni-americas.com/us/	It offers fiber optic raw materials, fibers, cables, assemblies, optical components, and accessories. Its other offerings include vehicle, electrical appliance,

Principal

			infrastructure, enterprise data solution, factory automation and robotics, and healthcare cable and wire products.
C8	Mc Pherson	http://www.mcphersoninc.com/	The company specializes in scientific instruments, including specialty fiber optic assemblies and adapters. Fiber optic assemblies include single fiber, multiple fiber, random, coherent, bifurcated, and circular to rectangular bundles, as well as liquid light guides.
C9	Fujikura	https://www.fujikura.com/	The Company provides materials to the power & telecommunication industry, electronic and automotive manufacturers, and also manages real estate in Japan.
C10	ZTT	https://www.ztt.com/	ZTT is the ninth largest fiber optic cable supplier, established in 1992. It is publicly traded on the Shanghai Stock Exchange, and produces nearly 100 series and over 1,000 varieties of fiber optic communication and power transmission products.
C11	Sumitomo Electric	http://www.sumitomoelectricusa.com/	It manufactures advanced materials used in automotive manufacturing and the energy industry, such as rubber and steel, in addition to fiber optics for telecommunications.
C12	Prysmian	https://na.prysmiangroup.com/	It provides cable to energy and telecommunication companies worldwide. It is a union of Prysmian, Draka, and General Cable.
C13	Futong	www.futonggroup.com/	It is a global vendor of basic internet materials and leading in optical fiber and cable industry in China, with 30 factories and a total of 12,200 employees worldwide. Its main products are optical fiber preform, optical fiber, optical cable, and end-use fiber optic products such as broadband access equipment and high temperature superconductor cable.
C14	Furukawa Electric	http://www.furukawaelectric.us/	Furukuwa manufactures mining equipment and advanced materials, including fiber optic cable.
C15	Fiber optics system Inc	https://www.fiberopticsystems.com/	It offers custom fiber optic assemblies for medical, industrial, spectrometry, and test and measurement applications. The company also offers bulk fiber, converters, light sources, and lights.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	A comprehensive study of linear and non-linear optical properties of novel charge transfer molecular systems	B.A Sriyanka Mendis	Journal of Molecular Structure: THEOCHEM	https://doi.org/10.1016/j.theochem.2004.02.027	Volume 678, Issues 1–3, June 2004, Pages 31-38
P2	Optical Fiber Communications Link Design	James P Wittke	19th Annual technical symposium	https://doi.org/10.1117/12.954472	Proceedings Volume-0063
P3	Evolution of WDM optical networks	A.Mrincic	5th International Conference on Telecommunications in Modern Satellite, Cable and Broadcasting Service. TELSIKS 2001.	https://doi.org/10.1109/TELSKS.2001.955822	Volume 2, 19-21 Sept. 2001
P4	Analysis of WDM system using DCF	J.Karunya	2017 Fourth International Conference on Signal Processing, Communication and Networking (ICSCN)	https://doi.org/10.1109/ICSCN.2017.8085726	16-18 March 2017
P5	DWDM: shaping the future communications network	S.V.Kartalopoulos	IEEE Potentials Journal	https://doi.org/10.1109/MP.2004.1343224	Volume: 23 , Issue: 4 , Oct.-Nov. 2004
P6	Quality factor improvement of self-phase modulation induced optical transmission system	Sonveer Yadav	2016 International Conference on Communication and Signal Processing (ICCSP)	https://doi.org/10.1109/ICCSP.2016.7754182	6-8 April 2016
P7	Self-Phase Modulation in Semiconductor Optical Amplifiers: Impact of Amplified Spontaneous Emission	Prashant P. Baveja	IEEE Journal of Quantum Electronics	https://doi.org/10.1109/JQE.2010.2048743	Volume: 46 , Issue: 9 , Sept. 2010
P8	Self-Phase-Modulation of Optical Beams-The Formative Years	T.K.Gustafson	2007 Conference on Lasers and Electro-Optics (CLEO)	https://doi.org/10.1109/CLEO.2007.4453558	6-11 May 2007
P9	High-speed photodiode and optical receiver technologies	Atsushi Wakatsuki	2009 Conference on Optical Fiber Communication	https://doi.org/10.1364/OFC.2009.OMK1	https://doi.org/10.1364/OFC.2009.OMK1
P10	High Speed Energy Efficient Optical Receiver	Yuan Sheng Lee	2018 IEEE International Conference on Electron Devices and Solid State Circuits (EDSSC)	https://doi.org/10.1109/EDSSC.2018.848712	https://doi.org/10.1109/EDSSC.2018.8487[illegible]
P11	Performance of optical receivers using photodetectors with different fields of view in an indoor cellular	Cuiwei He	2015 International Telecommunication Networks and Applications Conference (ITNAC)	https://doi.org/10.1109/ATNAC.2015.736679	18-20 Nov. 2015

	communication system				
P12	Analysis of signal-to-noise ratio in optical receivers	Z.Bielecki	6th International Conference on Telecommunications in Modern Satellite, Cable and Broadcasting Service, 2003. TELSIKS 2003.	https://doi.org/10.1109/TELSKS.2003.1246187	1-3 Oct. 2003
P13	Fiber-optic communication — An overview	Otto Strobel	20th International Crimean Conference "Microwave & Telecommunication Technology"	https://doi.org/10.1109/CRMICO.2010.5632426	13-17 Sept. 2010
P14	Impact of different noise sources on the performance of PIN- and APD-based FSO receivers	Fang Xu	Proceedings of the 11th International Conference on Telecommunications	INSPEC Accession Number: 12144353	INSPEC Accession Number: 12144353
P15	Recent Advances in Avalanche Photodiodes	Joe C.Campbell	Journal of Lightwave Technology	https://doi.org/10.1109/JLT.2015.2453092	https://doi.org/10.1109/JLT.2015.2453092
P16	InGaAs Communication Photodiodes: From Low- to High-Power-Level Designs	M. Achouche	IEEE Photonics Journal	DOI: 10.1109/JPHOT.2010.2050056 DOI: 10.1109/JPHOT.2010.2050056	DOI: 10.1109/JPHOT.2010.2050056 DOI: 10.1109/JPHOT.2010.2050056
P17	Measurement of pulse dispersion in optical fiber communication system	Farhana Nahar	2016, 5th International Conference on Informatics, Electronics and Vision (ICIEV)	https://doi.org/10.1109/ICIEV.2016.7760163	https://doi.org/10.1109/ICIEV.2016.7760163
P18	Comparative Analysis of Dispersion Compensating Fiber in DWDM System Using 10 Gbps and 40 Gbps Bit Rate	Fauza Khair	2018 10th International Conference on Information Technology and Electrical Engineering (ICITEE)	https://doi.org/10.1109/ICITEED.2018.8534851	https://doi.org/10.1109/ICITEED.2018.8534851
P19	The First 0.14-dB/km Loss Optical Fiber and its Impact on Submarine Transmission	Yoshiaki Tamura	Journal Of Lightwave Technology	10.1109/JLT.2018.2796647	, VOL. 36, NO. 1, JANUARY 1, 2018
P20	A review paper on fiber-optic sensors and application of PDMS materials for enhanced performance	Othman Sidek	2011 IEEE Symposium on Business, Engineering and Industrial Applications (ISBEIA)	https://doi.org/10.1109/ISBEIA.2011.6088858	https://doi.org/10.1109/ISBEIA.2011.6088858

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2020-21 (Odd Sem)

VISION	MISSION
To be a recognized as an Excellent Innovative Engineering Department through Academic Programme which develops leaders in Education and Research in Computer Science."	1. To create self-learning environment by facilitating leadership qualities, team-spirit and ethical responsibilities. 2. To Strengthen department-industry collaboration and 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 INFORMATION TECHNOLOGY	**Year/Semester :** 5th Semester (3rd Year)	
Name of the Teacher : Prof. Madhuri M.Pal	**Subject Code :**IT501	
Subject : Database Management Systems	**Section :**	
Periods per Week (each 60 min)	**Lecture**	**3**
	Tutorial	**1**
	Practical	**2**

Course Objective	Course Outcomes
1. Eliminate redundant data. 2. Make access to the data easy for the user. 3. Provide for mass storage of relevant data. 4 . Make the latest modifications to the data base available immediately 5. Protect the data from physical harm and un- authorized systems 6. Allow for multiple users to be active at one time	After learning the course the students should be able: CO1: To explain need of database management. CO2: To design and implement a database schema for a given problem-domain CO3: To normalize a database CO4: To create and query a database using SQL DML/DDL commands, stored procedures and functions. CO5: To declare and enforce integrity constraints on a database CO6: To illustrate understanding of indexing methods

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

					(Page no)		(R&D/ Industry)		
UNIT-I Basic Concepts DBMS									
1	1	1	**Unit I** Introduction: Basic concepts DBMS	Day 1	T1 Pg: 21	Video:https://www.youtube.com/watch?v=_f_Pu7t9eP8	P1,P2	Students should able to understand and Execute basic DBMS Student will also be able to Understand basic database concepts, including the structure and operation of the relational data model.	CO1
2	2	2	Advantages of DBMS over file-processing systems	Day 2	T1 Pg:21	https://www.youtube.com/watch?v=7LL70V1509o	P1,P2		CO1
3	3	3	Data models	Day 3	T1 Pg:24				CO1,CO2
4	4	4	Data abstraction and data independence	Day 4	T1Pg: 33				CO1
5	5	5	Components of DBMS and overall structure of DBMS	Day 5	T2 pg:33,57	https://www.youtube.com/watch?v=PIPiv6gn_Ls	P1		CO1,CO2
6	6	6	Data modeling	Day 6	T1 Pg:33-59		P1		CO1
7	7	7	Entity, Attributes, Relationships, Constraints method	Day 7	T1 pg: 811	https://www.youtube.com/watch?v=mhQvmjqM1i8	C1-C10	Understand the concept of a database transaction and related database facilities, including concurrency control, journaling, backup and recovery, and data object locking and protocols	CO1
8	8	8	Keys E-R diagrams, Components of E-R Model.	Day 8	T1Pg:36-57, 80-92		P1,P5,P7	Understand and successfully apply logical database design principles, including E-R diagrams and database normalization.;	CO1,CO2
9	9	9	Example Of ER Diagram	Day 9	T1Pg:36-57, 80-92			Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.	CO1,CO2

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10	10	10	Example Of ER Diagram	Day 10	T1Pg:36-57, 80-92				C02
11	11	11	Revision of Unit 1	Day 11			P2	able to correctly use quantifiers also in everyday language	
UNIT-II Basic concepts, Attributes and domains									
12	12	12	Model:Basic concepts, Attributes and domains	Day 12	T1 Pg: 257	https://www.youtube.com/watch?v=1CFUTFuyELo	P2	Create changes in program flow using control structures. Modularize program construction and increase code re-use using functions	CO2,CO5
13	13	13	Concept of integrity and referential constraints	Day 13	T1 Pg: 260	https://www.youtube.com/watch?v=cJg2AuSFdjw			CO2,CO5
14	14	14	Schema diagram	Day 14	T1-138 T1-156 T2-232				CO2,„CO3CO5
15	15	15	Relational query languages	Day 15	T2-201	https://www.youtube.com/watch?v=xPr7YFSnmiQ	P5		CO2,CO4,CO5
16	16	16	Relational Algebra	Day 16	T1 pg-339		P8		CO2,CO4,CO5
17	17	17	Example	Day17	T2-201				CO2,CO4,CO5
18	18	18	Relational Calculus	Day 18	T1 Pg.339	https://www.youtube.com/watch?v=ajJD0Df5CsY	P8		CO2,CO4,CO5
19	19	19	Example	Day19					CO2,CO4,CO5
20	20	20	Tuple relational and domain relational calculus.	Day20	T1 Pg.340	https://www.youtube.com/watch?v=ajJD0Df5CsY			CO2,CO4,CO5
21	21	21	Example	Day21		https://www.youtube.com/watch?v=4lcH3ZDKB5E			CO2,CO4,CO5
22	22	22	Revision of Unit II	Day22				Design and implement a small database project using MicrosoftAccess.	
UNIT-III Structured Query Language									

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23	23	23	**UNIT III** Structured Query Language-I: Introduction Characteristics and advantages	Day 23	T1 Pg:65	https://www.youtube.com/watch?v=nubRIbAF9cU	P3,P6	1. onstruct simple and moderately advanced database queries using Structured Query Language (SQL). 2.Create changes in program flow using control structures.	CO2
24	24	24	Data types and literals	Day 24	T1 Pg: 66	https://www.youtube.com/watch?v=g2laiylO1wY	P4		CO2,CO4,CO5
25	25	25	DDL Example	Day 25	T1 Pg: 67	https://www.youtube.com/watch?v=g2laiylO1wY	P5,P6		CO2,CO4,CO5
26	26	26	modifying, deleting, Views	Day 26	T1-65-66		P4,P6		CO2,CO4,CO5
27	27	27	dropping, Updation using views	Day 27	T1 Pg:64,73				CO2,CO4,CO5
28	28	28	DML Function	Day 28	T1 Pg:73	https://www.youtube.com/watch?v=nubRIbAF9cU			CO2,CO4,CO5
29	29	29	SQL DML queries	Day 29	Pg.83,85		P6		CO2,CO4,CO5
30	30	30	Example	Day 30	Pg.83				CO2,CO4,CO5
31	31	31	SELECT query and clauses	Day 31	Pg.90	https://www.youtube.com/watch?v=nepPkXUn-Mc		Demonstrate the use of interpolation methods to find intermediate values in given graphical and/or tabulated data.	CO2,CO4,CO5
32	32	32	Example	Day 32					CO2,CO4,CO5
33	33	33	Revision of Unit III	Day 33					
UNIT-IV Set operations, Predicates and Ordering of tuples									
34	34	34	Aggregate functions	Day 34	T1 Pg:200	https://www.youtube.com/watch?v=96_ydBBLGlM	P6	Design programs using a top-down design methodology	CO1,CO2,CO4
35	35	35	Example Of Aggregate functions	Day 35	T1 Pg: 198	https://www.youtube.com/watch?v=bK1gf1n7geM	P1		CO1,CO2,CO4,CO5
36	36	36	Nested queries	Day 36	T1 Pg:201	https://www.youtube.com/watch?v=HRXQ51BSjVk	P1		CO2,CO4,CO5
37	37	37	Database modification using SQL Insert, Update and Delete queries	Day 37	T1 Pg: 201	https://www.youtube.com/watch?v=bt_My4BtZTI	P1,P2		CO1
38	38	38	Example	Day 38					

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39	39	39	Dynamic and embedded SQL	Day 39	T1 Pg:204		P1,P2		CO1 ,CO2,CO4,CO5
40	40	40	concept of stored procedures	Day 40	T1 Pg:204	https://www.youtube.com/watch?v=bt_My4BtZTI	**P1**		
41	41	41	Query-by-example	Day 41					
UNIT-V Functional dependency, Decomposition									
42	42	42	Functional dependency, Decomposition	Day 42	T1 Pg:296	https://www.youtube.com/watch?v=lU9bGrIkqSw	P7		CO3,CO4
43	43	43	properties of decomposition	Day 43	T1 Pg:300	https://www.khanacademy.org/math/ap-calculus-bc/bc-differential-equations-new/bc-7-5/v/eulers-method	P7	Improve the database design by normalization Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and hashing.	CO3,CO4
44	44	44	Normalization using functional dependency	Day 44	T1 Pg:296	https://www.youtube.com/watch?v=gr_J36P4RNs	P1,P7,P5		CO3,CO4
45	45	45	Example of 1nf,2,nf,3,nf etc	Day 45	T1 Pg:299				CO3,CO4
46	46	46	Multivalued dependency , join dependency	Day 46	Pg T1304 Pg:296-304 .,	https://www.youtube.com/watch?v=hGN54bkE8Ac	P7		CO3,CO4
47	47	47	Secondary storage	Day 47	TI Pg309	https://www.youtube.com/watch?v=ujXi29Mf83Q			CO1,CO4
48	48	48	RAID, File organization	Day 48	T1 Pg.311				CO3,CO4
49	49	49	Indices, Static and dynamic hashing	Day 49	T1 Pg309	https://www.youtube.com/watch?v=ujXi29Mf83Q			CO3,CO4
50	50	50	B-Trees	Day 50	TI Pg.634	https://www.khanacademy.org/math/differential-equations/second-order-differential-equations/linear-homogeneous-2nd-order/v/2nd-order-linear-homogeneous-differential-equations-1	P5		CO1,CO2
51	51	51	B+ Trees	Day 51	TI Pg.634				CO1,CO2
UNIT-VI Query Processing and Transaction Management									

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			UNIT-VI:Transaction concept						
52	52	52	Measures of query cost, Selection operation	Day 52	T1 Pg.799 -Pg 807	https://www.youtube.com/watch?v=rKN60UnVsMw	P5,P7	STUDENT UNDERSTAND and discuss selected advanced database topics, such as distributed database systems and the data warehouse Understand the role of the database administrator.	CO3
53	53	53	Sorting and join operation	Day 53					
54	54	54	Components of transaction management , Concurrency and recovery system	Day 54	T 1 Pg .835	https://www.youtube.com/watch?v=eYQwKi7P8MM Hindi https://www.youtube.com/watch?v=AB_Yhfx9ZYg	P5		CO2,CO4
55	55	55	Different concurrency control protocols such as timestamps and locking	Day 55	T 1 Pg .835	https://dbjpanda.me/dbms/fundamentals/transactions-and-concurrency-control	P5		CO1,CO2
56	56	56	Validation, Multiple granularity	Day 56	T 1 Pg .866	https://dbjpanda.me/dbms/fundamentals/transactions-and-concurrency-control	P5		CO6
57	57	57	Deadlock handling	Day 57	T 1 Pg .867	hindi https://www.youtube.com/watch?v=_zOTMOubT1M	P9		CO2,CO4
58	58	58	Different crash recovery methods such as log-based recovery	Day 58	T 1 Pg .912	https://www.youtube.com/watch?v=0_DnBLn3ngg	P9		CO2,CO4,CO5
59	59	59	Buffer management and Remote backup system	Day 59	T 1 Pg .926	https://www.youtube.com/watch?v=J-cL2tqM-6U	P9		CO2,CO4

*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: -59

Tutorial Plan

Week	Topic	No. Of Problems	Mapped with CO
1	Database modification using SQL Insert, Update and Delete queries Example	03	II

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2	Relational Calculus with example	02	I,III
3	SQL with example	04	IV
4	Draw the ER Diagram of Hospital ,Car Insurance and college management	03	V

Assignment Plan

Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1	Basic concepts DBMS	27/7/18	4/8/18	I
2	Relational query languages	16/8/18	19/8/18	II

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	Implementation of various queries using Database		I, II, III, IV, V, VI
2	Mini project college database		I, II, III

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Database system concepts	Abraham Silberschatz, Henry F. Korth, and S. Sudarshan	McGraw Hill Education	7th edition, , 2011.
T2	Fundamental Database Systems	Ramez Elmasri and Shamkant B. Navathe	PHI Publication.	7th edition, Pearson Education, 2015
R1	Database systems: Design implementation and management	Carlos Coronel, Steven Morris	McGraw Hill Publication	11th edition, Cengage Learning Press 2014

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R2	An Introduction to Numerical Methods and Analysis	Murach's MySQL	Shroff Publication	2nd Edition 2016

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Google	www.google.com	Search engine optimization purpose.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Database Management Systems: A NoSQL Analysis	Innocent Mapanga, Prudence Kadebu	Springer International Publishing Switzerland 2015 S. Kozielski et al. (Eds.):. 136–146, 2015.	DOI: 10.1007/978-3-319-18422-7_12	BDAS 2015, CCIS 521, pp
P2	THE ROLE OF DATABASE MANAGEMENT SYSTEMS FOR INVESTIGATIVE DATA	Gary D. Anderson, MCMaster University	https://support.sas.com/resources/papers/proceedings-archive/SUGI82/Sugi-82-69%20Anderson.pdf IEEE Transactions on Power Systems	30(6):1-12 · December 2014 10.1109/TPWRS.2014.2376935	VOL. 30, NO. 6
P3	The Database Normalization Theory and the Theory of Normalized Systems: Finding a Common Ground	Erki Eessaar	https://www.researchgate.net/publication/297731569_The_Database_Normalization_Theory_and_the_Theory_of_Normalized_Systems_Finding_a_Common_Ground	February 2016	2, 2007, no. 39, 1945 – 1956 7.91 Tallinn University of Technology
P4	Prioritizing Technical Debt in Database Normalization Using Portfolio Theory and Data Quality Metrics	Mashel Albarak , Rami Bahsoon	https://arxiv.org/ftp/arxiv/papers/1801/1801.06989.pdf	JULY 2010	ISSN 1819-6608 VOL. 5, NO. 7 JULY 2010
P5	Transaction Processing and Query Optimization	Sumathi Sai S. Esakkirajan	https://www.researchgate.net/publication/294450433_Transaction_Processing_and_Query_Optimization	January 2007	DOI: 10.100[illegible] 7/978-3-540-[illegible] 48399-1_7
P6	Query Processing and Optimization in Distributed Database Systems	Muhammad Haroon		September 2018	Paper 229-27

			https://support.sas.com/resources/papers/proceedings/proceedings/sugi27/p229-27.pdf		
P7	Subset Queries in Relational Databases	Satyanarayana R Valluri , Kamalakar Karlapalem	https://arxiv.org/ftp/cs/papers/0406/0406029.pdf	January 1978 *with*2,168	10.1093/imamat/21.1.47
P8	Teaching Relational Algebra and Relational Calculus: A Programming Approach	Kirby Mcmaster Nicole Anderson	Journal of Information Systems Education	January 2008	https://www.researchgate.net/publication/228635531_Teaching_Relational_Algebra_and_Relational_Calculus_A_Programming_Approach
P9	Deadlock Detection Views of Distributed Database	**B.M. Monjurul Alom** **Frans Alexander Henskens**	https://www.researchgate.net/publication/220841608_Deadlock_Detection_Views_of_Distributed_Database	January 2009	DOI: 10.1109/ITNG.2009.220

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"Rectifying Ideas, Amplifying Knowledge"

2020-21 (Odd Sem)

VISION	MISSION
To produce Competent Professionals equipped with technical knowledge and commitment for satisfying the needs of Society.	**1. To impart advanced knowledge with an inclination towards research with well Equipped Lab.** **2. To develop an ability to work ethically and responsive towards the need of society.**

Course	**:** B. Tech in Information Technology	**Year/Semester**	**:** 7th Semester (4th Year)
Name of the Teacher	**:** Prof. B S Madan	**Subject Code**	**:** IT702
Subject	**:** Machine Learning	**Section**	**:**IT5T002
Periods per Week (each 60 min)		**Lecture**	**3**
		Tutorial	**-**
		Practical	**-**

Teaching Plan

Course Objective	Course Outcomes
1. To understand the basic concepts and methods of machine learning. 2. To make use of some elementary machine learning techniques in the design of computer systems. 3. To develop a broad perspective about the applicability of ML algorithms in different fields. 4. To understand the major machine learning algorithms, the problem settings and assumptions that underlies them. 5. To possess insights, concerning the relative strengths and weaknesses of various common machine learning methods.	After learning the course the student will be able: 1. To demonstrate knowledge of the machine learning literature. 2. To describe how and why machine learning methods work. 3. To demonstrate results of parameter selection. 4. To explain relative strengths and weaknesses of different machine learning methods. 5. To select and apply appropriate machine learning methods to a selected problem. 6. To implement machine learning algorithms on real datasets. 7. To suggest ways to improve results.

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CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	2	3	3	2	1	1	-	1	1	3	3	3
CO2	3	3	2	2	2	2	3	-	1	-	-	1	3	3	3
CO3	3	2	2	2	1	2	2	-	-	-	-	-	3	3	-
CO4	3	3	-	-	-	2	1	-	1	-	-	-	3	3	1
CO5	3	3	2	1	-	1	1	1	-	-	-	-	3	2	1
CO6	3	3	2	2	1	2	1	1	1	-	1	1	3	3	2
Avg .	**3**	**2.83**	**1.666**	**1.5**	**1.16**	**2**	**1.66**	**0.5**	**0.66**	**-**	**0.33**	**0.5**	**3**	**2.83**	**1.66**

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/OnlineMaterial/PPt/ Video)	Applications (R&D/ Industry)	Learning Outcomes	Mapping CO's
Unit 1: Introduction **PREREQUISITES: Engineering** Mathematics-III											
1	1	1.1	Well-posed learning problems, Designing a Learning System,	15/07/2020	15/07/2020	T1(3-11)	R1-1	1.https://www.cmpe.boun.edu.tr/~ethem/i2ml3e/3e_v1-0/i2ml3e-chap1.pptx 2.http://mleg.cse.sc.edu/edu/csce883/uploads/Main.LectureNotes/lec17.ppt 3.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod02lec06.mp4	C1-C5	Student will be able to demonstrate knowledge of the machine learning literature.	CO1
2	2	1.2	Perspectives and Issues in Machine learning,	20/07/2020	20/07/2020	T(14-15)	R1(34-56)	1.https://www.cmpe.boun.edu.tr/~ethem/i2ml3e/3e_v1-0/i2ml3e-chap1.pptx 2.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod01lec04.mp4	C1-C5	Student will be able to demonstrate knowledge of the machine learning literature.	CO1
3	3	1.3	Concept Learning and General-to-specific Ordering: A concept learning task,	22/07/2020	22/07/2020	T(20-22)	R1(39-47)	1.https://www.cmpe.boun.edu.tr/~ethem/i2ml3e/3e_v1-0/i2ml3e-chap1.pptx 2.https://nptel.ac.in/content/st	C1-C5	Student will be able to demonstrate knowledge of the machine learning literature.	CO1

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								orage2/106/106/106106202/MP4/mod02lec09.mp4			
4	4	1.4	Concept learning as Search, Finding a maximally specific hypothesis,	27/07/2020	29/07/2020	T(23-26)	R1(4-9)	1.https://www.cmpe.boun.edu.tr/~ethem/i2ml3e/3e_v1-0/i2ml3e-chap2.pptx 2.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod02lec09.mp4	C1-C5	Student will be able to demonstrate knowledge of the machine learning literature.	CO1
	5	1.5	Version Spaces and Candidate elimination algorithm,	29/07/2020	03/08/2020	T(29-39)	R1(4-9)	1.https://www.cmpe.boun.edu.tr/~ethem/i2ml3e/3e_v1-0/i2ml3e-chap2.pptx 2.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod02lec09.mp4	C1-C5	Student will be able to demonstrate knowledge of the machine learning literature.	CO1
	6	1.6	Inductive Bias.	03/08/2020	05/08/2020	T(39-45)		1.https://www.cmpe.boun.edu.tr/~ethem/i2ml3e/3e_v1-0/i2ml3e-chap2.pptx 2.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod02lec09.mp4	C1-C5	Student will be able to demonstrate knowledge of the machine learning literature.	CO1

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/OnlineMaterial/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	Mapping CO's
Unit 2: Decision Tree Learning											
5	5	2.1	Decision tree learning algorithm,	05/08/2020	10/08/2020	T1-(52-59)	R1(113)	1.https://www.slideshare.net/arifulhoque3/decision-tree-learning48159691?qid=143b9344-600e-44ae-ae89a2d929971141&v=&b=&from_search=4 2.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod03lec12.mp4	C1-C5	Students will able to To describe how and why machine learning methods work.	CO2
6	6	2.2	Hypothesis space search in decision tree	10/08/2020	10/08/2020	T1 (60)	R1(114-117)	1.https://www.slideshare.net/butest/machine-learning-3859131?qid=a1a7ea2a-aa9e-4e8b-92fa-e259cf030f69&v=&b=&from_	C1-C5	Students will able to describe how and why machine learning methods work.	CO2

								search=5 2.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod04lec21.mp4			
7	7	2.3	Evaluating Hypothesis: Estimating Hypothesis accuracy,	12/08/2020	12/08/2020	T1-(128-131)	R1(118-124)	1.https://www.slideshare.net/butest/machine-learning-3859131?qid=a1a7ea2a-aa9e-4e8b-92fae259cf030f69&v=&b=&from_search=5 2.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod04lec22.mp4	C1-C5	Students will able to describe how and why machine learning methods work.	CO2
8	8	2.4	Basics of sampling theory, Deriving confidence intervals,	17/08/2020	19/08/2020	T1-(132-141)	R1(125-130)	1.https://www.slideshare.net/butest/3learningppt?qid=a1a7ea2a-aa9e-4e8b-92fa-e259cf030f69&v=&b=&from_search=12 2.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod04lec21.mp4	C1-C5	Students will able to describe how and why machine learning methods work.	CO2
9	9	2.5	Hypothesis testing,	19/08/2020	24/08/2020	T1(143-145)	R1(131-135)	1.https://www.slideshare.net/butest/3learningppt?qid=a1a7ea2a-aa9e-4e8b-92fa-e259cf030f69&v=&b=&from_search=12 2.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod04lec22.mp4	C1-C5	Students will able to describe how and why machine learning methods work.	CO2
10	10	2.6	comparing learning algorithms.,	24/08/2020	26/08/2020	T1(145-148)	R1(136-137)	1.https://nptel.ac.in/content/storage2/106/106/106106202/MP4/mod04lec22.mp4	C1-C5	Students will able to describe how and why machine learning methods work.	CO2

Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Actual Teaching Date	Text Books (Page	Reference Book (Page no)	URL's (NPTEL/OnlineMaterial/PPt/Video)	Application s(R&D/ Industry)	Learning Outcomes	Mapping CO

						no)					
		Unit3: Bayesian Learning:									
9	9	3.1	Bayes theorem and concept learning,	26/08/2020	31/08/2020	T1 (156-162)	R1(19-43)	1.http://mleg.cse.sc.edu/edu/csce883/uploads/Main.LectureNotes/lec3.ppt 2.https://nptel.ac.in/content/storage/106/106/106106139/MP4/mod16lec63.mp4	C1-C5	Students will able to demonstrate results of parameter selection.	CO3
10	10	3.2	Maximum likelihood and least square error hypotheses, Minimum description length principle,	31/08/2020	02/09/2020	T1(164-167)	R1(19-43)	1.http://mleg.cse.sc.edu/edu/csce883/uploads/Main.LectureNotes/lec4.ppt 2.https://nptel.ac.in/content/storage/106/106/106106139/MP4/mod11lec36.mp4	C1-C5	Students will able to demonstrate results of parameter selection.	CO3
11	11	3.3	Bayes optimal classifier, Gibbs algorithm, Naive Bayes classifier,	02/09/2020	07/09/2020	T1(174-178)	R1(19-43)	1.https://nptel.ac.in/content/storage/106/106/106106139/MP4/mod16lec63.mp4	C1-C5	Students will able to demonstrate results of parameter selection.	CO3
12	12	3.4	Computational Learning Theory: Probably learning an approximately correct hypothesis, PAC learnability,	07/09/2020	09/09/2020	T1(201-205)	R1(19-43)	1.https://slideplayer.com/slide/16223540/#.YY4NcvgclH0.gmail 2.https://www.youtube.com/watch?v=8hJ9V9-f2J8	C1-C5	Students will able to demonstrate results of parameter selection.	CO3
13	13	3.5	The VC dimension,	09/09/2020	14/09/2020	T1(214-218)	R1(19-43)	1.https://slideplayer.com/slide/16223540/#.YY4NcvgclH0.gmail 2.https://www.youtube.com/watch?v=8hJ9V9-f2J8	C1-C5	Students will able to demonstrate results of parameter selection.	CO3
14	14	3.6	the mistake bound model for learning.,	14/09/2020	16/09/2020	T1(220-223)	R1(19-43)	1.https://slideplayer.com/slide/16223540/#.YY4NcvgclH0.gmail 2.https://www.youtube.com/watch?v=8hJ9V9-f2J8	C1-C5	Students will able to demonstrate results of parameter selection.	CO3

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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/OnlineMaterial/PPt/ Video)**	**Applications (R&D/ Industry)**	**Learning Outcomes**	
		Unit4: Linear Models for Regression									
13	13	4.1	Linear basis function models, The Bias-Variance decomposition,	16/09/2020	23/09/2020	T2(	R2-137	1.https://slideplayer.com/slide/4551164/ 2.https://nptel.ac.in/content/storage2/106/106/106106198/MP4/mod04lec24.mp4	C1-C5	Students will able to explain relative strengths and weaknesses of different machine learning methods.	CO4
14	14	4.2	Bayesian Linear Regression, Bayesian Model comparison,	21/09/2020	28/09/2020	T2(277)	R2(138-144)	1.https://www.gatevidyalay.com/tag/linear-regression-machine-learning-ppt/ 2.https://nptel.ac.in/content/storage2/106/106/106106198/MP4/mod11lec92.mp4	C1-C5	Students will able to explain relative strengths and weaknesses of different machine learning methods.	CO4
15	15	4.3	Kernel Methods: Constructing kernels, Radial basis function networks,	23/09/2020	30/09/2020		R2(291-301)	1.https://www.cs.tau.ac.il/~nn/Courses/NC05/RBF2.ppt 2.https://www.youtube.com/watch?v=IzGS8uKc5E4	C1-C5	Students will able to explain relative strengths and weaknesses of different machine learning methods.	CO4
16	16	4.4	Gaussian Processes,	28/09/2020	05/10/2020		R2(303-313)	1.https://slideplayer.com/slide/9206070/ 2.https://www.youtube.com/watch?v=vU6AiEYED9E	C1-C5	Students will able to explain relative strengths and weaknesses of different machine learning methods.	CO4
17	17	4.5	Ensemble Learning: Bagging, boosting, and DECORATE.	30/09/2020	07/10/2020		R2(303-313)	1.https://www.slideshare.net/marinasantini1/lecture06-ml4-ltmarinasantini2013 2.https://www.youtube.com/watch?v=WtWxOhhZWX0	C1-C5	Students will able to explain relative strengths and weaknesses of different machine learning methods.	CO4
18	18	4.6	Active learning with ensembles	05/10/2020	12/10/2020		R2(303-313)	1.https://www.slideshare.net/marinasantini1/lecture06-	C1-C5	Students will able to explain relative strengths and	

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								ml4-ltmarinasantini2013 2.https://www.youtube.com/watch?v=WtWxOhhZWX0		weaknesses of different machine learning methods.	CO4

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/OnlineMaterial/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	Mapping CO
Unit 5: Unsupervised Learning											
17	17	5.1	Clustering:Learning from unclassified data,	07/10/2020	14/10/2020			1.https://slideplayer.com/slide/9038781/ 2.https://www.youtube.com/watch?v=UhVn2WrzMnI	C1-C5	Students will be able to select and apply appropriate machine learning methods to a selected problem.	CO 5
18	18	5.2	Hierarchical Aglomerative Clustering,	12/10/2020	19/10/2020			1.https://slideplayer.com/slide/14462156/ 2.https://www.youtube.com/watch?v=q5ifs9xfsRk	C1-C5	Students will be able to select and apply appropriate machine learning methods to a selected problem	CO 5
19	19	5.3	k-means partitional clustering,	14/10/2020	21/10/2020			1.https://www.gatevidyalay.com/tag/k-means-clustering-example-ppt/ 2.https://www.youtube.com/watch?v=aoE_rJCG744	C1-C5	Students will be able to select and apply appropriate machine learning methods to a selected problem	CO 5
20	20	5.4	Batchler and Wilkin's algorithm	19/10/2020	26/10/2020			1.https://www.slideserve.com/tivona/2011-clustering-in-machine-learning 2.https://www.youtube.com/watch?v=EItlUEPCIzM	C1-C5	Students will be able to select and apply appropriate machine learning methods to a selected problem	CO 5

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/OnlineMaterial/PPt/Video)	Applications (R&D/ Industry)	Learning Outcomes	Mapping CO
Unit 6: Reinforcement Learning											

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21	21	6.1	The learning task,	21/10/2020	28/10/2020	T1-(367-370)		1.https://slideplayer.com/slide/5133811/ 2.https://www.youtube.com/watch?v=JgvyzIkgxF0	C1-C5	Student will be able to implement machine learning algorithms on real datasets.	CO6
22	22	6.2	Q learning, Non-deterministic rewards and action,	26/10/2020	11/11/2021	T1(373-379)		1.https://slideplayer.com/slide/16101998/ 2.https://www.youtube.com/watch?v=4dcgjcuR-1o	C1-C5	Student will be able to implement machine learning algorithms on real datasets.	CO6
23	23	6.3	Temporal difference learning,	28/10/2020	16/11/2021	T1(381)		1.https://slideplayer.com/slide/5169094/ 2.https://www.youtube.com/watch?v=L64E_NTZJ_0	C1-C5	Student will be able to implement machine learning algorithms on real datasets.	CO6
24	24	6.4	Generalizing from examples.	9/11/2021	18/11/2021	T1(384)		1.https://slideplayer.com/slide/5169094/ 2.https://www.youtube.com/watch?v=tWtM4Dq05ZA	C1-C5	Student will be able to implement machine learning algorithms on real datasets.	CO6

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

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Text Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Machine Learning,	Mitchell, Tom. M	McGraw-Hill Education, 1st Edition	May 2013.
T2	Programming Collective Intelligence- Building Smart Web 2.0 Applications	Segaran, Toby	O'Reilly Media	August 2007

Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
R1	"An Introduction to Machine Learning"	Miroslav, Kubat.	Springer Publishing	
R2	"Pattern Recognition and Machine Learning",	Bishop, C. M	Springer Publishing.	
R3	, "Machine Learning for Hackers",	Conway, Drew and White, John Myles	O'Reilly Media,	February 2012.

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	Indium Software	www.indiumsoftware.com/	Indium is an independent software testing company and it's vision is to Enhance Software Quality for Product Companies and Enterprise Businesses. Team Indium's vision is to provide highly reliable quality engineering through innovative test strategies, best practices and engagement models. Indium Software has been a leading Software Testing/QA services company focussing on Independent, objective and highly specialized in Software Testing. Facts and figures bear out Indium's consistent growth measured against all crucial parameters. It has constantly expanded its knowledge-base and capabilities to offer optimum value for every customer.
C2	Prolitus	www.prolitus.com/	From their inception in 2005, Prolitus has been constantly endeavouring to provide its clients with cutting edge technology to transform their business. They are known for their technology synergies which have successfully mitigated

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			challenges faced by their clients.They have over 200 seasoned professionals who build scalable solutions to cater to a growing consumer base. They are a Machine Learning company that offers services in Blockchain Consulting, Blockchain Application Development, Exchange Development, OTC Exchange Platform, Wallet Development, Cryptocurrency Development Services, STO Solutions and more.
C3	**Webtunix AI**	www.webtunix.com/	Webtunix is a data science consulting company that offers various solutions including Machine Learning services, data analytics, mining services, object detection and natural language processing services. They help companies understand the machinations of their business and work with different companies across India, the United Kingdom, Singapore, Brazil and more. Their clients hail from various industries like e-commerce, sports, telecom, healthcare, cyber security and the stock market. It uses AIML technologies like predictive analysis, reinforcement learning, natural language processing, computer vision and more to create solutions that answer industry-specific requirements
C4	**ValueCoders**	https://www.valuecoders.com/	Valuecoders have been delivering top AIML offshore software development services for 14 years now.With a strength of more than 650 developers, they are one of the most sought after machine learning companies in India.Whether it is digital transformation or software development, ValueCoders clients have always had rave reviews for the company, which resulted in a 96% client retention rate.Their software development services ensure a robust mobile and web apps for a seamless user experience.
C5	**Wobot**	https://wobot.ai/	Wobot is an Artificial Intelligence and Machine Learning company that's creating advanced solutions for surveillance. Wobot is helping companies optimise their surveillance systems by eliminating manual monitoring. Their machine learning algorithms are capable of detecting any deviations in the standard operating systems, making the process of analysing data much more standardised and error-free.These machine learning algorithms can list the anomalies and make them trackable for their stakeholders. A number of businesses including government enterprises and food delivery service providers have benefitted from Wobot's innovative solutions.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume /Page no/Year
P1	**Machine learning and its applications: A review**	Sheena Angra	Ieee	https://doi.org/10.1109/ICBDACI.2017.8070809	19 October 2017
P2	**A Quick Review of Machine Learning Algorithms**	Sustima Ray	https://ieeexplore.ieee.org/xpl/conhome/8851231/proceeding	https://doi.org/10.1109/COMITCon.2019.8862451	14-16 Feb. 2019
P3	Dropout: A Simple Way to Prevent Neural Networks from Overfitting	Nitish Srivastava	Journal of Machine Learning Research 15 (2014) 1929-1958		2014
P4	**Enhancing the pattern recognition capacity of machine learning techniques: The importance of feature positioning**	Debora Di Caprio	https://www.sciencedirect.com/science/journal/26668270	https://doi.org/10.1016/j.mlwa.2021.100196	
P5	**ECR-DBSCAN: An improved DBSCAN based on computational geometry**	**Kinsuk Giri**	Machine Learning with Applications 6 (2021) 100148	https://doi.org/10.1016/j.mlwa.2021.100148	2 September 2021
P6	A Research on Machine Learning Methods and Its Applications	Ozer Cilik	https://www.researchgate.net/journal/Journal-of-Educational-Technology-and-Online-Learning-2618-6586	http://dx.doi.org/10.31681/jetol.457046	September 2018
P7	SENTIMENT ANALYSIS FROM SOCIAL MEDIA COMMENTS	Ozer Cilik	https://www.researchgate.net/publication/342450179_SENTIMENT_ANALYSIS_FROM_SOCIAL_MEDIA_COMMENTS	http://dx.doi.org/10.21923/jesd.546224	June 2020
P8					
P9					
P10					
P11					

Subject Teacher

Academic Incharge

Head of Department IT-CSE

Principal
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Department of Mechanical Engineering

"Rectifying Ideas, Amplifying Knowledge"

2020-21 (Odd Sem)

Education to Eternity

।।ज्ञानम् सर्वार्थ साधनम्।।

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 Mechanical Engineering	**Year/Semester :4th Semester (2nd Year)**	
Name of the Teacher : Prof. Tushar S. Muratkar	**Subject Code : ME4T002**	
Subject : Basic Electronics Engineering	**Section :**	
Periods per Week (each 60 min): 4	**Lecture**	**3**
	Tutorial	**1**
	Practical	**--**

Course Objective	Course Outcomes
1. To understand the properties, characteristics and behaviours of basic solid state devices such as PN junction diode/BJT/FET 2. To design electronics circuit using diode, transistor OPAMP etc 3. To understand basic logic circuits.	1. Define semiconductor, Energy band diagram, diffusion component diode, DC circuit, BJT & FET amplifier. 2. Illustrate semiconductor material, energy band diagram, DC circuit, BJT & FET amplifier, Bipolar transistor & various semiconductor devices. 3. Develop energy band diagram, diffusion current circuit, Bipolar transistor amplifier circuit using BJT & FET. 4. Analyse semiconductor material, diffusion current component, electronic circuit, BJT & FET amplifier circuit. 5. Interpret electronic circuit, simple amplifier circuit.

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	6. Design electronic circuit & amplifier circuit using BJT & FET.

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 – Semiconductor Diode Mechanism of Conduction in Semiconductors									
1	1	1.1	Mobility and Conductivity, Electrons and holes in an intrinsic semiconductors	Lecture 1	T1 (Pg : 1-5)	https://www.youtube.com/watch?v=Wqg3rGpSPWc Lecture 1	P1, C1-C10	Able to understand concept of electronics and holes	CO1
2	2	2.1	Donor and acceptor impurities, Fermi level, Carrier densities in semiconductor, Hall effect,	Lecture 2	T1 (Pg : 29)	https://www.youtube.com/watch?v=8QhQQMm0YQI Lecture 3 and 6	P1,C1-C10	Able to understand different effects in semiconductor.	CO1
3	3	3.1	Diffusion, Recombination Junction Diode PN junction characteristic and its equation	Lecture 3	T1 (Pg : 113-128); (Pg : 58-59)	https://www.youtube.com/watch?v=USrY0JspDEg Lecture 6 and 7	P2, C1-C10	Able to understand working of PN Junction diode	CO1
4	4	4.1	Effect of Temperature, Depletion Layer, Piecewise linear diode model	Lecture 4	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=TZ6IA1GBqXw Lecture 5	P2,C1-C10	Able to understand Depletion Layer concept	CO1
5	5	5.1	Breakdown Mechanism, Zener and	Lecture 5	T1 (Pg : 63–69); (Pg : 52)	https://www.youtube.com/watch?v=EzlSafjMltc Lecture 6	P3, C1-C10	Able to understandconcept of Breakdown Mechanism	CO1

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			Avalanche Breakdown characteristics						
6	6	6.1	Diode as circuit element Half wave and full wave rectifiers, capacitive filters, Zener diode as a regulator	Lecture 6	T1 (Pg : 136)	https://www.youtube.com/watch?v=wMdRfXxa7EY	P3,C1-C10	Able to understandconcept of Diodes	CO1
Unit II – BJT Characteristics and Circuits									
7	7	7.1	Transistor Operation, CE	Lecture 7	T1 (Pg : 181)	https://www.youtube.com/watch?v=IRok_SGrx9Q	P4,C1-C10	Able to understand CE Configuration	CO1, CO2
8	8	8.1	Transistor Operation CB, CC configuration	Lecture 8	T1 (Pg : 182)	https://www.youtube.com/watch?v=SuRXWgT-P5Q	P5, C1-C10	Able to understand CB, CC Configuration	CO2
9	9	9.1	characteristics, transistor biasing circuits	Lecture 9	T1 (Pg : 465–471)	https://www.youtube.com/watch?v=5T84Jzcgj7M	P6,C1-C10	Able to understand concept of biasing	CO2
10	10	10.1	stability factor, h- parameter model (low frequency)	Lecture 10	T1 (Pg : 336)	https://www.youtube.com/watch?v=h6wvwspLkkc	P7,C1-C10	Able to understand stability factor	CO1,CO2
11	11	11.1	computation of Ai, Av,	Lecture 11	T1 (Pg : –)	https://www.youtube.com/watch?v=-MyVscG-Pew	P8,C1-C10	Able to understand computation of Ai, Av,	CO1,CO2
12	12	12.1	Ri, Ro of single transistor CE amplifier configuration.	Lecture 12	T1 (Pg : 452)	https://www.youtube.com/watch?v=jZ-pD8nVD6s	P8,C1-C10	Able to understand computation of Ri, Ro	CO1,CO2
Unit III – Field Effect Transistors JFET									
13	13	13.1	Construction and principle of working,	Lecture 13	T1 (Pg : 410)	https://www.youtube.com/watch?v=2I_8YNVgbEw	P9 C1-C10	Able to understand concept of JFET	CO3

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14	14	14.1	Drain / Transfer characteristics,	Lecture 14	T1 (Pg : 411)	https://www.youtube.com/watch?v=h9WlHNVHZ84	P9 C1-C10	Able to describe various Drain characteristics of JFET	CO3
15	15	15.1	basic amplifier circuits	Lecture 15	T1 (Pg : 421–426)	https://www.youtube.com/watch?v=IfGCxrgNpQE	P9 C1-C10	Able to understand basic amplifier circuits	CO2
16	16	16.1	Biasing of JFET MOSFET	Lecture 16	T1 (Pg : 421–426)	https://www.youtube.com/watch?v=L6DK3PqeNLw	P10, C1-C10	Able to know concept of Biasing of JFET	CO2
17	17	17.1	Enhancement and depletion type N-channel	Lecture 17	T1 (Pg : 421–426)	https://www.youtube.com/watch?v=XqGBNyhImV4	P10, C1-C10	Able to understand Enhancement and N-Type depletion Drain / Transfer Characteristics	CO3
18	18	18.1	P-channel, Drain / Transfer Characteristics	Lecture 18	T1 (Pg : 697–703)	https://www.youtube.com/watch?v=H7Gdz4QTvUU	P11,C1-C10	Able to understand Enhancement and P-Type depletion Drain / Transfer Characteristics	CO4
Unit IV – Switching Theory and Logic Gates									
19	19	19	Number system, Conversion	Lecture 19	T1 (Pg : 70–74); (Pg : 58-)	https://www.youtube.com/watch?v=MPMX7TKcGis	P5, C1-C10	Able to understand Number system	CO2
20	20	20	Compliments, Addition and Subtraction	Lecture 20	T1 (Pg : 63–69); (Pg : 52)	https://www.youtube.com/watch?v=brM0tpBAx8U	P6,C1-C10	Able to understand concept of compliments	CO4
21	21	21	BCD numbers, Boolean algebra,	Lecture 21	T1 (Pg : 136)	https://www.youtube.com/watch?v=fViyGihzAeg	P7,C1-C10	Able to understand Boolean algebra	CO4
22	22	22	Canonical form,	Lecture 22	T1 (Pg : 113-128); (Pg : 58-59)	https://www.youtube.com/watch?v=KHYoxbGuusE	P8,C1-C10	Able to understand Canonical form,	CO4
23	23	23	Logic gates	Lecture 23	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=fw-N9P38mi4	P8,C1-C10	Able to understand Logic gates	CO3
24	24	24	Minimization of logical function using	Lecture 24	T1 (Pg : 63–69); (Pg : 52)	https://www.youtube.com/watch?v=ygm25sqgepg	P6,C1-C10	Able to understand concept Karnaugh map	CO4

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			Karnaugh map						
Unit V – Operational Amplifier									
25	25	25	Concept of ideal operational amplifier	Lecture 25	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=61iodjs7f6U	P4,C1-C10	Able to understand Concept of ideal operational amplifier	CO1, CO2
26	26	26	Inverting and non-inverting and its applications	Lecture 26	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=iB4325n8afg	P5, C1-C10	Able to understand Concept of Inverting and non-inverting amplifier	CO2
27	27	27	Inverter,	Lecture 27	T1 (Pg : 113-128); (Pg : 58-59)	https://www.youtube.com/watch?v=iIqhAX0I7lI	P6,C1-C10	Able to understand Concept of Inverter	CO2
28	28	28	, integrator, differentiator	Lecture 28	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=RX6QelNH9m0	P7,C1-C10	Able to understand concept of integrator, differentiator	CO1,CO2
29	29	29	voltage follower,	Lecture 29	T1 (Pg : 63–69); (Pg : 52)	https://www.youtube.com/watch?v=C1ftAg4Gb-Y	P8,C1-C10	Able to understand concept of voltage follower,	CO1,CO2
30	30	30	summing and differential amplifier	Lecture 30	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=ha1PpuukVVM	P8,C1-C10	Able to understand concept of summing and differential amplifier	CO1,CO2
Unit VI – Industrial applications									
31	31	31	Transducers for-Temperature, level, displacement, pressure	Lecture 31	T1 (Pg : 113-128); (Pg : 58-59)	https://www.youtube.com/watch?v=Ch-yoilA3xU	P1, C1-C10	Able to understand concept of Transducers for-Temperature, level,	CO4
32	32	32	Range, Specifications, Limitations and applications	Lecture 32	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.linquip.com/blog/pressure-transducer-types-and-definitions/	P1,C1-C10	Able to understand concept of Range, Specifications	CO5

33	33	33	Block diagrams of-Digital thermometer	Lecture 33	T1 (Pg : 63–69); (Pg : 52)	https://www.youtube.com/watch?v=c5NeTnp_poA	P2, C1-C10	Able to understand concept of Digital thermometer	CO4
34	34	34	weighing machine.	Lecture 34	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=VIYNZycZQLU	P1,C1-C10	Able to understand concept of weighing machine.	CO4
35	35	35	Introduction & block diagram of-Two wire transmitter, PID controller	Lecture 35	T1 (Pg : 63–69); (Pg : 52)	https://www.youtube.com/watch?v=X1zT161zwB0	P2, C1-C10	Able to understand concept of Two wire transmitter	CO3
36	36	36	data logger, alarm annunciator, CNC machine, PLC	Lecture 36	(Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=GwKYi7aqcRU https://www.youtube.com/watch?v=QUA1NfHbcEk	P2,C1-C10	Able to understand concept of data logger, alarm annunciator	CO4

Tutorial Lectures:

1	1	1	Numerical on clipper and voltage doubler	Lecture 1	T1 (Pg : 113-128); (Pg : 58-59)	https://www.youtube.com/watch?v=u9IP_cKn5io	P4,C1-C10	Able to understand practical concept of clipper and voltage doubler	CO5
2	2	2	Numerical on Transistor	Lecture 2	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=0zE1CkXQPLA	P5, C1-C10	Able to understand practical concept of Transistor	CO5
3	3	3	Numerical on P- Channel MOSFET	Lecture 3	T1 (Pg : 63–69); (Pg : 52)	https://www.youtube.com/watch?v=W2nNAtR4zFQ	P6,C1-C10	Able to understand practical concept of P- Channel MOSFET	CO5
4	4	4	Numerical on N- Channel MOSFET	Lecture 4	T1 (Pg : 136)	https://www.youtube.com/watch?v=W2nNAtR4zFQ	P7,C1-C10	Able to understand practical concept of N- Channel MOSFET	CO5
5	5	5	Numerical on Boolean	Lecture 5	T1 (Pg : 113-	https://www.youtube.com/watch?v=EPJf4owqwdA	P8,C1-C10	Able to understand practical concept of Boolean algebra	CO4

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			algebra		128); (Pg : 58-59)				
6	6	6	Numerical on Karnaugh map	Lecture 6	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=CtnogQOXuwE	P8,C1-C10	Able to understand practical concept of Karnaugh map	CO4
7	7	7	Numerical on Logic gates	Lecture 7	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://www.youtube.com/watch?v=QkF4iMK2XkA	P1,C1-C10	Able to understand practical concept of Logic gates	CO4
8	8	8	Numerical on Inverter	Lecture 8	T1 (Pg : 63–69); (Pg : 52)	https://www.youtube.com/watch?v=GD1irj8PRD4	P2, C1-C10	Able to understand practical concept of Inverter	CO5
9	9	9	Numerical on , integrator, differentiator	Lecture 9	T1 (Pg : 136)	https://www.youtube.com/watch?v=OPvs7A554Rw	P2,C1-C10	Able to understand practical concept of integrator, differentiator	CO5
10	10	10	Numerical on voltage follower	Lecture 10	T1 (Pg : 113-128); (Pg : 58-59)	https://www.youtube.com/watch?v=ZjcLlHcsDZs	P6,C1-C10	Able to understand practical concept of voltage follower	CO5
11	11	11	Numerical on summing amplifier	Lecture 11	T1 (Pg : 70–74); (Pg : 56-57) (Pg : 52-53)	https://math.gallery.video/detail/videos/engineering-circuits---vol-6---op-amps-part-1/video/A5sl9WVJIkM/20---summing-amplifier-problems-part-1	P6,C1-C7	Able to understand practical concept of summing amplifier	CO6
12	12	12	Numerical on differential amplifier	Lecture 12	T1 (Pg : 113-128); (Pg : 58-59)	https://www.youtube.com/watch?v=ltVspUteuuI	P6,C1-C9	Able to understand practical concept of differential amplifier	CO6

*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	Mapped With CO

		Problems/Programs	
1	Numerical on Transistors	03	3
2	Numerical on Logic Gates	04	5
3	Numerical on Op-Amp	05	4,5

Assignment Plan

Assignment No.	Topic	Given Date	Submission Date	Mapped With CO
1	Different types of Semiconductor Diode	08/02/2021	15/02/2021	2,3
2	Switching Theory and Logic Gates	08/04/2021	08/04/2021	4,5

Content Beyond Syllabus Topic – Planned

Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	Power devices	03/01/2021	2
2	Universal Gates	21/03/2021	4

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Basic Electronics	D P Kothari and I Nagrath	Wiley	2015
T2	Basic Electronics: (Includes Solved Problems and MCQS)	B Somanathan Nair and S R Deepa	Pearson Education	1999
T3	Basic Electrical Engineering	C L Wadhwa	Tata McGraw Hill Publications	1998
R1	Schaum's Outline of Basic Electrical Engineering	J Cathey	Wiley	2007
R2	Basic Electronics Engineering	Shamim Akhter	Tata McGraw Hill Publications	2000
R3	Basic Electronic	J B Gupta	Chapman and Hall	1993

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Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	**Mitsubishi Electric**	https://www.mitsubishielectric.com	Since 1980, this company has introduced a wide range of robotic systems that help improve productivity in high-speed and precision performance in manufacturing. Mitsubishi extended its range of compact SCARA and articulated arm robotics with the addition of Codian Robotics' exclusive delta style robots.
C2	**ABB (ASEA Brown Boveri)**	http://www.new.abb.com	From the time it pioneered the world's first all-electric microprocessor-controlled robot and the world's first industrial paint robot in the late 1960s and early 1970s, ABB remains a technology and market leader in robotics with over 300,000 robots sold to customers all over the world. Today, ABB is still one of the world's largest industrial robotics companies.
C3	**Omron Adept Technologies**	https://www.robotics.omron.com	This is the largest US-based industrial robotics company. Its intelligent automation products include mobile robots, industrial robots and other automation equipment, applications software, machine vision, and systems. In 2015, the Omron Corporation acquired Adept Technology Inc. to create this entity.
C4	**FANUC Robotics**	https://www.fanuc.co.jp	Covering a diverse range of industries and applications, FANUC Robotics offers more than 100 models of industrial robots that are easy to operate and provide great flexibility. FANUC has never taken its market dominance for granted and has been dynamically working on smarter and flexible solutions, particularly those that incorporate Artificial Intelligence (AI).
C5	**Yaskawa**	https://www.yaskawa-global.com	This is another Japanese brand that has led the industrial robotics industry since the first launch of its all-electric industrial robot Motoman in 1977. With more than 300,000 Motoman robots, 18 million inverter drives and 10 million servos and 18 million installed globally, Yaskawa has successfully commercialized optimum robots for various uses including arc welding, assembly, dispensing, material handling, material removal, material cutting, packaging, and spot welding.
C6	**Kuka**	https://www.kuka.com	German industrial giant Kuka is one of the world's largest producers of robotics that are used to manufacture automobiles, characterized by its signature bright orange crane-like bots. KUKA Robotics offers a fully integrated range of automated robotics, control technology, and customized software solutions. Since 2004, automation and robotics have been the company's primary focus, and non-core areas have been closed or sold. In 2016, Kuka, a company whose robots already grace several factory floors, was acquired by Midea Group, a Chinese household company, for USD$3.9 billion.

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C7	**Epson robots**	https://www.epson.co.in	This pioneering company first entered the North and South American Market in 1984 as the EPSON Factory Automation Group. Originally founded to support automation needs, EPSON quickly became prominent in many of the largest manufacturing sites throughout the world. Over the past three decades, EPSON Robots has been leading the automation industry for small parts assembly products and has introduced several industry firsts, including compact SCARA robots, PC based controls, and much more.
C8	**Kawasaki**	https://www.robotics.kawasaki.com	With over 160,000 robotics installed worldwide, the Japan-based Kawasaki is a leading provider of industrial robots and automation systems with a broad product portfolio. Kawasaki robotics was the first in Japan to commercialize industrial robots. Since then, the company has developed several robots as a domestic pioneer and has contributed to growth in many industry verticals through automation and labor-saving systems. In 2015, the company began sales of duAro, an advanced, dual-arm SCARA robot that can work alongside humans.
C9	**Staubli**	https://www.staubli.com	This is a global mechatronics solution provider with three core activities: Connectors, Robotics, and Textile. Since 1892 when it was founded, the Staubli Group has expanded both geographically and technologically. With the acquisition of Unimation – a prominent vendor in industrial robotics industry – Staubli continued its dynamic path into the most advanced and innovative industrial sectors. The company has launched a new range of collaborative robots and is investing further into its software business.
C10	**Universal Robots**	http://www.universal-robots.com	This company is renowned for developing safe, flexible, easy-to-use robotic arms that serve a range of industries, including food and tobacco production, metal and machining, automotive and subcontractors, pharma and chemistry, furniture and equipment, and scientific and research industries. This Danish company develops lightweight industrial robots that streamline and automate repetitive industrial processes. These robots are most commonly used for injection molding, pick-and-place, CNC, quality inspection, packaging and palletizing, assembly, machine tending, and gluing and welding applications.

Research Paper:

Code	Title of the Paper	First Author Name	Journal/Conference Name	DOI no.	Issue/Volume/Page no/Year
P1	Modeling and design methodology for [illegible] systems	R.Isermann	IEEE/ASME Transactions on Mechatronics	10.1109/3516.491406	1/1/16-28/1996
P2	Overview of Automatic power devices	William J. Fleming	IEEE SENSORS JOURNAL	10.1109/7361.983469	1/4/296-308/2001
P3	Capacitive tactile array for touch screen	Hong-Ki Kim	Sensors and Actuators A: Physical	10.1016/j.sna.2009.12.031	1/165/2-7/2011

	application				
P4	Sensor technologies and electronics issues for electronics systems	R.C.Luo	IEEE/ASME Transactions on Mechatronics	10.1109/3516.491408	1/1/39-49/1996
P5	active filters using the operational amplifier pole	K.R.Rao	IEEE Transactions on Circuits and Systems	10.1109/TCS.1974.1083825	2/21/260-262/1974
P6	A Digital-Domain Calibration of Split-Capacitor DAC for a Differential SAR ADC Without Additional Analog Circuits	Ji-Yong Um	IEEE Transactions on Circuits and Systems I: Regular Papers	10.1109/TCSI.2013.2252475	11/60/2845-2856/2013
P7	New method of tolerance design of electromagnetic relay reliability	Zhai Guofu	Journal of Engineering, Taylor and Francis	10.1080/09544820310001501 61	5/15/425-431/2007
P8	Data logger for humidity and temperature measurement based on a programmable SoC	Silvia Folea	2014 IEEE International Conference on Automation, Quality and Testing, Robotics	10.1109/AQTR.2014.6857877	2014
P9	Transistor simulation tool	Ali Chehab	Computer Applications in Engineering Education	10.1002/cae.20022	4/12/249-256/2004
P10	Role of Differential in electronics industries	A.J. Martin	Ninth International Symposium on Asynchronous Circuits and Systems	10.1109/ASYNC.2003.1199162	2003
P11	Three-layer PLC/SCADA system Architecture in process automation and data monitoring	Mohamed Endi	2010 The 2nd International Conference on Computer and Automation Engineering (ICCAE)	10.1109/ICCAE.2010.5451799	2010
P12	Design of industrial automated systems via relay ladder logic programming and Petri nets	M.C.Zhou	IEEE Transactions on Systems, Man, and Cybernetics, Part C (Applications and Reviews)		

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Affiliated to DBATU, RTMNU

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 : Masters of Business Administration	**Year/Semester** : 1st semester (1st Year)	
Name of the Teacher : Dr. Swarnalata Filip	**Subject Code** :1T5	
Subject : Financial Reporting, Statements And Analysis	**Section** : -	
Periods per Week (each 60 min)	**Lecture**	3
	Tutorial	1
	Practical	-

Course Objective	Course Outcomes
1. ***To learn*** various accounting ***standard***s for diverse ***accounting policies*** and ***principles*** 2. ***To learn*** how financial statements are ***prepared*** and ***calculate*** the profit or loss of a firm as at the end of the financial year. 3. ***To acquire*** the knowledge of how Cash Flow statements are prepared. 4. ***To obtain*** the knowledge of various ***ratios*** applied in the financial statement. 5. ***To learn*** the techniques of how financial analysis is done and various methods of doing it.	1. To ***be able to evaluate*** the selected accounting standards and ***perform*** their application. 2. To be A***ble to explain*** and ***apply*** **accounting** concepts, ***principles*** and ***conventions***; and record basic ***accounting*** transactions and prepare annual financial statements 3. To be ***Able to evaluate*** whether a firm is doing well financially and has sufficient cash to meet its obligations 4. To be able to ***perform*** Ratio analysis and ***comment*** on the performance of the firm. Whether a firm is doing well or not. 5. ***Developed*** an ***analytical understanding*** in doing inter-firm and intra firm ***comparison***

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Sr. No	Lec. No	Topic Code	Contents to be Covered	Planned Teaching Dates	Text Books (Page no) Reference Book	URL's (NPTEL/OnlineMaterial /PPt/Video)

					(Page no)			
Unit I – Accounting Standards								
1	1	1	Introduction to accounts.	Day 1	• NCERT • Financial Accounting for Management"	https://www.youtube.com/watch?v=OT5RdoJAkhY&list=PLPjSqITyvDeUTeAOGhip_ubjN3y8oqT13 Lecture 1-8		• To be able to understand the basics of accountings. • What are Journals, Ledgers, Accounts and Trial Balance.
2	2	2	Introduction to Indian Accounting Standards	Day 2	• Financial Accounting for Management	https://resource.cdn.icai.org/38480bos28154-mod1-cp1.pdf		• Understand the signicance of issuance of Accounting Standards. • Grasp the objectives, benefits and limit-ations of Accounting Standards
3	3	3	Indian Accounting Standards.AS 2 (Valuation of Inventories)	Day 3	• Financial Accounting for Management	https://resource.cdn.icai.org/55001bosfndnov19-p1-cp4.pdf https://resource.cdn.icai.org/38480bos28154-mod1-cp1.pdf		• Understand the meaning of term 'Inventory'. • Learn the technique of Specic identi-cation method.
4	4	4	AS 3 (Cash Flow Statement)	Day 4	• Financial Accounting for Management	https://kb.icai.org/pdfs/PDFFile5b3b2fedbef0e3.22139651.pdf		• To be able to understand business **cash** position • Helps in cash forecast for the near future
5	5	5	AS 6 (Depreciation Accounting)	Day 5	• Financial Accounting for Management	https://resource.cdn.icai.org/55002bosfndnov19-p1-cp5.pdf		• Understand various methods of depreciation. • familiarize with the accounting treatment for change in the method of depreciation
6	6	6	AS 10 (Accounting	Day 6	• Financial Accounting for Management	http://kb.icai.org/pdfs/PDFFile5b2764fb0253815.2811227.pdf		• Able to understand treatment for property, plant and equipment.

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			for Fixed Assets) and Practice questions.					
Unit II – Financial Statement Reporting – I								
7	7	7	Introduction to Financial Statement.	Day 7	Accounts for Management.	https://www.icai.org/post.html?post_id=12430		• Understand basic terminology of financial statement. • Understanding the new act.
8	8	8	Preparation of Financial Statement Profit & Loss, Balance sheet (as per Companies Act 2013)	Day 8	Taxmann Publication	https://www.icai.org/post.html?post_id=12430		• Able to prepare financial statements. • Compare it with previous year's financial statement.
9	9	9	Preparation of Financial Statement Profit & Loss, Balance sheet (as per Companies Act 2013)	Day 9	Taxmann Publication	https://www.icai.org/post.html?post_id=12430	C1-C10	• Able to prepare financial statements. • Compare it with previous year's financial statement.
10	10	10	Preparation of Financial Statement Profit & Loss, Balance sheet (as per Companies Act 2013)	Day 10	Taxmann Publication	https://www.icai.org/post.html?post_id=12430	C1-C10	• Able to prepare financial statements. • Compare it with previous year's financial statement.
11	11	11	Preparation of Financial Statement Profit & Loss, Balance sheet (as per Companies Act 2013)	Day 11	Taxmann Publication	https://www.icai.org/post.html?post_id=12430	C1-C10	• Able to prepare financial statements. • Compare it with previous year's financial statement.
12	12	12	Preparation of Financial Statement Profit & Loss, Balance sheet (as per Companies Act 2013)	Day 12	Taxmann Publication	https://www.icai.org/post.html?post_id=12430		• Able to prepare financial statements. • Compare it with previous year's financial statement.
Unit III – Financial Statement Reporting – II								

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13	13	13	**Financial Statement Reporting – II**: Cash Flow Analysis – introduction	Day 13	Financial Accounting & Analysis	https://kb.icai.org/pdfs/PDFFile5b3b2fedbef0e3.22139651.pdf		• Developing the basic understanding of cash flow statement.
14	14	14	CFS - features, objectives, importance, concept of cash and cash equivalents,	Day 14	Financial Accounting & Analysis	https://kb.icai.org/pdfs/PDFFile5b3b2fedbef0e3.22139651.pdf		• Developing the understanding and various terms of cash flow statement.
15	15	15	Cash flow from investment activeti-es & financing activities	Day 15	Financial Accounting & Analysis	https://kb.icai.org/pdfs/PDFFile5b3b2fedbef0e3.22139651.pdf		• Able to understand cash flow through investment and finance activity.
16	16	16	cash flow from operating activities	Day 16	Financial Accounting & Analysis	https://kb.icai.org/pdfs/PDFFile5b3b2fedbef0e3.22139651.pdf		• Able to understand cash flow through investment and finance activity.
17	17	17	Preparation of Cash Flow Statement (as per Companies Act 2013)	Day 17	Financial Accounting & Analysis	https://kb.icai.org/pdfs/PDFFile5b3b2fedbef0e3.22139651.pdf		• Can prepare the cash flow statement. • Can do an analysis and make a sense out of it.
18	18	18	Preparation of Cash Flow Statement (as per Companies Act 2013)	Day 18	Financial Accounting & Analysis	https://kb.icai.org/pdfs/PDFFile5b3b2fedbef0e3.22139651.pdf		• Can prepare the cash flow statement. • Can do an analysis and make a sense out of it.
Unit IV – Analysis of financial Statement – I:								
19	19	19	Introduction, Asses-sment of Business Perform-ance through Ratio Analysis	Day 19	Financial Accounting & Analysis	https://ca-intermediate.in/wp-content/uploads/2018/08/Chapter-3-Financial-Analysis-and-Planning-Ratio-Analysis.pdf		• Able to understand the basics of Ratio Analysis. • Learn the various ratios.
20	20	20	Concept of Ratio, significance of ratio analysis,	Day 20	Financial Accounting & Analysis Accounts for Management",", Taxmann Publication	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Understand the significance..

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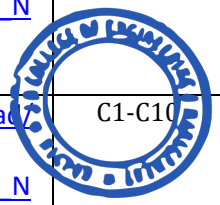
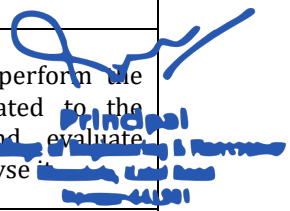
21	21	21	Interpretation of financial performance using ratio.	Day 21	Financial Accounting & Analysis Accounts for Management",", Taxmann	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Able to interpret the financial performance
22	22	22	Profitability Ratio, Liquidity Ratio	Day 22	Financial Accounting & Analysis Accounts for Management",", Taxmann	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Able to interpret the financial performance • Applying the Profitability and Liquidity ratio
23	23	23	Solvency Ratio, Activity Ratio & efficiency Ratio,	Day 23	Financial Accounting & Analysis Accounts for Management",", Taxmann	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Able to interpret the financial performance • Applying the Solvency, activity and efficiency ratio.
24	24	24	Practice problems	Day 24	Financial Accounting & Analysis Accounts for Management",", Taxmann	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Ensure hold over the topic.
Unit V – Analysis of financial Statement – II								
25	25	24	Techniques of Financial statement Analysis	Day 25	Financial Accounting & Analysis	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Develop the idea of various techniques of financial statement analysis.
26	26	25	Common size statement, Trend Analysis	Day 26	Financial Accounting & Analysis	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Able to perform the task related to this and evaluate and analyse it.
27	27	26	Inter Firm Comparison, Intra Firm Comparison	Day 27	Financial Accounting & Analysis	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Able to perform the task related to the topic and evaluate and analyse it.
28	28	27	Du-Pont Analysis	Day 28	Financial Accounting & Analysis	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_N	C1-C10	• Able to perform the task related to the topic and evaluate and analyse it.





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29	29	28	Numerical problems	Day 29	Financial Accounting & Analysis	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Able to perform the task related to the topic and evaluate and analyse it.
30	30	29	Numerical problems of all topics	Day 30	Financial Accounting & Analysis	https://icmai.in/upload/Students/Syllabus-2012/Study_Material_New/Final-Paper20-Revised.pdf		• Able to perform all the task of the course and able to evaluate and analyse it.

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	Valuation of inventory, depreciation and accounting of fixed assets.	06	
2	Final Account	08	
3	Cash Flow Statement.	08	
4	Ratio analysis	10	
5	Analysis of financial statement II	06	

Assignment Plan

Assignment No.	Topic	Given Date
1	Final accounts and Cash Flow Statement	
2	Ratio analysis and various analysis of 5th module.	

Content Beyond Syllabus Topic – Planned

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Sr. No.	Content Beyond Syllabus Topic	Date Given	Mapped with CO's not covered in TP
1	Practical application of theoretical topics.		
2	Role play.		

Text Books / Reference Books:

Code	Title of the Book	Author Name/Designation/ Organization	Publisher	Edition/ Publication Year
T1	Financial Accounting for Management	N. Ramchandran, Ram Kumar Kakani	Tata Mc Gram Hill	2nd Edition
T2	Financial Accounting & Analysis	Narender Ahuja & Varun Dawar,	Taxmann Publication	1st Edition
T3	Financial Accounting Management an Analytical Perspective	Ambrish Gupta	Pearson	
T4	Accounts for Management	Sehgal	Taxmann Publication	

Company/Industry:

Code	Company/Industry Name	Website	Detailed Information
C1	**All Company.**		As per the notification, Indian accounting standards (Ind AS) converged with international financial reporting standards (IFRS) shall be implemented on voluntary basis from 1st April, 2015 and mandatory from 1st April, 2016.

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

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