Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Scheme and detailed syllabus (DJ19)

Second Year B.Tech.

in

Electronics & Telecommunication Engineering

(Semester III and IV)

Revision: 1 (2019)
With effect from the Academic Year: 2020-2021

1st July, 2020

Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA : 3.18)

Scheme for Second Year Undergraduate Program in Electronics & Telecommunication Engineering : Semester III (Autonomous)
(Academic Year 2020-2021)

Semester III

Sr No	Course Code	Course	Teaching Scheme				Semester End Examination (A)						Continuous Assessment (B)					Aggregate (A+B)	Credits earned	
			Theory (hrs.)	Practical (hrs.)	Tutorial (hrs.)	Credits	Duration (Hrs)	Theory	Oral	Pract	Oral & Pract	SEE Total (A)	Term Test 1 (TT1)	Term Test 2 (TT2)	Avg (TT1 & TT2)	Term Work Total	CA Total (B)			
1	DJ19ECC301	Engineering Mathematics III	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19ECT301	Engineering Mathematics III- Tutorial	--	--	2	1	--	--	--	--	--	--	--	--	--	25	25	25	1	
2	DJ19ECC302	Analog Circuit Design	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19ECL302	Analog Circuit Design -Laboratory	--	2	--	1	2	--	--	--	25	25	--	--	--	25	25	50	1	
3	DJ19ECC303	Digital System Design	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19ECL303	Digital System Design- Laboratory	--	2	--	1	2	--	--	--	25	25	--	--	--	25	25	50	1	
4	DJ19ECC304	Electrical Network Analysis and Synthesis	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19ECT304	Electrical Network Analysis and Synthesis-Tutorial	--	--	2	1	--	--	--	--	--	--	--	--	--	25	25	25	1	
5	DJ19ECC305	Signals and Systems	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19ECL305	Signals and Systems- Laboratory	--	2	--	1	--	--	25	--	--	25	--	--	--	25	25	50	1	
6	DJ19ECL306	Object Oriented Programing - Laboratory	--	4	--	2	2	--	--	25	--	25	--	--	--	25	25	50	2	2
7	DJ19A2	Innovative Product Development-I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	DJ19A3	Constitution of India	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
		Total	**16**	**10**	**4**	**22**	**21**	**375**	25	**25**	**50**	**475**	**125**	**125**	**125**	**150**	**275**	**750**	**22**	

Prepared by | Checked by | **Head of the Department** | **Vice Principal** | **Principal**

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Scheme for Second Year Undergraduate Program in Electronics & Telecommunication Engineering : Semester IV (Autonomous)
(Academic Year 2020-2021)

Semester IV

Sr	Course Code	Course	Teaching Scheme				Semester End Examination (A)						Continuous Assessment (B)					Aggregate (A+B)	Credits earned	
			Theory (hrs.)	Practical (hrs.)	Tutorial (hrs.)	Credits	Duration (hrs.)	Theory	Oral	Pract	Oral & Pract	SEE Total (A)	Term Test 1 (TT1)	Term Test 2 (TT2)	Avg (TT1 & TT2)	Term Work Total	CA Total (B)			
1	DJ19ECC401	Engineering Mathematics IV	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19ECT401	Engineering Mathematics IV - Tutorial	--	--	2	1	--	--	--	--	--	--	--	--	--	25	25	25	1	
2	DJ19ECC402	Analog Communication	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19ECL402	Analog Communication - Laboratory	--	2	--	1	2	--	--	--	25	25	--	--	--	25	25	50	1	
3	DJ19ECC403	Integrated Circuits	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19ECL403	Integrated Circuits - Laboratory	--	2	--	1	2	--	--	--	25	25	--	--	--	25	25	50	1	
4	DJ19ECC404	Electromagnetics and Wave Propagation	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	4
	DJ19ECT404	Electromagnetics and Wave Propagation - Tutorial	--	--	2	1	--	--	--	--	--	--	--	--	--	25	25	25	1	
5	DJ19ECL405	Python Programing - Laboratory	--	2	--	1	2	--	--	25	--	25	--	--	--	25	25	50	1	1
6	DJ19IHC1	Universal Human Values	2	--		2	3	75	--	--	--	75	25	25	25	--	25	100	2	3
	DJ19IHT1	Universal Human Values -Tutorial	--	--	1	1	--	--	--	--	--	--	--	--	--	25	25	25	1	
7	DJ19A4	Innovative Product Development -II	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
		Total	**14**	**6**	**5**	**20**	21	375	--	25	50	450	**125**	**125**	**125**	**150**	**275**	**725**	**20**	

Prepared by | Checked by | **Head of the Department** | **Vice Principal** | **Principal**

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester- III (Autonomous)
(Academic Year 2020-2021)

<table>
<tr><td colspan="8">Program: Second Year Electronics and Telecommunication Engineering</td><td colspan="3">Semester: III</td></tr>
<tr><td colspan="8">Course: Engineering Mathematics III</td><td colspan="3">Course Code: DJ19ECC301</td></tr>
<tr><td colspan="8">Course: Engineering Mathematics III -Tutorial</td><td colspan="3">Course Code: DJ19ECT301</td></tr>
<tr><td colspan="4" rowspan="3">Teaching Scheme
(Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="2">Lectures</td><td rowspan="2">Practical</td><td rowspan="2">Tutorial</td><td rowspan="2">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="4">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td rowspan="3">3</td><td rowspan="3">--</td><td rowspan="3">2</td><td rowspan="3">3+1=4</td><td colspan="3">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">25</td></tr>
<tr><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory</td><td>Tutorial / Mini project / presentation/ Journal</td></tr>
<tr><td>--</td><td>--</td><td>--</td><td>--</td><td>25</td><td>25</td></tr>
</table>

Objectives:

1. To build the strong foundation in Mathematics of learner needed for the field of Electronics andTelecommunication Engineering.
2. To provide learner with mathematics fundamentals necessary to formulate, solve and analyses complexengineering problems.
3. To prepare student to apply reasoning informed by the contextual knowledge to engineering practice.
4. To prepare learner to work as part of teams on multi-disciplinary projects.

Outcomes: On completion of the course, learner will be able to

1. Learner will demonstrate basic knowledge of Laplace Transform. Fourier series, Vector Algebra and ComplexVariable.
2. Learner will demonstrate an ability to identify and Model the problems of the field of Electronics andTelecommunication Engineering and solve it.
3. Learner will be able to apply the application of Mathematics in Electronics and Telecommunication Engineering.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Laplace Transform:** Laplace Transform (LT) of Standard Functions: Definition of Laplace transform, Condition of Existence of Laplace transform, Laplace transform of e^{at}, $\sin(at)$, $\cos(at)$, $\sinh(at)$, $\cosh(at)$, t^n. Heaviside unit step function, Dirac-delta function, Laplace transform of Periodic function Properties of Laplace Transform: Linearity, first shifting theorem, second shifting theorem, multiplication by t^n,Division by t, Laplace Transform of derivatives and integrals, change of scale, convolution theorem, Evaluation of integrals using Laplace transform.	**10**
2	**Inverse Laplace Transform & its Applications:** Partial fraction method, Method of convolution, Laplace inverse by derivative. Applications of Laplace Transform: Solution of ordinary differential equations, Solving RLC circuit differential equation of first order and second order with boundary condition using Laplace transform (framing of differential equation is not included).	**08**
3	**Fourier Series:** Introduction: Orthogonal and orthonormal set of functions, Introduction of Dirichlet‘s conditions, Euler‘s formulae. Fourier Series of Functions: Exponential, trigonometric functions of any period =2L, even and odd functions, half range sine and cosine series. Complex form of Fourier series.	**08**
4	**Vector Algebra, Vector Differentiation & Vector Integral :** Vector differentiation, Gradient of scalar point function, Divergence and Curl of vector point function. Properties: Solenoidal and irrotational vector fields, conservative vector field. Vector Integral: Green‘s theorem in a plane, Gauss‘ divergence theorem and Stokes‘ theorem.	**09**
5	**Complex Variable:** Analytic Function: Necessary and sufficient conditions (No Proof), Cauchy Riemann equation Cartesian form (No Proof) Cauchy Riemann Equation in polar form (with Proof), Milne Thomson Method and its application, Harmonic function, orthogonal trajectories. Mapping: Conformal mapping, Bilinear transformations, cross ratio, fixed points.	**07**

Books Recommended:

Text books:

1. H.K. Das, *Advanced Engineering Mathematics*, S. Chand, 2008.
2. Kanti B. Datta, *Mathematical Methods in Science and Engineering*, 1st Edn, Cengage India Publication.
3. B.S. Grewal, *Higher Engineering Mathematics*, 44th Edn, Khanna Publication.

Reference Books:

1. B. V. Ramana, *Engineering Mathematics*, 2nd Edn, Tata McGraw Hill Publication
2. C. R. Wylie and L. C. Barret, *Advanced Engineering Mathematics*, 6th Edn, Tata McGraw Hill Publication.
3. Erwin Kreysizg, *Advanced Engineering Mathematics*, 10th Edn, Wiley Publication.
4. Murry R. Spieget, *Vector Analysis*, 2nd Edn, McGraw Hill Publication.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Tutorials: (Details of Term work)

1. Term work shall consist of minimum eight tutorials.

The distribution of marks for term work shall be as follows:

Tutorials: 25 marks

The final certification and acceptance of term work will be subject to satisfactory performance of Tutorial work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester- III (Autonomous)
(Academic Year 2020-2021)

<table>
<tr><td colspan="8">Program: Second Year Electronic and Telecommunication Engineering</td><td colspan="3">Semester: III</td></tr>
<tr><td colspan="8">Course: Analog Circuit Design</td><td colspan="3">Course Code: DJ19ECC302</td></tr>
<tr><td colspan="8">Course: Analog Circuit Design - Laboratory</td><td colspan="3">Course Code: DJ19ECL302</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="4">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td colspan="4">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Total Term work</td><td rowspan="2">50</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">2</td><td rowspan="2">--</td><td rowspan="2">3+1=4</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory</td><td>Tutorial / Mini project / presentation/ Journal</td></tr>
<tr><td>--</td><td>--</td><td>25</td><td>15</td><td>10</td><td>25</td></tr>
</table>

Pre-requisite:

2. Basic Electrical & Electronics Engineering.
3. Engineering Physics-1.

Objectives:

1. To understand operation of semiconductor devices.
2. To understand DC analysis and AC models of semiconductor devices.
3. To apply concepts for the design of Amplifiers
4. To verify the theoretical concepts through laboratory and simulation experiments.
5. To implement mini projects based on concept of electronics circuit concepts.

Outcomes: On completion of the course, learner will be able to:

1. Understand the current voltage characteristics of semiconductor devices,
2. Analyze dc circuits and relate ac models of semiconductor devices with their physical operation.
3. Design and analyze of amplifier circuits.
4. Evaluate frequency response to understand behavior of Electronics circuits.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Bipolar Junction Transistor:** BJT characteristics, DC load line and regions of operation, transistor as a switch. DC analysis of common BJT circuits, analysis and design of fixed bias, collector to Base bias and voltage divider bias, stability factor analysis.	**06**
2	**BJT Amplifier:** Introduction: Understanding of amplification concept with reference to input/output characteristics, AC load line analysis, definition of amplifier parameters Zi, Z0, Av and Ai, graphical analysis to evaluate parameters. Small Signal mid Frequency Models: Hybrid-pi model, early effect, h-parameter Model. Small Signal amplifier Analysis: Small signal analysis of CE, CB, and CC configurations using hybrid-pi model.Low frequency and high frequency response amplifier.	**10**
3	**Introduction to MOSFET:** MOSFET: Symbol, Types of MOSFET - Depletion and Enhancement type MOSFET (N channel and P channel), Construction, Operation, and V-I characteristics of MOSFET.MOSFET biasing, MOSFET as a switch, MOSFET as amplifier.	**06**
4	**Multistage amplifier:** Introduction to multistage amplifier, Frequency response of coupled amplifiers. Cascaded amplifiers (CE-CE, CS-CS). Darlington emitter follower (CC-CC). Cascode amplifier (CE-CB).Design of single stage and multistage amplifier: Design of single stage CE, and CS.Amplifier. Design of two stage CE-CE, and CS-CS amplifier.	**07**
5	**Power Amplifiers:** Introduction to power amplifier, Need of power amplifier and Harmonic distortion. Power efficiency of class A, B, AB and C amplifier.	**06**
6	**Feedback amplifiers and oscillators:** Concepts of Feedback: Concept of negative Feedback, voltage / current, series, Shunt feedback. Positive feedback. Introduction to Oscillator: Introduction, Operation of oscillator. Types of Transistor oscillators.RC oscillators: Phase shift and Wein bridge. LC Oscillators: Hartley, Colpitt's and Clapp.Tuned Oscillator: Twin-T oscillator and crystal oscillator.	**07**

List of Laboratory Experiments: (minimum eight)

1. BJT Biasing.
2. Single stage Common Emitter Amplifier
3. Single Stage CS Amplifier using MOSFET.
4. Two stage CE-CE Amplifier.
5. Two stage CS-CS Amplifier
6. Darlington Emitter Follower.
7. Complementary symmetry Class B Push Pull Power amplifier
8. Negative Feedback Amplifier
9. RC Phase Shift Oscillator.
10. LC Oscillator.
11. Any other experiment based on syllabus may be included, which would help the learner to understand topic/concept.
12. One Mini Project based on the theory learnt in Analog Circuit Design course.

Books Recommended:

Textbooks:

1. D. A. Neamen, *Electronic Circuit Analysis and Design*, 2nd Edn, Tata McGraw Hill.
2. J B. Gupta, *Electronic Devices and Circuits*, 6th Edn, Katson Education Series.
3. David A. Bell, *Electronic devices and circuits*, 5th Edn, Oxford University higher education, 2008.
   Boylestad and Nashelesky, *Electronic Devices and Circuits Theory*, 11th Edn, Pearson Education.

Reference Books:

1. A. K. Maini, *Electronic Devices and Circuits*, Wiley Publication, 2009.
2. T. L. Floyd, *Electronic Devices*, 9th Edn Prentice Hall.
3. A. Rockett, *Material Science of Semiconductors*, 1st Edn, Springer.
   A. Mottershead, *Electronic Device s and Circuits; an Introduction*, PHI Learning, 1979.
4. S. Sedra, K. C. Smith, and A. N. Chandorkar, *Microelectronic Circuits Theory and Applications*, 6th Edn. International Version, OXFORD International Students.
5.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

1. Oral examination will be based on the entire syllabus including, the practical's performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

1. Term work shall consist of minimum 8 experiments, and a case study based on any one topic is compulsory.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments): 15 Marks
ii. Journal Documentation (Write-up, Assignments, Case study): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of Laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester- III (Autonomous)
(Academic Year 2020-2021)

Program: Second Year Electronics and Telecommunication Engineering	**Semester: III**
Course: Digital System Design	**Course Code: DJ19ECC303**
Course: Digital System Design - Laboratory	**Course Code: DJ19ECL303**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				75			**25**	**25**	**25**	**100**
				Laboratory Examination			**Term work**		**Total Term work**	**50**
3	**2**	**--**	**3+1=4**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory**	**Tutorial / Mini project / presentation/ Journal**		
				--	**--**	**25**	**15**	**10**	**25**	

Pre-requisite:

1. Basic Electrical & Electronics Engineering.

Objectives:

1. To introduce different digital codes and their conversions.
2. To introduce methods for minimizing logical expressions.
3. To outline the formal procedure to design combinational logic circuits.
4. To introduce flip flops and outline the formal procedure to sequential circuits.
5. To illustrate concept of programmable devices

Outcomes: On successful completion of the course, learner will be able to:

1. Explain different digital codes and their conversions.
2. Minimize logic expressions using various reduction techniques
3. Analyze and design combinational logic circuits
4. Design flip-flops using logic gates and use them to realize different sequential circuits
5. Classify different programmable logic devices.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Digital codes and binary arithmetic:** Signed Binary number representation: Sign Magnitude, 1's complement, 2's complement representation and binary arithmetic's. Codes: BCD, Excess-3, Gray code, Binary Code and their conversions.	**04**
2	**Minimization techniques and Logic gates:** Logic Gates: AND, OR, NOT, NAND, NOR, Exclusive–OR and Exclusive–NOR, Implementations of Logic Functions using universal gates. Boolean postulates and laws – De-Morgan's Theorem, Boolean expression - Minterm – Maxterm - Sum of Products (SOP) – Product of Sums (POS), Minimization of Boolean expressions –– Karnaugh map Minimization – Quine - Mc Cluskey method of minimization, Don't care conditions.	**12**
3	**Design of Combinational Logic :** Introduction to combinational logic, Code converter: BCD, Excess-3, Gray code, Binary Code, Half- Adder, Full Adder, Half Subtractor, Full Subtractor, Binary Adder, BCD adder, Look ahead carry generator, Multiplexers- MUX tree, De-multiplexer & Decoders, Implementation of SOP and POS using Multiplexer & De-multiplexer/Decoder.	**12**
4	**Sequential Logic Design :** Introduction to sequential logic, Flip- flop: SR, JK, D, T; Preset & Clear, Truth Tables and Excitation tables, Conversion from one type to another type of Flip Flop,Shift Registers: SISO, SIPO, PISO, PIPO, Bi-directional, Counters: Asynchronous counter,Synchronous counter, ring counters, Johnson Counter, Modulus of the counter. State Machines: Basic design steps- State diagram, State table, State reduction, State assignment, Mealy and Moore machines representation, Sequence detector.	**10**
5	**Programmable Logic Devices:** Programmable logic devices: Architecture of PROM, PAL, PLA, Designing combinational circuits using PLDs. General Architecture of FPGA and CPLD.	**04**

List of Laboratory Experiments: (minimum eight)

1. Verify different logic gates (introduce logic families CMOS and TTL and electrical and switching parameters)
2. Simplification of Boolean functions.
3. Verify Universal gates NAND and NOR and design EXOR and EXNOR gates using Universal gates.
4. Implement Half adder, Full adder, Half subtractor and Full subtractor circuits.
5. Implement BCD adder using four bit binary adder IC-7483.
6. Flip flops conversion JK to D, JK to T and D to TFF.
7. Implement logic equations using Multiplexer.

8. Design synchronous MOD N counter using IC-7490.

9. Verify encoder and decoder operations.

10. Implement digital circuits to perform binary to gray and gray to binary operations.

11. Verify truth table of different types of flip flops.

12. Verify different counter operations.

Books Recommended:

Text Book

1. John F. Wakerly, *Digital Design Principles and Practices*, 4th Edn, Pearson Education.

2. R. P. Jain, *Modern Digital Electronics*, 3rd Edn, Tata McGraw Hill Education.

Reference Books:

1. Morris Mano, Michael D. Ciletti, *Digital Design*, 4th Edn, Pearson Education.

2. Thomas L. Floyd, *Digital Fundamentals*, 11th Edn, Pearson Prentice Hall.

3. Mandal, *Digital Electronics Principles and Applications*, 1st Edn, Tata McGraw Hill Education.

4. Ronald J. Tocci, Neal S. Widmer, *Digital Systems Principles and Applications*, 8th Edn, Pearson Publication,

5. Donald P. Leach, Albert Paul Malvino, Gautam Saha, *Digital Principles and Applications*, 7th Edn, Tata McGraw Hill.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

Oral examination will be based on the entire syllabus including, the practicals performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester. Total duration allotted for writing each of the paper is 1 hr.
2. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

1. Term work shall consist of minimum 7 experiments and one mini project

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments): 15 Marks
ii. Journal Documentation (Write-up and Mini project: 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester- III (Autonomous)
(Academic Year 2020-2021)

Program: Second Year Electronics and Telecommunication Engineering	**Semester: III**
Course: Electrical Network Analysis and Synthesis	**Course Code: DJ19ECC304**
Course: Electrical Network Analysis and Synthesis -Tutorial	**Course Code: DJ19ECT304**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				75			**25**	**25**	**25**	**100**
				Laboratory Examination			**Term work**		**Total Term work**	**25**
3	**--**	**2**	**3+1= 4**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory**	**Tutorial / Mini project / presentation/ Journal**		
				--	**--**	**--**	**--**	**25**	**25**	

Pre-requisite:

1. Basic Electrical & Electronics Engineering
2. Engineering Mathematics-II

Objectives:

1. To analyze the Circuits in time and frequency domain
2. To study network Topology, network Functions, two port network.
3. To synthesize passive network by various methods

Outcomes: On completion of the course, learner will be able to:

1. Apply their knowledge in analyzing Circuits by using network theorems.
2. Apply the time and frequency method of analysis.
3. Find the various parameters of two port network.
4. Apply network topology for analyzing the circuit
5. Synthesize the network using passive elements.

Unit	Detailed Syllabus: (unit wise)	Duration
1	**Electrical circuit analysis:** Analysis of DC & AC Circuits: Analysis of Circuits with and without dependent sources using generalized loop and node matrix methods, Analysis: Mesh, Super mesh, Node and Super Node. Circuit Theorems: Superposition, Thevenin's, Norton's, Maximum Power Transfer. **Magnetic circuits**: Concept of Self and mutual inductances, coefficient of coupling, dot convention, equivalent circuit, Coupled circuit- solution using mesh analysis	**10**
2	**Graph Theory:** Objectives of graph theory, Linear Oriented Graphs, graph terminologies, Matrix representation of a graph: Incidence matrix, Circuit matrix, Cut-set matrix, reduced incident matrix, tieset matrix, f-cutset matrix. KVL & KCL using matrix, solution of resistive networks and principle of duality.	**06**
3	**Time and frequency domain analysis:** Time domain analysis of R-L and R-C Circuits: Forced and natural response, initial and finalvalues. Time domain analysis of R-L-C Circuits: Forced and natural response, Over damped and under damped series RLC circuit. Frequency domain analysis: Frequency – domain representation of R, L, C, initial value theorem & final value theorem, applications of Laplace Transform in analysing electrical circuits	**08**
4	**Network functions and Realization:** Network functions for the one port and two port networks, Driving point and transfer functions, Poles and Zeros of Network functions, necessary condition for driving point functions, necessary condition for transfer functions, Hurwitz Criterion Concept of positive real function, testing for necessary and sufficient conditions for Positive Real Functions, Synthesis of LC, RC & RL Circuits: properties of LC, RC & RL driving pointfunctions, LC, RC & RL network Synthesis in Cauer-I & Cauer-II, Foster-I & Foster-II forms	**08**
5	**Two port Network:** Parameters: Open Circuits, short Circuit, Transmission and Hybrid parameters, relationship among parameters, conditions for reciprocity and symmetry Interconnections of Two-Port networks (Series, Parallel, Cascaded, Series- Parallel), T & π representation.	**08**

Books Recommended:

Text books:

1. Franklin F Kuo, *Network Analysis and Synthesis*, 2nd Edn, Wiley Publication.
2. M E Van Valkenburg, *Network Analysis*, Prentice-Hall of India Pvt. Ltd, New Delhi, 26th Indian Reprint,2000.
3. Ravish Singh, *Circuit Theory and Networks*, 2nd Edn, Tata McGraw-Hill Publication.

Reference Books:

1. A Chakrabarti, *Circuit Theory*, 6th Edn, Dhanpat Rai Publication.
2. Sudhakar, Shyammohan S. Palli, *Circuits and Networks*, 5th Edn, McGraw Hill Publication.
3. Smarajit Ghosh, *Network Theory Analysis and Syntshesis*, 1st Edn, PHI Publication.
4. K.S. Suresh Kumar, *Electric Circuit Analysis*, 1st Edn, Pearson Publication.
5. D Roy Choudhury, Networks and Systems, 2nd Edn, New Age International Publication.

List of Tutorials

1. Determine the following using KCL, KVL, node, loop analysis and circuit simplification techniques
   a Currents through various given branches
   b Voltages across the given branches
2. Determine the following using Network Theorems.
   a Currents through various given branches
   b Voltages across the given branches
   c A C analysis of coupled coils considering dot convention
3. Carry out the following analysis of a given network.
   a Draw relevant network graph, tree, co-tree, and loops.
   b Formulate incidence matrix, tie-set, cut-set matrix whichever is applicable.
4. Formulate equilibrium equations in matrix form, and solve.
5. Two port network
   Formulate the Z, Y, h, ABCD parameters and find the conditions for Reciprocity and Symmetry conditions
6. Two port network
   Determine the z, y, h, ABCD parameters for a given network
7. Analyze the given network using Laplace Transform and find the network transfer function
8. Formulate differential equation for RL and RC circuits and solve for current and voltages by determining initial conditions for driven and source free conditions.
9. Carry out the transient analysis and determine the voltage, current expressions for a given network involving RL, RC (One problem statement on each combination, source free and driven RL, RC network)
10. Carry out the transient analysis and determine the voltage, current expressions for a given network

involving RLC (One problem statement on each combination, source free and driven series RLC network)

11. Carry out the Laplace domain and determine the voltage, current expressions for a given network involving RL, RC (One problem statement on each combination, source free and driven RL, RC, network)
12. Carry out analysis of Positive Real Function
13. Realize the network function in Foster form.
14. Realize the network function in Cauer form
15. Numerical from previous years GATE Examination paper.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

1. Term work shall consist of minimum 8 tutorials covers all modules.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester- III (Autonomous)
(Academic Year 2020-2021)

<table>
<tr><td colspan="8">Program: Second Year Electronics and Telecommunication Engineering</td><td colspan="2">Semester: III</td></tr>
<tr><td colspan="8">Course: Signals and Systems</td><td colspan="2">Course Code: DJ19ECC305</td></tr>
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<tr><td colspan="4" rowspan="2">Teaching Scheme
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<tr><td colspan="3">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
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<tr><td rowspan="2">3</td><td rowspan="2">2</td><td rowspan="2">--</td><td rowspan="2">3+1=4</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory</td><td>Tutorial / Mini project / presentation/ Journal</td></tr>
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</table>

Pre-requisite:

1. Engineering Mathematics – III
2. Basic Electrical & Electronics Engineering

Objectives:

1. To introduce students the concept and theory of signals and systems needed in electronics and telecommunication engineering fields.
2. To introduce students to the basic idea of signal and system analysis and its characterization in time and frequency domain.

Outcomes: On completion of the course, learner will be able to:

1. Classify, and perform mathematical operations on various types of signals and systems.
2. Determine the impulse response and analyze LTI systems in time domain using convolution integral andconvolution sum.
3. Analyze the effect of frequency transformation of signals and systems in continuous and discrete time domain.
4. Apply the concepts of Signals and Systems in different areas of Telecommunication.

	Detailed Syllabus: (unit wise)	
Unit	**Description**	**Duration**
1	**Introduction to signals:** Definition, sampling theorem, sampling of continuous time signals, Nyquist Criterion, concept of aliasing, concept of digital frequency. Continuous and discrete time representation of elementary signals: exponential, sine, step, impulse, ramp, rectangular, triangular, signum, sinc, operations on signals (shift, invert, scale) Classification of signals: Continuous and discrete time, deterministic and non-deterministic, periodic and aperiodic, symmetric (even) and asymmetric (odd), energy and power, causal and anti-causal signal Introduction to systems: Definition, Classification of systems: Static and dynamic, time variant and time invariant, linear and nonlinear, causal and non-causal, stable and unstable systems, Invertible and Non-Invertible Systems.	**10**
2	**Response of Continuous Time–LTI System:** Representation of systems using differential equation, Impulse response and convolution integral, properties of convolution, signal responsesto CT-LTI system, system stability Impulse, step and, system stability Response of Discrete Time-LTI System: Representation of systems using difference equation, Impulse response characterization and convolution sum, Properties of convolution summation, Impulse response of DT-LTI system and its properties, step response, system stability. Correlation and spectral Density**:** auto-correlation, cross correlation, analogy between correlation and convolution, energy spectral density, power spectral density, relation of ESD,PSD with auto-correlation.	**10**
3	**Fourier series:** Trigonometric and exponential Fourier series representation of C T signals, Gibbs phenomenon. Fourier Transform (FT): Fourier Transform and Inverse Fourier Transform of a-periodic continuous and discrete time signals and systems, limitations of CT/DT Fourier Transform and need for Laplace/Z Transform. Overview of Laplace Transform: Need of Laplace Transform, review of unilateral and bilateral Laplace Transform, properties, inverse of Laplace Transform, concept of Region of Convergence (ROC),poles and zeros, relation between continuous time Fourier Transform and Laplace Transform.	**08**

4	**Z Transform:** Need of Z-Transform, definition of unilateral and bilateral Z Transform, Z- Transform of finite and infinite duration sequences, properties, Inverse Z-Transform, relation between discrete time Fourier Transform and Z-Transform, Z Transform of standard signals, ROCfor ZT, plotting poles and zeros of transfer function Analysis of discrete time LTI systems using Z-Transform: Transfer Function, causality and stability of systems, relation between Laplace Transform and Z–Transform. Realization structures: direct form–I, direct form–II, cascade, and parallel forms	**10**
5	**Application of Various Signals:** Types of signals used in biomedical field, Speech, Audio Processing and Multimedia (image & video) field. Application of Communication and Filter System: Modulation (Analog and Digital) process, Low Pass and Highpass filters as Systems.	**04**

List of Laboratory Experiments: (minimum eight)

1. Introduction to Matlab.
2. To plot various types of Continuous time signals.
3. To implement Sampling and reconstruction of Continuous Signals.
4. To plot various types of Discrete time signals and perform various operations on unit step signals.
5. To perform Convolution of two discrete time signals.
6. To observe frequency response of various signals.
7. To find poles, zeros and ROC of any DT system using Z transform.
8. To analyze the spectrogram of a speech signal.
9. Tutorial 1(Operation on signals).
10. Tutorial 2(Convolution sum, Convolution Integral and Correlation).
11. Tutorial 3(Fourier, Laplace Transform).
12. Tutorial 4(Z transform and Realization structures).

Books Recommended:

Text books:

1. Tarun Kumar Rawat *Signals and Systems*, 2nd Edn, 2010, Oxford.
2. B.P. Lathi, *Principles of Linear Systems and Signals*, 2nd Edn, 2010, Oxford.
3. S. L. Nalbalwar, A. M. Kulkarni and S. P. Sheth, *Signals and Systems*, 2016, Synergy Knowledgeware.
4. Simon Haykin and Barry Van Veen, *Signals and Systems*, 2nd Edn, 2004, John Wiley and Sons.
5. Alan V. Oppenhiem, Alan S. Willsky and S. Hamid Nawab, *Signals and Systems*, 2nd Edn, 2002, Prentice-Hall of India.
6. Nagoor Kani, *Signals and Systems*, 3rd Edn, 2011 Tata McGraw Hill.

Reference Books:

1. Hwei. P Hsu, *Signals and Systems*, 3rd Edn, 2010. Tata McGraw Hill.
2. V. Krishnaveni and A. Rajeshwari, *Signals and Systems*, 1st Edn, 2012 Wiley-India.
3. NarayanaIyer, *Signals and Systems*, 1st Edn, 2011 Cenage Learning.
4. Michael J Roberts, *Fundamentals of Signals and Systems*, Special Indian Economy Edition, 2009, Tata McGraw Hill.
5. Rodger E Ziemer, William H. Tranter and D. Ronald Fannin, *Signals and Systems*, 4th Edn, 2009, Pearson Education.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

Oral examination will be based on the entire syllabus including, the practicals performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

Term work shall consist of minimum 6 experiments and minimum 4 Tutorials.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments): 15 Marks
ii. Journal Documentation (Write-up, Tutorials): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester- III (Autonomous)
(Academic Year 2020-2021)

Program: Second Year Electronics & Telecommunication Engineering	**Semester: III**
Course: Object Oriented Programming - Laboratory	**Course Code: DJ19ECL306**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				--			--	--	--	--
				Laboratory Examination			**Term work**		**Total Term work**	
--	**4**	--	**2**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory**	**Mini project / presentation/ Journal**		**50**
					25	--	**15**	**10**	**25**	

Pre-requisite:

1. Programming in C

Objectives:

1. Describe the principles of Object-Oriented Programming (OOP).
2. To understand object-oriented concepts such as data abstraction, encapsulation, inheritance and polymorphism.
3. To lay a foundation for advanced programming.
4. Develop programming insight using OOP constructs.

Outcomes: On completion of the course, learner will be able to:

1. Describe the basic principles of OOP.
2. Design and apply OOP principles for effective programming.
3. Develop programming applications using OOP language.
4. Implement different programming applications using packaging.

Detailed Syllabus: (unit wise)

Unit	Description	Duration
1	**Fundamentals of C++ Programming:** Basics of C++: Introduction to OOP language and its basic features, Basic components of a C++, Program and program structure, Writing, Compiling and executing the First C++ Program. Tokens: Data types, Variables, identifiers, constants. Scope of Variables: Introduction, Syntax of declaring a variable, initializing a variable, Scope of variables, Global variable, Local variable. Functions: What is a function, Function with arguments, Function without arguments. Conditional Statements: If and Else-If statements, Nested If and Switch statements, Continue statement, Break statement. Operators: Increment, Decrement operators, Typecasting, Arithmetic Operators, Relational Operators, Logical Operators, Loops: For, While, Do…..While loops. Array: Definition, Declaration and initialization of 1D and 2D array, Accepting values from the user, Strings: Definition, Syntax for declaring a string, Syntax for initializing a string, To read a string from keyboard, String Handling functions: strcpy, strncpy, strcat, strncat, strcmp, strncmp, strtok, strlen, Structures: Introduction, Syntax, Declaration and initialization, Declaration of structure variables, Accessing structure variables. Pointers: Introduction, Syntax of Pointer, Declaration, Casting Between Numeric Address and Pointer, Constant Pointer and Pointer to Constant, Pass Pointer By Reference, Receive array with pointer, operations on pointers, Pointer Offset and Subscription, "sizeof" operator. Function call: types of function calls, function pass by value, function pass by reference.	10
2	**Classes and Constructors in C++:** Classes and Objects in C++: Defining Classes, create a class, Defining Objects, create an object of the class, Member Functions, to create a function, Encapsulation, Data Abstraction. Constructor and Destructor: To create a constructor, Parameterized constructors, Default constructor, Destructor. Static members in C++: Static Keyword, Static variable, Static member function.	08
3	**Inheritance, Polymorphism, Exception Handling in C++:** Inheritance: Concept of subclass and superclass, Types of inheritance, single level inheritance, Multilevel inheritance, Multiple Inheritance, Hierarchical Inheritance Function overloading, function overriding, difference between both. Polymorphism in C++: Polymorphism, Virtual Members, Virtual Function. Abstract class in C++: Pure virtual function-abstract class, abstract methods. Friend Function: friend function. Exception Handling: Exceptions, try, throw, catch.	10
4	**Introduction to Java:** Java History, Java Features, Java Virtual Machine, Programming Language JDK Environment and Tools, Structure of Java Program, First Java Program. Data Types and Size (Signed vs. Unsigned,	02

	User Defined vs. Primitive Data Types, Explicit Pointer type).	
5	**Inheritance, Polymorphism, Encapsulation using Java:** Classes and Methods: class fundamentals, declaring objects, assigning object reference variables, adding methods to a class, returning a value, constructors, this keyword, garbage collection, finalize() method, overloading methods, argument passing, object as parameter, returning objects, access control, static, final, nested and inner classes, command line arguments, variable-length Arguments. String: String Class and Methods in Java. Inheritances: Member access and inheritance, super class references, Using super, multilevel hierarchy, constructor call sequence, method overriding, dynamic method dispatch, abstract classes, Object class. Packages and Interfaces: defining a package, finding packages and CLASSPATH, access protection, importing packages, interfaces (defining, implementation, nesting, applying), variables in interfaces, extending interfaces, instance of operator.	**10**
6	**Exception Handling, Applets and Swing in Java:** Exception Handling: fundamentals, exception types, uncaught exceptions, try, catch, throw, throws, finally, multiple catch clauses, nested try statements, built-in exceptions, custom exceptions (creating your own exception sub classes). Managing I/O: Streams, Byte Streams and Character Streams, Predefined Streams, Reading console Input, Writing Console Output, and Print Writer class. Threading: Introduction, thread life cycle, Thread States: new, runnable, Running, Blocked and terminated, Thread naming, thread join method, Daemon thread Applet: Applet Fundamental, Applet Architecture, Applet Life Cycle, Applet Skeleton, Requesting Repainting, status window, HTML Applet tag, passing parameters to Applets, Applet and Application Program Java Swing: Introduction to swing, Components and Containers, Swing packages and event handling, Simple Swing GUI Application.	**14**

Skill-Enhancement:

The students should be trained to code in industry accepted software tools e.g. Ubuntu for C++ and Ubuntu/Eclipse for JAVA.

Suggested List of Laboratory Experiments for C++ and Java are attached in the last Page

Books Recommended:

Text Books:

1. Bjarne Stroustrup, *The C++ Programming language*, 3rd Edn, Pearson Education.
2. Yashwant Kanitkar, *Let Us C++*, 3rd Edn, BPB Publications.
3. Herbert Schidt, *Java: The Complete Reference*, Tata McGraw-Hill Publishing. Company Limited, Ninth Edition.

4. Yashwant Kanitkar, *Let Us Java*, 2nd Ed., BPB Publications.
5. Spoken Tutorials C++ of IITB: https://spoken-tutorial.org/tutorial-search/?search_foss=C+and+Cpp&search_language=English
6. Spoken Tutorials Java of IITB: https://spoken-tutorial.org/tutorial-search/?search_foss=Java&search_language=English

Reference Books:

1. Deitel, *C++ How to Program*, 4th Ed., Pearson Education.
2. D.T. Editorial Services, *Java 8 Programming Black Book*, 2015, Dreamtech Press.
3. Deitel, *Java: How to Program*, 8th Edn, PHI.
4. Grady Booch, James Rumbaugh, Ivar Jacobson, *The Unified Modeling Language user Guide*, 1st Edn, Pearson Education.

Software Tools:

1. Raptor-Flowchart Simulation: http://raptor.martincarlisle.com/
2. Eclipse: https://eclipse.org/
3. NetBeans: https://netbeans.org/downloads/
4. CodeBlock: http://www.codeblocks.org/
5. J-Edit/J-Editor/Blue J

Online Repository:

1. Google Drive
2. GitHub
3. Code Guru

Evaluation Scheme:

Semester End Examination (A):

Laboratory:

Practical examination will be based on the entire syllabus including the practical performed during laboratory sessions.

Continuous Assessment (B):

Laboratory: (Term work)

Term work shall consist of minimum 8 experiments of C++ and 8 experiments of Java and one Mini Project each of C++ and Java.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments and Mini-Project): 15 Marks
ii. Journal Documentation (Write-up, Timely submission) :10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

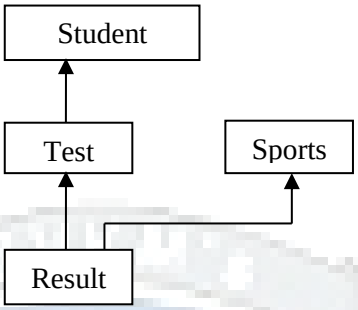
Prepared by Checked by Head of the Department Principal

LIST OF C++ PROGRAMS:	
	Fundamentals of C++ Programming:
1	Pooja would like to withdraw Rs X from an ATM. The cash machine will only accept the transaction if X is a multiple of 5, and Pooja's account balance has enough cash to perform the withdrawal transaction (including bank charges). For each successful withdrawal the bank charges Rs50.. Calculate Pooja's account balance after an attempted transaction.
2	Given a positive integer num consisting only of digits 6 and 9. Return the maximum number you can get by changing at most one digit (6 becomes 9, and 9 becomes 6)
3	You're given strings J representing the types of stones that are jewels, and S representing the stones you have. Each character in S is a type of stone you have. You want to know how many of the stones you have are also jewels. The letters in J are guaranteed distinct, and all characters in J and S are letters. Letters are case sensitive, so "a" is considered a different type of stone from "A".
4	Program that performs Insert, Delete and display operations on a Queue using Array.
5	Chef loves to play with arrays by himself. Today, he has an array A consisting of N distinct integers. He wants to perform the following operation on his array A. Select a pair of adjacent integers and remove the larger one of these two. This decreases the array size by 1. Cost of this operation will be equal to the smaller of them.
6	Write a function that reverses a string. The input string is given as an array of characters char []. Do not allocate extra space for another array, you must do this by modifying the input array in-place with O (1) extra memory. You may assume all the characters consist of printable ascii characters.
7	You are given a string representing an attendance record for a student. The record only contains the following three characters: 1. 'A' : Absent. 2. 'L' : Late. 3. 'P' : Present. A student could be rewarded if his attendance record doesn't contain more than one 'A' (absent) or more than two continuous 'L' (late). You need to return whether the student could be rewarded according to his attendance record.
8	International Morse Code defines a standard encoding where each letter is mapped to a series of dots and dashes, as follows: "a" maps to ".-", "b" maps to "-...", "c" maps to "-.-.", and so on. For convenience, the full table for the 26 letters of the English alphabet is given below: [".-","-...","-.-.","-..",".","..-.","--.","....","..",".---","-.-",".-..","--","-.","---",".--.","--.-",".-.","...","-","..-","...-",".--","-..-","-.--","--.."] Now, given a list of words, each word can be written as a concatenation of the Morse code of each letter. For example, "cba" can be written as "-.-..--...", (which is the concatenation "-.-." + "-..." + ".-"). We'll call such a concatenation, the transformation of a word. Return the number of different transformations among all words we have. Example: Input**: words = ["gin", "zen", "gig", "msg"]**
	Classes and Constructors in C++:
9	WAP to define Constructor inside the class, outside the class,

10	Parameterised constructor for prime number generation, Copy constructor for factorial number generation.
11	WAP for Destructor scope measurement.
	Inheritance, Polymorphism, Exception Handling in C++:
12	Single Inheritance: Step 1: Start the program. Step 2: Declare the base class emp. Step 3: Define and declare the function get() to get the employee details. Step 4: Declare the derived class salary. Step 5: Declare and define the function get1() to get the salary details. Step 6: Define the function calculate() to find the net pay. Step 7: Define the function display(). Step 8: Create the derived class object. Step 9: Read the number of employees.
13	Multiple Inheritance : Step 1: Start the program. Step 2: Declare the base class student. Step 3: Declare and define the function get() to get the student details. Step 4: Declare the other class sports. Step 5: Declare and define the function getsm() to read the sports mark. Step 6: Create the class statement derived from student and sports. Step 7: Declare and define the function display() to find out the total and average. Step 8: Declare the derived class object, call the functions get(), getsm() and display(). Step 9: Stop the program
14	Polymorphism Write a base class called Animal that has a method called animalSound(). Derived classes of Animals could be Pigs, Cats, Dogs, Birds - And they also have their own implementation of an animal sound (the pig oinks, and the cat meows, etc.). Now we can create Pig and Dog objects and override the animalSound() method:
15	Exception Handling Write an exception handling program to throw and catch an exception if the parameter age is greater than 18.

LIST OF JAVA PROGRAMS:

	Introduction to Java:
1	A man deposit 2000 INR in bank account at a interest rate of 6% per annum for 3 years, Write a java program calculate the simple interest at the end of 3 years. Take the inputs P, R,T from the user.
2	Find the rank of students based on total marks (Bubble Sort). No. of students=5, Subjects= Physics Chem, Maths. Marks are to be taken from the user. Keep the total in an array.
3	There are many formulae for computing π (the ratio of a circle's circumference to its diameter). The simplest is $\pi/4 = 1 - 1/3 + 1/5 - 1/7 + 1/9 - \cdots$ (1) which comes from putting $x = 1$ in the series $\arctan x = x - x^3/3 + x^5/5 - x^7/7 + x^9/9 - \cdots$ (2) (a) Write a program to compute π using Equation (1). Use as many terms in the series as your computer will reasonably allow (start modestly, with 100 terms, say, and re-run your program with more and more each time). You should find that the series converges very slowly, i.e. it takes a lot of terms to get fairly close to π. (b) Rearranging the series speeds up the convergence: $\pi/8 = 1/(1 \times 3) + 1/(5 \times 7) + 1/(9 \times 11) + \ldots$ Write a program to compute π using this series instead. You should find that you need fewer terms to reach the same level of accuracy that you got in (a). (c) One of the fastest series for π is $\pi/4 = 6 \arctan 1/8 + 2 \arctan 1/57 + \arctan 1/239$.
4	Write a menu driven program implementing a Calculator using switch case to perform mathematical operations.
5	WAP to display sum of series: 1+2+3+……. n
6	Read input through Scanner, Read input through BufferedReader
7.	Write a java program to demonstrate constructors, parameterized constructors and constructor overloading
8	WAP find area of square and rectangle using overloaded constructor.
9	WAP to display area of square and rectangle using the concept of overloaded functions.
	Inheritance, Polymorphism, Encapsulation using Java:
10	**Study of Objects and Classes** Define a class to represent a bank account. Include the following members: Data: name of the depositor account number type of account balance amount in the account Methods: a) To assign initial values b) To deposit an amount c) To withdraw an amount after checking balance. To display the name & balance

11	**Programs based on Inheritance and Interface** WAP to implement three classes namely Student, Test and Result. Student class has member as roll no, Test class has members as sem1_marks and sem2_marks and Result class has member as total. Create an interface named sports that has a member score (). Derive Test class from Student and Result class has multiple inheritances from Test and Sports. Total is formula based on sem1_marks, sem2_mark and score.  Create an interface Area & implement the same in different classes Rectangle, Circle, Triangle.
12	**Study of utility package and creating your own packages** Write a program to display current date. Also display Time in hours & minutes using Date class. WAP to create a user defined package & import the package in another program.
	I/O handling, Threading. Exception Handling, Applets and Swing in Java:
13	Java program to Java program to update in the file "friendsContact.txt" which has name and contact and change the number of an old contact
14	**Study of Multithreading.** WAP to illustrate function yield (), is Alive(), sleep(), join(). Create three threads as P, Q, R. Thread P has maximum priority, thread Q has minimum priority, thread R has normal priority.
15	Write a java program to print first 20 prime numbers and 15 Fibonacci numbers by creating two child threads and also print the total time taken by each thread for the execution.
16	Write a Graphics Program that does the following: 1. Add buttons to the South region labeled "North", "South", "East", and "West" written at the bottom 2. Create an X-shaped cross 10 pixels wide and 10 pixels high. 3. Adds the cross so that its center is at the center of the graphics canvas.
17	Draw a line, arc, rectangle, square, smiley in an Applet window.
18	GUI Programs using Swings Write a Java program to implement Swing components namely Buttons, J Labels, Checkboxes, Radio Buttons, J Scroll Pane, J List, J Combo Box, etc. to design interactive GUI. Write a program to create a window with four text fields for the name, street, city and pin code with suitable labels. Also, windows contain a button My Info. When the user types the name, his street, city and pin code and then clicks the button, the types details must appear in Arial Font with Size 32, Italics.

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester- III (Autonomous)
(Academic Year 2020-2021)

<table>
<tr><td colspan="8">Program: Second Year Electronics and Telecommunication Engineering</td><td colspan="2">Semester: III</td></tr>
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Pre-requisite:

1. Applied Mathematics, Physics and Mechanics
2. Basic Electrical & Electronics Engineering
3. Basic programming knowledge

Objectives:

1. To identify real-world problem, based on the current industrial methods and practices to connect theory with practice.
2. To identify project goals, resource requirements and present them in the form of a document.
3. To familiarize with technical and time management skills.
4. To learn the process involved in planning, designing, and estimation as well as budgeting of a project.

Outcomes: On completion of the course, learner will be able to:

1. Conduct a survey of several available literatures in the preferred field of study.
2. Demonstrate various/alternate approaches to complete a project.
3. Ensure a collaborative project environment by interacting and dividing project work among team members.
4. Manage project work effectively including the determination of scope, time, costs and quality.
5. Develop and enhance software/ hardware skills associated with the product design.

Syllabus:

Domain knowledge (any field of knowledge and beyond) needed from the following areas for the effective implementation of the project:

Microcontroller and Embedded Systems, Signal Processing, Microwave and Antennas, Networking and Internet of Things, Data science and Big data, Communication, Web and Application development, Robotics, Artificial Intelligence(AI), Machine learning(ML) etc.

Above areas can be updated, based on the technological innovations and development needed for a specific project.

Guidelines:

The main purpose of this course is to improve the students' documentation and technical skills to find a cost effective solution. Guidelines are as follows:

1. The project work is to be carried out by a group of 4/5/6 students (2^{nd} second year and 3^{rd} third year students)
2. Each group is allotted a final year student as mentor and a faculty member as guide.
3. Project topics will be floated in various domains. Each group submit three project topic preferences, out of which one topic is allotted in discussion with faculty guide and faculty coordinators.
4. Each group will identify the hardware and software requirement for their problem statement.
5. Each group will be reviewed twice in a semester (August and October) and grades will be allotted based on the various points mentioned in the evaluation scheme.
6. In the first review of the semester, each group is expected to complete literature survey, budget plan and documentation based on project methodology.
7. In the second review of the semester, each group is expected to complete 30% of project.
8. Subsequent reviews will be carried out in fourth semester.

Evaluation Scheme:

Semester review (B)

Each group will be reviewed twice in a semester by faculty guide and faculty coordinators based on the following Criteria:

1. Long term social impact
2. Innovative ideas and Motivation
3. Objective and Expected outcome
4. Literature survey and Comparative Methodology
5. Documentation
6. Project Progress/Implementation
7. Overall Presentation and Team work

The final certification and acceptance is subject to satisfactory performance of project.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester- III (Autonomous)
(Academic Year 2020-2021)

<table>
<tr><td colspan="8">Program: Common for All programs</td><td colspan="3">Semester: III</td></tr>
<tr><td colspan="8">Course: Constitution of India</td><td colspan="3">Course Code: DJ19A3</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="7">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td>Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td><td rowspan="2"></td></tr>
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<tr><td rowspan="2">01</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td colspan="3" rowspan="2">-</td></tr>
<tr><td>-</td><td>-</td><td>-</td></tr>
</table>

Objectives:

1. To provide basic information about Indian constitution.
2. To identify individual role and ethical responsibility towards society.
3. To understand human rights and its implications.

Outcomes: On completion of the course, learner will be able to

1. Have general knowledge and legal literacy and thereby to take up competitive examinations.
2. Understand state and central policies, fundamental duties.
3. Understand Electoral Process, special provisions.
4. Understand powers and functions of Municipalities, Panchayats and Co- operative Societies,
5. Understand Engineering ethics and responsibilities of Engineers
6. Understand Engineering Integrity & Reliability

Detailed Syllabus : (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction to the Constitution of India:** The Making of the Constitution and Salient features of the Constitution. Preamble to the Indian Constitution Fundamental Rights & its limitations.	**02**
2	**Directive Principles of State Policy:** Relevance of Directive Principles State Policy Fundamental Duties. Union Executives – President, Prime Minister Parliament Supreme Court of India.	**03**
3	**State Executives:** Governor, Chief Minister, State Legislature High Court of State. Electoral Process in India, Amendment Procedures, 42nd, 44th, 74th, 76th, 86th & 91st Amendments.	**03**
4	**Special Provisions**: For SC & ST Special Provision for Women, Children & Backward Classes Emergency Provisions. **Human Rights:** Meaning and Definitions, Legislation Specific Themes in Human Rights- Working of National Human Rights Commission in India Powers and functions of Municipalities, Panchyats and Co – Operative Societies.	**03**
5	**Scope & Aims of Engineering Ethics**: Responsibility of Engineers Impediments to Responsibility. Risks, Safety and liability of Engineers, Honesty, Integrity & Reliability in Engineering	**03**

Books Recommended:

Text books:

1. Durga Das Basu: "Introduction to the Constitution on India", (Students Edn.) Prentice –Hall EEE, 19th / 20th Edn., 2001
2. Charles E. Haries, Michael S Pritchard and Michael J. Robins "Engineering Ethics" Thompson Asia, 2003-08-05.

Reference Books:

1. M.V.Pylee, "An Introduction to Constitution of India", Vikas Publishing, 2002.
2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, "Engineering Ethics", Prentice – Hall of India Pvt. Ltd. New Delhi, 2004
3. Brij Kishore Sharma," Introduction to the Constitution of India", PHI Learning Pvt. Ltd., New Delhi, 2011.
4. Latest Publications of Indian Institute of Human Rights, New Delhi

Website Resources:

1. www.nptel.ac.in
2. www.hnlu.ac.in
3. www.nspe.org
4. www.preservearticles.com

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Syllabus for Second Year Electronics and Telecommunication Engineering-Semester IV (Autonomous)
(Academic Year 2020-2021)

<table>
<tr><td colspan="8">Program: Second Year Electronics & Telecommunication Engineering</td><td colspan="4">Semester: IV</td></tr>
<tr><td colspan="8">Course: Engineering Mathematics IV</td><td colspan="4">Course Code: DJ19ECC401</td></tr>
<tr><td colspan="8">Course: Engineering Mathematics IV -Tutorial</td><td colspan="4">Course Code: DJ19ECT401</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
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<tr><td colspan="3">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td colspan="3">Laboratory Examination</td><td colspan="3">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">25</td></tr>
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<tr><td>--</td><td>--</td><td>--</td><td>--</td><td>25</td><td>25</td></tr>
</table>

Pre-requisite:

1. Engineering Mathematics III

Objectives: To teach students

1. Random Variables and Random Process.
2. The design of the systems which involves randomness using mathematical analysis and computer simulations.
3. Concepts of Linear Algebra.

Outcomes: On completion of the course, learner will be able to:

1. Apply theory of probability in identifying and solving relevant problems.
2. Differentiate random variables through the use of cumulative distribution function (CDF), probability density function (PDF), probability mass function (PMF) as well as joint, marginal and conditional CDF, PDF and PMF.
3. Determine the response of a linear time invariant system to random processes.
4. Understand the theory of linear algebra and its applications to telecommunication engineering.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction to Probability and Random Variable:** Sample space, events, set operations, the notion and axioms of probability Conditional probability, Joint probability, Bayes' rule, Independence of events. Definition of Random Variable. Continuous random variables, probability density function, probability distribution function Uniform, Exponential and Gaussian continuous random variables and distributions.	**10**
2	**Operations on One and Multiple Random Variable:** Functions of a random variable and their distribution and density functions, Expectation, Variance and Moments of random Variable. Pairs of random variables, Joint CDF, Joint PDF, Independence, Conditional CDF and PDF, Conditional Expectation One function of two random variables, two functions of two random variables; joint moments,joint characteristic function, covariance and correlation-independent, uncorrelated and orthogonal random variables. Central limit theorem and its significance.	**10**
3	**Random Process:** Random process: Definition, realizations, sample paths, discrete and continuous timeprocesses. Probabilistic structure of a Random process: mean, correlation and covariance, functions, stationarity of random process. Ergodicity and WSS.	**05**
4	**Matrix theory:** Eigenvalues and Eigenvectors, properties of Eigenvalues and Eigenvectors. Cayley- Hamilton theorem, Examples based on verification of Cayley-Hamilton theorem. Similarity of matrices, Diagonalisation of matrices. Function of square matrix. Quadratric forms over real field, Reduction of quadratic form to a diagonal canonical form, Rank, index and signature of quadratic form, Sylvester's law of inertia, Value-class of quadratic form of definite, Semi-definite and indefinite.	**10**
5	**Linear Algebra:** Vector Spaces, Subspaces, Span, Basis, Dimension, Rank. Linear transformations Givens and Householder transformations. Application of SVD to principal component analysis	**07**

List of Tutorials: (minimum eight)

1. Probability: Sample Space, events, Venn Diagram, De Morgan's law, Properties of Probability, Conditional Probability.
2. Bayes' Rule, Application of probability in communication
3. Random Variables: Functions of a random variable, distribution and density functions
4. Binomial, Poisson, Geometric discrete Random variable and their distributions.
5. Transformation of random variable, characteristic function, moment generating function of Bernoulli, Poisson, exponential random variable
6. Pairs of random variable, Joint CDF, Joint PDF, conditional CDF and PDF.
7. One function of Two random variables, Two functions of Two random variables
8. Mean and variance of a Random Process.
9. Eigenvalues and eigenvectors
10. Quadratic forms.
11. Implementation of Gram Schmidt Orthogonalization process.
12. Implementation of the singular vector decomposition algorithm.

Books Recommended:

Text Books:

1. T. Veerarajan, *Probability, Statistics and Random Processes*, 1st Edn, 2018, McGraw Hill.
2. Papoulis and S. Unnikrishnan Pillai, *Probability, Random Variables and Stochastic Processes*, 4th Edn. McGraw Hill.
3. Alberto Leon Garcia, *Probability and Random Processes For Electrical Engineering*, 2nd Edn. Pearson Education.
4. B.S. Grewal, *Higher Engineering Mathematics*, 44th Edn, Khanna Publishers.

Reference Books

1. Miller, *Probability and Random Processes-With Applications to Signal Processing and Communication*,1st Edn, 2007, Elsevier.
2. Dimitris. G. Manolakis, Vinay Ingale, and Stephen M. Kogon, *Statistical and Adaptive Signal Processing*,, 2005, Artech House, Inc.
3. Todd K. Moon and Wynn C. Stirling, *Mathematical Methods and Algorithms for Signal Processing"*, 2000, Pearson Education, Inc.
4. Seymour Lipschutz and Marc Lipson ― *Linear Algebra‖ Schaum's Outline Series*, 1st Edn, 2020, Mc-Graw Hill Publication.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Tutorials: (Details of Term work)

1. Term work shall consist of minimum eight tutorials.
2. The distribution of marks for term work shall be as follows:

   Tutorials : 25 marks

The final certification and acceptance of term work will be subject to satisfactory performance of Term work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester IV (Autonomous)
(Academic Year 2020-2021)

Program: Second Year Electronics and Telecommunication Engineering	**Semester: IV**
Course: Analog Communication	**Course Code: DJ19ECC402**
Course: Analog Communication - Laboratory	**Course Code: DJ19ECL402**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				75			**25**	**25**	**25**	**100**
				Laboratory Examination			**Term work**		**Total Term work**	**50**
3	**2**	**--**	**3+1=4**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory Work**	**Tutorial / Mini project / presentation/ Journal**		
				--	**--**	**25**	**15**	**10**	**25**	

Pre-requisite:

1. Analog Circuits Design
2. Engineering Mathematics- III

Objectives:

1. To understand basics of communication systems and effect of noise on communication.
2. To understand various Continuous and pulse modulation, demodulation techniques.
3. Get acquainted with various types of multiplexing techniques and their use in communication.

Outcomes: On completion of the course, learner will be able to:

1. Describe different types of noise and its effect on communication system.
2. Analyze AM, FM, PM modulation and Demodulation systems.
3. Explain the block diagram of various types of receiver for analog communication.
4. Apply Sampling Technique in various pulse modulation systems.
5. Explain and differentiate TDM and FDM techniques used in communication.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Basics of Communication System:** Block diagram, electromagnetic spectrum, signal bandwidth and power, types of communication channels, Introduction to time and frequency domain. Types of noise, signal to noise ratio, noise figure and noise temperature.	**04**
2	**Amplitude Modulation and Demodulation:** Basic concepts, signal representation, need for modulation. DSBFC: Mathematical analysis, time domain waveforms, frequency spectrum, modulationindex, concept of under modulation, over modulation and critical modulation, bandwidth, voltage distribution and power calculations. Low level and high level modulation, simple diode detector, practical diode detector, square law detector. DSBSC: Mathematical analysis, time domain waveforms, frequency spectrum, modulation index, bandwidth, voltage distribution and power calculations. Multiplier modulator, balancedModulator. SSBSC: Mathematical analysis, time domain waveforms, frequency spectrum, modulation index, bandwidth, voltage distribution and power calculations. SSB generation, Filter method, Phase shift method, Third method. ISB: Basic concepts, transmitter and receiver block diagram, applications SB: Basic concepts, application in television. Comparison of different AM techniques	**10**
3	**Angle Modulation and Demodulation:** Frequency modulation (FM): Basic concept, mathematical analysis, time domain waveform, spectrum of FM wave, maximum deviation, modulation index, bandwidth requirement, narrowband FM and wideband FM, Effect of noise, noise triangle, pre-emphasis and de-emphasis, FET reactance modulator, varactor diode modulator, frequency stabilized reactance modulator, indirect method of FM generation. Phase modulation (PM): Basic concept, mathematical analysis, time domain waveform, maximum deviation, modulation index, Principle and working of transistor direct PM modulator FM demodulation: Balance slope detector, Foster-Seely discriminator, ratio detector, amplitude limiting and thresholding. Comparison between FM and PM, Applications of FM and PM.	**10**

4	**Radio Receivers:** Receiver parameters, TRF receiver, problems in TRF receiver, Super - heterodyne receiver, choice of IF. Importance of RF amplifier, tracking circuit, mixer, IF amplifier, simple AGC, AFC in super-heterodyne receiver. Comparison of FM receiver with AM receiver, communication receiver	**06**
5	**Pulse Modulation & Demodulation:** Sampling theorem, Nyquist criteria Sampling techniques, aliasing error and aperture effect PAM,PWM, PPM generation anddetection Pulse Code Modulation, delta modulation, adaptive delta modulation, principle, generation and detection Applications of pulse communication	**08**
6	**Multiplexing & De-multiplexing:** Frequency Division Multiplexing transmitter & receiver block diagram Time Division Multiplexing transmitter & receiver blockExamples and applications of FDM and TDM	**04**

List of Laboratory Experiments: (minimum eight)

1. Study of Amplitude Modulation.
2. **S**tudy of Double Side Band Suppressed Carrier and Single Side Band Amplitude Modulation.
3. Simulate of AM system and generate time and frequency domain output.
4. To study different types of frequency modulators and Demodulators.
5. Simulate Frequency Modulation system generate time and frequency domain output.
6. Implement Pre-emphasis and De-emphasis circuit required for FM and analyze the output.
7. Study of Natural Sampling and its reconstruction.
8. Study of Flat top sampling and its reconstruction.
9. Study of Pulse Amplitude Modulation.
10. Study of Pulse width Modulation.
11. Study of Pulse Position Modulation.
12. Study of PAM-TDM system.
13. Study of FDM.

Books Recommended:

Text books:

1. Kennedy & Devis, *Electronic Communication System*, 4th Edn McGraw Hill Education Pvt. Ltd.
2. Wayne Tomasi, *Electronic Communication System*, 4th Edn Pearson Publication
3. B. P. Lathi, Zhi Ding, *Modern digital and analog communication system, 4th* Edn Oxford University Press

Reference Books:

1. Toub Schilling and Shaha, *Principles of Communication System,* 3rd Edn ,Tata McGraw Hill Publication
2. Symon Haykin, Michal Moher, *Introduction to Analog and Digital Communication*, 4th Edn Wiley Publication.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

1. Practical/Oral examination will be based on the entire syllabus including, the practicals performed during laboratory sessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

Term work shall consist of minimum 8 experiments, minimum 1 assignments and a mini project.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments): 15 Marks
ii. Journal Documentation (Write-up, Assignments, Mini project): 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester IV (Autonomous)
(Academic Year 2020-2021)

Program: Second Year Electronic and Telecommunication Engineering	**Semester: IV**
Course: Integrated Circuits	**Course Code: DJ19ECC403**
Course: Integrated Circuits - Laboratory	**Course Code: DJ19ECL403**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				75			**25**	**25**	**25**	**100**
				Laboratory Examination			**Term work**		**Total Term work**	**50**
3	**2**	**--**	**3+1=4**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory**	**Tutorial / Mini project / presentation/ Journal**		
				--	**--**	**25**	**15**	**10**	**25**	

Pre-requisite:

1. Basic Electrical & Electronics Engineering
2. Analog Circuit Design
3. Digital System Design

Objectives:

1. To understand fabrication of integrated circuit.
2. To analyze active load differential amplifier
3. To understand the concepts, working principles and key applications of linear integrated circuits.
4. To perform analysis of circuits based on linear integrated circuits
5. To design circuits and systems for particular applications using linear integrated circuits

Outcomes: On successful completion of course, learner will be able to:

1. Analyze various constant current source circuit using MOS
2. Design and implement active load differential amplifier
3. Understand the fundamentals and areas of applications for the integrated circuits
4. Demonstrate the ability to design practical circuits that perform the desired operations.
5. Select the appropriate integrated circuit modules to build a given application.

	Detailed Syllabus: (unit wise)	
Unit	**Description**	**Duration**
1	**Physics of MOSFET**: NMOS, PMOS enhancement and depletion mode MOSFET transistor, threshold voltage, linearand saturated operation, FET capacitance.	**05**
2	**Silicon Semiconductor Technology:** Fabrication of passive elements, NMOS and PMOS processes, CMOS using n-well, CMOS using p-well, CMOS using twin tub process, CMOSLatch up, Comparison between MOS and Bipolar technology, Bipolar processes.	**07**
3	**Current sources & Operational Amplifier Overview:** Current Mirror, Current sources using FETs, Widlar current source, Wilson current source. Block diagram of Op-Amp, Basic MOS differential Amplifier, MOS differential amplifier with active load, Op-Amp symbol and Terminals, Ideal Op-Amp and Practical Op-Amp characteristics, Op-Amp Parameters, open loop and Closed loop configurations, Inverting, Non-inverting and Differential amplifier.	**12**
4	**Applications of OP-Amp & Special Purpose Integrated Circuits:** Summing and difference amplifier, Integrator and Differentiator, Schmitt trigger: Inverting andNon-inverting Schmitt trigger, 3 op-amp Instrumentation amplifier. Overview of Special purpose ICs, Functional block diagram, working, design of IC 555. Design of astable and monostable multivibrator using Timer 555, Functional block diagram, working andapplications of VCO 566, Functional block diagram, working and applications of PLL 565, Voltage regulators- functional block diagram, working of three terminal voltage regulators.	**12**
5	**Data Converters**: Performance parameters of ADC, single ramp ADC, ADC using DAC, dual slope ADC, successive approximation ADC, flash ADC, Performance parameters of DAC, binary weighted register DAC, R/2R ladder DAC, invertedR/2R ladder DAC.	**06**

List of Laboratory Experiments: (minimum eight)

1. To study VI characteristics of MOSFET using Spice tool.
2. To design single stage MOS amplifier.
3. To design Differential amplifier using MOSFET.
4. Design Inverting and non-inverting amplifier using Op-Amp (IC 741)
5. Design Integrator and Differentiator using Op-Amp (IC 741)
6. Design R-2R Ladder DAC using Op-Amp
7. Design Schmitt trigger using Opamp
8. Design of astable Multivibrator using IC 555.
9. Design voltage regulator

Books Recommended:

Textbooks:

1. D. A. Neamen, *Electronic Circuit Analysis and Design*, 2nd Edn, Tata McGraw Hill.
2. Ramakant A. Gayakwad, *Op-Amps and Linear Integrated Circuits*, 4th Edn, Pearson Prentice Hall
3. Sung-Mo Kang & Yusuf Leblebici, *CMOS Digital Integrated Circuits - Analysis & Design*, 2nd Edn, McGraw Hill.

Reference Books:

1. S. Sedra, K. C. Smith and A. N. Chandorkar, *Microelectronic Circuits Theory and Applications*, International Version, 6th Edn, OXFORD.
2. Sergio Franco, *Design with operational amplifiers and analog integrated circuits*, 3rd Edn, Tata McGraw Hill.
3. K. R. Botkar, *Integrated Circuits*, Khanna Publishers, 2004.
4. D. Roy Choudhury and S. B. Jain, *Linear Integrated Circuits*, 4th Edn, New Age International Publishers.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks.
2. Total duration allotted for writing the paper is 3 hrs.

Laboratory:

Oral examination will be based on the entire syllabus including, the practical performed during laboratorysessions.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester. Total duration allotted for writing each of the paper is 1 hr.
2. Average of the marks scored in both the two tests will be considered for final grading.

Laboratory: (Term work)

Term work shall consist of minimum eight experiments, 1 power point presentation and assignment.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments): 15 Marks
ii. Journal Documentation (Write-up, Power Point Presentation and Assignments: 10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester IV (Autonomous)
(Academic Year 2020-2021)

Program: Second Year Electronics and Telecommunication Engineering	**Semester: IV**
Course: Electromagnetics and Wave Propagation	**Course Code: DJ19ECC404**
Course: Electromagnetics and Wave Propagation -Tutorial	**Course Code: DJ19ECT404**

Teaching Scheme (Hours / week)				**Evaluation Scheme**						
				Semester End Examination Marks (A)			**Continuous Assessment Marks (B)**			**Total marks (A+ B)**
Lectures	**Practical**	**Tutorial**	**Total Credits**	**Theory**			**Term Test 1**	**Term Test 2**	**Avg.**	
				75			**25**	**25**	**25**	**100**
				Laboratory Examination			**Term work**		**Total Term work**	**25**
3	**-**	**2***	**3+1=4**	**Oral**	**Practical**	**Oral & Practical**	**Laboratory**	**Tutorial / Mini project / presentation/ Journal**		
				-	-	-	-	**25**	**25**	

***Batch wise Tutorial of two hours**

Pre-requisite:

1. Engineering Mathematics-III

Objectives:

1. To learn concept of static and time varying electromagnetic fields.
2. To solve problems related to EM fields using Vectors and Partial differential equations.
3. To learn Electromagnetic radiation and propagation in space and within transmission lines.

Outcomes: On completion of the course, learner will be able to:

1. Compute electric and magnetic fields for symmetrical charge and current configurations using basic principles of electromagnetics.
2. Explain coupling between electric and magnetic fields through Faraday's law, displacement current and Maxwell's equations.
3. Explain Wave Polarization and propagation in different media.
4. Determine the parameters of transmission lines for various frequencies.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Electrostatics:** Coulomb's Law, Gauss's Law and its applications, Electric Potential, Electric Dipole Properties of Materials, Convection and Conduction Currents, Conductors, DielectricPolarization, Electric Boundary Conditions, Poisson's and Laplace's Equations, Resistance andCapacitance.	**10**
2	**Magnetostatics:** Biot - Savart's Law, Ampere's Circuital Law and its applications, Magnetic Flux density, Magnetic Scalar and Vector potentials Forces due to magnetic fields, Torque and Moment, Magnetic dipole, Classification of Magnetic materials, Magnetic boundary conditions.	**08**
3	**Time varying Fields:** Faraday's Law, Transformer and Motional Electromotive Forces, Displacement Current, Maxwell's equations in point form and integral form, Boundary conditions for time varying field, magnetic vector potential, Time-harmonic field.	**08**
4	**Electromagnetic Wave Propagation:** Derivation of Wave equation and its solution, Wave Propagation in lossy dielectrics, Plane waves in loss less dielectrics, free space and good conductors, Wave Polarization, Power and Poynting Vector and skin depth, Reflection of a Plane wave at normal incidence and oblique incidence. Ground Wave Propagation: Ground waves, effect of Earth's Curvature on Ground wave propagation, impact of imperfect earth. Sky Wave Propagation Ionosphere and Earth magnetic field effect, Critical frequency, Angle of incidence, Maximum usable frequency, Skip distance, Virtual height, Variations in ionosphere and Attenuation and fading of waves in ionosphereSpace Wave Propagation.	**12**
5	**Transmission Lines:** Parameters, Transmission line equations, Input impedance, reflection coefficient, Standing wave ratio.	**04**

List of Tutorials: (minimum eight)

1. Numerical problems based on Electrostatics
2. Numerical problems based on Electric Boundary conditions
3. Numerical problems based on Poisson's and Laplace's Equations
4. Numerical problems based on Magnetostatics
5. Numerical problems based on Vector Potentials
6. Numerical problems based on Maxwell Equations
7. Numerical problems based on calculation of Transmission line impedance
8. Numerical problems based on Transmission line reflection coefficient calculations
9. Numerical problems based on Wave Propagation in different material
10. Numerical problems based on Normal and Oblique incidence
11. Numerical problems based on Sky and Space wave propagation

Books Recommended:

Text books:

1. Matthew N. O.Sadiku, S.V.Kulkarni, *Principles of Electromagnetics*, 6th Edn, Oxford University Press.
2. William H. Hayt and John A Buck, *Engineering Electromagnetics*, 7th Edn, Tata McGraw Hill.
3. Edward C. Jordan, Keth G. Balmin, *Electromagnetic Waves & Radiating Systems*, 2nd Edn, Pearson Publications.
4. R. K. Shevgaonkar, *Electromagnetic Waves*, 3rd Edn, Tata McGraw Hill.

Reference books:

1. J.D. Krauss and Daniel Fleisch, *Electromagnetics with applications*, 5th Edn, McGraw Hill Education.
2. Bhag Singh Guru, Hüseyin R. Hiziroglu , *Electromagnetic Field Theory Fundamentals*, 2nd Edn, Cambridge University Press.
3. Joseph Edminister, Mahmood Nahvi, *Electromagnetics*, 4th Edn, Schaum Outline Series.
4. David K. Cheng, *Fundamentals of Electromagnetics*, 1st Edn, Addison Wesley, MA.
5. David M. Pozar, *Microwave Engineering*, 4th Edn, Wiley.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper will be based on the entire syllabus summing up to 75 marks
2. Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1. Two term tests of 25 marks each will be conducted during the semester out of which, one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2. Total duration allotted for writing each of the paper is 1 hr.
3. Average of the marks scored in both the tests will be considered for final grading.

Tutorial (Term work):

Term work shall consist of minimum 8 tutorials two hours per batch lab wise and minimum 2 assignments.

The distribution of marks for term work shall be as follows:

i. Tutorial solving in lab (accuracy, Timely submission): 15 Marks
ii. Assignments: 10 marks

The final certification and acceptance of term work will be subject to satisfactory submission of tutorials and assignments.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester IV (Autonomous)
(Academic Year 2020-2021)

<table>
<tr><td colspan="8">Program: Second Year Electronics & Telecommunication Engineering</td><td colspan="2">Semester: IV</td></tr>
<tr><td colspan="8">Course: Python Programming - Laboratory</td><td colspan="2">Course Code: DJ19ECL405</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="6">Evaluation Scheme</td></tr>
<tr><td colspan="3">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="3">--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
<tr><td colspan="3">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">50</td></tr>
<tr><td>--</td><td>2</td><td>--</td><td>1</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory</td><td>Mini project / presentation/ Journal</td></tr>
<tr><td></td><td>25</td><td>--</td><td>15</td><td>10</td><td>25</td></tr>
</table>

Pre-requisite:

1. Object Oriented Programming Laboratory

Objectives: The objective of this course is to get the students acquainted with

1. Python programming basics, Functions in Python and files handling.
2. GUI Programming and Databases operations in Python.
3. Network Programming in Python.

Outcomes: On completion of the course, learner will be able to:

1. Describe the various data types, dictionaries and regular expressions in Python.
2. Describe different control statements, conditional statements and functions in Python.
3. Realize and encapsulate different File handling and exception handling operations using Python.
4. Design GUI, estimate different database operations and array handling in Python.
5. Design and develop network applications using Python.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Introduction to Python:** History of Python, Data types & Regular expression Basic Data types identifiers, Basic Data types, Integer Data Type, Float and Complex Data Type, Mathematical Functions, String Data Types, String Manipulation Functions, String Slices Basic Data Types Collections Lists: Working with Lists, Basic Operations, Sorting, Count & Append, List Comprehension Dictionary: Definition, Update dictionary, Dictionary Comprehension Sets, Tuples and Frozen Sets Conversion of List to Dictionary Regular Expressions: Match function, Search Function, Modifiers, Patterns. **List of Suggested Practical (Any three)** 1. To read a number 'n' and print patterns 2. Program to map a list into a dictionary and vice versa 3. Program to study list and dictionary comprehension 4. To implement different string manipulation functions. 5. To count the number of letters/ vowels/ consonants in a string or a list or a dictionary. (Multiple variations of the above suggested programs can be performed)	**06**
2	**Control statements and Functions in Python:** While, for, Nested loops. Use of Continue, Pass and Break statement. Range function Conditional Statements: if, else, elif, nested if and Switch Case statements Function arguments pass by value and reference, Recursive Functions. **List of Suggested Practical (Any three)** Use of the control statements to implement :- 1. Factorial of a number 2. Palindrome of number or a string 3. Fibonacci series 4. Sine and Cosine series 5. Pythagoras triplets 6. Any one program to demonstrate the method of recursive functions	**06**

3	**Files Directories & Flow control:** Making and List directories, Changing directory, List files in directories. File & Directory manipulation, File functions, File object attributes, close () method, Opening a binary file, File Attributes, read (read_fixed_size) readline ( ) tell (). Read data from keyboard. File handling: Opening and closing file, Reading and writing files. Exception Handling, Except Clause, User defined Exceptions **List of Suggested Practical (Any three)** 1. Open a file and read the contents of a file and print 2. Open a file and write to a file (overwrite and append). 3. Open a file and count the characters present in the file. 4. Program to demonstrate Exception Handling 5. Splitting of lines by file handling.	**06**
4	**Python Database (Any Two):** Introduction, Connections and Executing queries, Transactions and Handling Errors Introduction to GUI Programming. **List of Suggested Practical:-** 1. Install MySQLdb 2. Establish database connection 3. Creating Database Table. 4. Use of Insert/Read/Update Operations in database	**04**
5	Working with numpy, constructing numpy arrays, Printing arrays, Arithmetic operations on matrix, Slicing Arrays, Random number generation. Working with Matplotlib, and pandas: Installation and implementation **List of Suggested Practical (Any Two)** 1. Data visualization with matplotlib. 2. Array manipulation/strings/indexing/slicing and other numpy library functions 3. Histogram using matplotlib. 4. Statistical functions in numpy. 5. Any one toolkits to extend python matplotlib functionality	**04**
6	Python for Networking Socket, Socket Module Clients and Server, Internet Modules. **List of Suggested Practical (Any Two)** 1. The socket Module 2. Client Socket Methods 3. A Simple Client 4. A simple server 5.Sending Email using SMTP	**04**

Suggested List of Laboratory Experiments:

1. Installing python and setting up environment. Simple statements like printing the names, numbers, mathematical calculations, etc.
2. Programs related to string manipulation.
3. Programs Lists, Tuples, Sets, arrays and dictionaries.
4. Programs based on various loops, conditional constructs and functions.
5. PYTHON program to update in the file "friendsContact.txt" which has name and contact and change the number of an old contact.
6. Demonstrate Amplitude-Shift-Keying (ASK) or On-Off Keying (OOK).
7. Compute the spectrum of the above OOK signal using FFT and plot its magnitude.
8. Write a program to demonstrate the BPSK signal of sequence [1 0 0 0 1 0 1 0 0 1].
9. Compute the spectrum of the above BPSK signal.
10. Write python programs to understand TCP and UDP Sockets in Python
11. Examples Illustrating broadcasting in Python (one for each rule of broadcasting).

Books Recommended:

Text Books:

1. James Payne, *Beginning Python: Using Python 2.6 and Python 3.1*, 2010, Wrox Publication

2. Dr. R. Nageswara Rao, *Core Python Programming*, 2021, Dreamtech Press, Wiley Publication.

3. Magnus Lie Hetland, *Beginning Python from Novice to Professional*, 2nd Edn, Apress Publication.

4. Charles Dierbach, *Introduction to Computer Science using Python*, 2013Wiley.

Reference Books:

1. Wesley J Chun, *Core Python Applications Programming*, 3rd Edn Pearson Publication.

2. E. Balaguruswamy, *Introduction to Computing and Problem Solving using Python*, 2017, McGraw Hill Education India Pvt. Ltd.

Evaluation Scheme:

Semester End Examination (A):

Laboratory:

Practical examination will be based on the entire syllabus including the practical performed during laboratory sessions.

Continuous Assessment (B):

Laboratory: (Term work)

Term work shall consist of minimum eight experiments and one Mini Project.

The distribution of marks for term work shall be as follows:

i. Laboratory work (Performance of Experiments and Mini-Project): 15 Marks
ii. Journal Documentation (Write-up, Timely submission) :10 marks

The final certification and acceptance of term work will be subject to satisfactory performance of laboratory work and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester IV (Autonomous)
(Academic Year 2020-2021)

<table>
<tr><td colspan="8">Program: Common for all program</td><td colspan="4">Semester: IV</td></tr>
<tr><td colspan="8">Course: Universal Human Values</td><td colspan="4">Course Code: DJ19IHC1</td></tr>
<tr><td colspan="8">Course: Universal Human Values -Tutorial</td><td colspan="4">Course Code: DJ19IHT1</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="8">Evaluation Scheme</td></tr>
<tr><td colspan="4">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="2">Lectures</td><td rowspan="2">Practical</td><td rowspan="2">Tutorial</td><td rowspan="2">Total Credits</td><td colspan="4">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="4">75</td><td>25</td><td>25</td><td>25</td><td>100</td></tr>
<tr><td rowspan="3">2</td><td rowspan="3">--</td><td rowspan="3">1</td><td rowspan="3">2+1=3</td><td colspan="4">Laboratory Examination</td><td colspan="3"></td><td rowspan="3">125</td></tr>
<tr><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td colspan="3">Total Term work (C)</td></tr>
<tr><td>--</td><td>--</td><td>--</td><td colspan="3">25</td></tr>
</table>

Objectives:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society, and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society, and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

Outcomes: On completion of the course, learner will be able to:

1. Become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They would have better critical ability.
2. Become sensitive to their commitment towards what they have understood (human values, human relationship, and human society).
3. Apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Unit	Description	Duration in Hrs
1	**Introduction**: **Need, Basic Guidelines, Content and Process for Value Education:** Purpose and motivation for the course. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfil the above human aspirations: understanding and living in harmony at various levels.	**05**
2	**Understanding Harmony in the Human Being - Harmony in Myself!:** Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility. Understanding the Body as an instrument of 'I' (I am being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Health.	**06**
3	**Understanding Harmony in the Family and Society: Harmony in Human-Human Relationship**.: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship. Understanding the meaning of Trust; Difference between intention and competence. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.	**06**
4	**Understanding Harmony in the Nature and Existence: Whole existence as Coexistence:** Understanding the harmony in the Nature 19. Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature. Understanding Existence as Co-existence of mutually interacting units in all pervasive space. Holistic perception of harmony at all levels of existence.	**05**

5	**Implications of the above Holistic Understanding of Harmony on Professional Ethics**: Natural acceptance of human values 23. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order, b. Ability to identify the scope and characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists, and managers, b. At the level of society: as mutually enriching institutions and organizations.	**06**

Books Recommended:

Textbooks:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Reference books:

1. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj - PanditSunderlal
9. Rediscovering India - by Dharampal
10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11.India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)

Evaluation:

Semester End Examination (A):

Theory:

1) Question paper will be based on the entire syllabus summing up to 75 marks.
2) Total duration allotted for writing the paper is 3 hrs.

Continuous Assessment (B):

Theory:

1) Two term tests of 25 marks each will be conducted during the semester out of which; one will be a compulsory term test (on minimum 02 Modules) and the other can either be a term test or an assignment on live problems or a course project.
2) Total duration allotted for writing each of the paper is 1 hr.
3) Average of the marks scored in both the two tests will be considered for final grading.

Continuous Assessment (C):

Tutorials: (Term work)

1. Term work shall consist of minimum 4 activities based on activities suggested.
2. Term work shall carry total 25 marks based on the performance in the tutorials.

The tutorials could be conducted as per the following topics: -

Activity No 1	Practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony, and co-existence) rather than as arbitrariness in choice based on liking-disliking.
Activity No 2	Practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.
Activity No 3	Practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.
Activity No 4	Practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.
Activity No 5	Practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions e.g. To discuss the conduct as an engineer or scientist etc.

The final certification and acceptance of term work will be subject to satisfactory performance of activities and upon fulfilling minimum passing criteria in the term work.

Prepared by Checked by Head of the Department Principal

Syllabus for Second Year Electronics and Telecommunication Engineering-Semester IV (Autonomous)
(Academic Year 2020-2021)

<table>
<tr><td colspan="8">Program: Second Year Electronics and Telecommunication Engineering</td><td colspan="2">Semester : IV</td></tr>
<tr><td colspan="8">Course : Innovative Product Development II</td><td colspan="2">Course Code: DJ19A4</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme
(Hours / week)</td><td colspan="6">Evaluation Scheme</td></tr>
<tr><td colspan="3">Semester End Examination Marks (A)</td><td colspan="3">Continuous Assessment Marks (B)</td><td rowspan="2">Total marks (A+ B)</td></tr>
<tr><td rowspan="3">Lectures</td><td rowspan="3">Practical</td><td rowspan="3">Tutorial</td><td rowspan="3">Total Credits</td><td colspan="3">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="3">--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
<tr><td colspan="3">Laboratory Examination</td><td colspan="2">Semester review</td><td rowspan="2">Total</td><td rowspan="3">--</td></tr>
<tr><td>--</td><td>--</td><td>--</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Review 1</td><td>Review 2</td></tr>
<tr><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>--</td><td>---</td></tr>
</table>

Pre-requisite:

1. Analog and Digital Circuit Design
2. Basic Programming Skills

Objectives:

1. To design and implement the problem statement as per the project requirement.
2. To improve the team building, communication and management skills.
3. To excel in arriving at a problem solution by making connections between the ideas and concepts across different disciplinary boundaries.
4. Consolidate learning by synthesizing ideas from many perspectives and consider an alternative way of acquiring knowledge.

Outcomes: On completion of the course, learner will be able to:

1. Apply engineering design to produce solutions that meet specified needs with consideration of cultural, social, environmental and economic factors.
2. Use project based learning that allows students to identify and transfer existing ideas into new contexts and applications thereby improving individual grooming.
3. Present their research in the form of a technical paper and thereby improve the technical communication skill.
4. Demonstrate the ability to work in teams and manage the conduct of the research study.
5. Integrate and synthesize different perspectives from relevant disciplines, which help them to get internships, jobs and admission for higher studies.

Syllabus:

Domain knowledge (and beyond as applicable) needed from the following areas for the effective implementation of the project.

Microcontroller and Embedded Systems, Signal Processing, Microwave and Antennas, Networking and Internet of Things, Data science and Big data, Communication, Web and Application development, Robotics, AI and Machine learning etc.

Above areas can be updated based on the technological innovations and development needed for specific project.

Guidelines:

The main purpose of this course is to improve the student's technical skills and paper writing skills by integrating key aspect of writing, presentation and teamwork opportunities. Each project group is already undergone project topic allotment, followed by two reviews in their third semester and during this semester, students are expected to continue the project work.

1. Each group will be reviewed twice in a semester (January and March) and grades will be allotted based on the various points mentioned in the evaluation scheme.
2. In the first review of this semester, each group is expected to complete 50% of project and write first draft of the technical paper.
3. In the second review of this semester, each group is expected to complete 80% of project and submit final draft of the technical paper.
4. The technical paper will be published in DJ Strike magazine with ISBN number.
5. The students may use this opportunity to learn different computational techniques towards the development of the product.
6. Interaction with alumni mentor will also be appreciated for the improvement of project.

Evaluation Scheme:

Semester review (B):

Each group will be reviewed twice in a semester by the faculty guide and faculty coordinators, based on the following criteria:

1. Project progress
2. Documentation/Technical paper writing
3. Key findings
4. Validation of results
5. Product Development

The final certification and acceptance is subject to satisfactory performance of the project.

Prepared by Checked by Head of the Department Principal