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 Engineering

(Semester III and IV)

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

1st July, 2020

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

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	DJ19ELXC301	Applied Engineering Mathematics - I	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19ELXT301	Applied Engineering Mathematics - I Tutorial	--	--	1	1	--	--	--	--	--	--	--	--	--	25	25	25	1	
2	DJ19ELXC302	Electronic Devices and Circuits - I	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19ELXL302	Electronic Devices and Circuits - I Laboratory	--	2	--	1	--	--	--	--	25	25	--	--	--	25	25	50	1	
3	DJ19ELXC303	Electrical Network Analysis and Synthesis	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19ELXL303	Electrical Network Analysis and Synthesis Laboratory	--	2	--	1	--	--	25	--	--	25	--	--	--	25	25	50	1	
4	DJ19ELXC304	Digital Circuit Design	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19ELXL304	Digital Circuit Design Laboratory	--	2	--	1	2	--	--	--	25	25	--	--	--	25	25	50	1	
5	DJ19ELXC305	Database and Management system	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19ELXL305	Database and Management system Laboratory	--	2	--	1	--	--	25	--	--	25	--	--	--	25	25	50	1	
6	DJ19ELXL306	Python Programming Laboratory	--	2	--	1	2	--	--	--	25	25	--	--	--	25	25	50	1	**1**
7	DJ19A2	Innovative Product Development - I (Non credit)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100	100	--	--
8	DJ19A3	Constitution of India (Non credit)	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
		Total	**16**	**10**	**1**	**21**	--	**375**	**50**	--	**75**	**500**	**125**	**125**	**125**	**150**	**375**	**875**	**21**	

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

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 (TT 1)	Term Test 2 (TT 2)	Avg (TT 1 & TT2)	Term Work Total	CA Total (B)			
1	DJ19ELXC401	Advanced Engineering Mathematics - II	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19ELXT401	Advanced Engineering Mathematics Tutorial	--	--	1	1	--	--	--	--	--	--	--	--	--	25	25	25	1	
2	DJ19ELXC402	Electronic Devices and Circuits - II	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19ELXL402	Electronic Devices and Circuits - II Laboratory	--	2	--	1	--	--	--	--	25	25	--	--	--	25	25	50	1	
3	DJ19ELXC403	Analog and Digital Communication	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19ELXL403	Analog and Digital Communication Laboratory	--	2	--	1	--	--	25	--	--	25	--	--	--	25	25	50	1	
4	DJ19ELXC404	Control Systems and Instrumentation	3	--	--	3	3	75	--	--	--	75	25	25	25	--	25	100	3	**4**
	DJ19ELXL404	Control Systems and Instrumentation Laboratory	--	2	--	1	--	--	25	--	--	25	--	--	--	25	25	50	1	
5	DJ19ELXL405	HDL Programming Laboratory	--	2	--	1	2	--	--	--	25	25	--	--	--	25	25	50	1	**1**
6	DJ19ELXL406	JAVA Programming Laboratory	--	2+2*	--	2	2	--	--	--	50	50	--	--	--	50	50	100	2	**2**
7	DJ19IHC1	Universal Human Values	2	--	--	2	3	75	--	--	--	75	25	25	25	--	25	100	2	**3**
8	DJ19IHT1	Universal Human Values Tutorial	--	--	1	1	--	--	--	--	--	--	--	--	--	25	25	25	1	
9	DJ19A4	Innovative Product Development - II (Non credit)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	100	100	--	--
		Total	**14**	**12**	**2**	**22**	--	375	50	--	100	525	**125**	**125**	**125**	**200**	**425**	**950**	**22**	

* 2 hours class wise and 2 hours batch wise

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

<table>
<tr><td colspan="8">Program: Second Year Electronics Engineering</td><td colspan="3">Semester : III</td></tr>
<tr><td colspan="8">Course : Applied Engineering Mathematics</td><td colspan="3">Course Code:DJ19ELXC301</td></tr>
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<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours / week)</td><td colspan="7">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="2">Lectures</td><td rowspan="2">Practical</td><td rowspan="2">Tutorial</td><td rowspan="2">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">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">1</td><td rowspan="3">4</td><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>
<tr><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory Work</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>
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Objectives:

1. To build the strong foundation in Mathematics needed for the field of Electronics Engineering.
2. To provide learner with fundamentals of Mathematics necessary to formulate, solve and analyse complex engineering problems.

Outcomes:

1. Learner will demonstrate basic knowledge of Laplace transform, Fourier series, Complex Variable and Calculus of variation.
2. Learner will demonstrate an ability to identify and model the problems of the field of Electronics Engineering and solve it.
3. Learner will be able to apply the application of Mathematics in Electronics Engineering.

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Laplace Transform:** **1.1 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. **1.2 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:** **2.1** Partial fraction method, method of convolution, Laplace inverse by derivative. **2.2 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).	**06**
3	**Fourier Series:** **3.1 Introduction:** Orthogonal and orthonormal set of functions, introduction of Dirichlet's conditions, Euler's formulae. **3.2 Fourier Series of Functions:** Exponential, trigonometric functions of any period =2L, even and odd functions, half range sine and cosine series. **3.3** Complex form of Fourier series, Fourier integral representation. **3.4 Discrete Fourier transform (DFT):** Discrete Fourier series (DFS), linearity property, properties of DFT, discrete convolution, relation with Laplace transform.	**14**
4	**Complex Variable:** **4.1 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. **4.2 Mapping:** Conformal mapping, bilinear transformations, cross ratio, fixed points.	**07**
5	**Calculus of Variation:** **5.1** Euler's Lagrange equation, solution of Euler's Lagrange equation (only results for different cases for Function) independent of a variable, independent of another variable, independent of differentiation of a variable and independent of both variables. **5.2 Functions involving higher order derivatives:** Rayleigh-Ritz method.	**05**
	Total hours	**42**

Books Recommended:

Textbooks:

1. H.K. Das, *"Advanced engineering mathematics",* S. Chand Publication, 10th edition, 2014.
2. A. Datta, *"Mathematical Methods in Science and Engineering",* Wiley Publications, 1st edition, 2012.
3. B.S. Grewal, *"Higher Engineering Mathematics",* Khanna Publication, 40th edition, 2014
4. S. Salivahanan, A. Vallavraj, C. Gnanapriya, *"Digital signal processing",* Tata McGraw-Hill.

Reference Books:

1. B. V. Ramana, *"Higher Engineering Mathematics",* Tata Mc-Graw Hill Publication.
2. Wylie and Barret, *"Advanced Engineering Mathematics",* Tata Mc-Graw Hill, 6th edition.
3. Erwin Kreysizg, *"Advanced Engineering Mathematics",* John Wiley & Sons, Inc, 10th edition, 2010.
4. Murry R. Spiegel, *"Vector Analysis",* Schaum's outline series, Mc-Graw Hill Publication, 2nd edition.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper 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.

Term work:

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 SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Program: Second Year Electronics Engineering	Semester : III
Course : Electronic Devices and Circuits – I	Course Code:DJ19ELXC302
Course : Electronic Devices and Circuits - I Laboratory	Course Code:DJ19ELXL302

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			
3	2	--	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	Total Term work	50
				--	--	25	15	10	25	

Objectives:

1. To enhance comprehension capabilities of students through understanding of electronic devices and circuits.
2. To introduce and motivate students to the use of advanced microelectronic devices.

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

1. Demonstrate knowledge of working of semiconductor devices and analyze its characteristics.
2. Perform DC and AC analysis of Electronics circuits.
3. Identify various biasing circuits as well as various configurations of BJT, JFET and MOSFETs.
4. Design electronics circuits for given specifications.

Detailed Syllabus: (unit wise)

Unit	Description	Duration
1	**Bipolar Junction Transistor**: BJT operation(both pnp and npn transistors), voltages and currents, BJT characteristics , BJT amplifying action, Configurations(CE), comparisons, Q point, DC load line Early Effect. **1.1 DC Circuit Analysis**: Configurations (CE biasing circuits), bias stability and compensation of Fixed, Self, Voltage divider, Collector to base, Collector to base self. BJT as a switch.	14

	1.2 AC Analysis of BJT Amplifiers: AC load line, small signal models (h-parameter model, re model, Hybrid-pi model), ac equivalent circuits and analysis to obtain voltage gain, current gain, input impedance, output impedance of CE amplifier. (Any one small signal model can be used).	
2	**Field Effect Devices:** **2.1 JFET:** Construction, operation and characteristics. **2.2 MOSFET:** Construction, operation and characteristics of D-MOSFET and E-MOSFET. **2.3 DC Analysis**: DC load line and region of operation, common-MOSFETs configurations (CS, CG, CD), analysis and design of biasing circuits (fixed, self, voltage divider). **2.4 AC Analysis**: AC load line, small-signal model of MOSFET and its equivalent circuit, small-signal analysis of MOSFET amplifiers (common-source, source follower, common Gate)	**12**
3	**Special semiconductor devices – I:** **3.1**. Construction, working and characteristics of: Zener diode, Schottky diode, Varactor diode, Tunnel diode, Solar cells, Photodiodes, LEDs	**04**
4	**Rectifiers and Regulators:** **4.1**. Rectifiers: working and analysis of Half wave, Full wave and Bridge. **4.2**. Filters: C, L, LC, pi. **4.3**. Regulators: Zener shunt regulator, series and shunt regulator using single transistor and Zener.	**04**
5	**Design of electronic circuits:** Design of single stage CE amplifier. Design of single stage CS MOSFET amplifier. Design of full wave rectifier with LC and pi filter.	**08**
	Total hours	**42**

Books Recommended:

Textbooks:

1. Adel S. Sedra, Kenneth C. Smith and Arun N Chandorkar, *"Microelectronic Circuits Theory and Applications",* International Version, OXFORD International Students' Edition, 5th edition.
2. Donald A. Neamen, *"Electronic Circuit Analysis and Design",* TATA McGraw Hill, 2nd edition.
3. R. L. Boylestad, *"Electronic Devices and Circuit Theory"*, Pearson, 10th edition.

Reference Books:

1. David A. Bell, *"Electronic Devices and Circuits",* Oxford, 5th edition.
2. Muhammad H. Rashid, *"Microelectronics Circuits Analysis and Design",* Cengage, 2nd edition.
3. S. Salivahanan, N. Suresh Kumar, *"Electronic Devices and Circuits",* Tata McGraw Hill,
4. Millman and Halkias, *"Integrated Electronics",* TATA McGraw Hill.

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Oral and Practical Examination:

Oral and practical examination of 25 marks 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.

Term work:

Term work shall consist of minimum of at least eight experiments (5+3 simulation) and two assignments covering entire syllabus.

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

Laboratory work:	15 Marks
Assignment/Quiz:	10 Marks
Total:	25 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.

Suggested List of Experiments:

(*However Instructor is free to design his/her own experiments as per the guidelines)*

Laboratory Experiments:

1. To study passive (R, L, C) and active (BJT, MOSFTET) components.
2. Implement input and output characteristics of BJT in CE configuration.
3. To perform analysis and design fixed bias, voltage divider bias for CE amplifier.
4. To study and implement BJT as a switch.
5. To implement CE amplifier as voltage amplifier (Calculate Av, Ai, Ri, Ro).
6. To study and implement transfer and output characteristics of JFET.
7. To study frequency response of CS amplifier using JFET.
8. To study and implement characteristics of MOSFET.
9. To implement Half wave/Full wave/Bridge rectifier with LC/pi filter.
10. To implement Zener as a shunt voltage regulator.

11. To design single stage CE Amplifier.
12. To design single stage CS Amplifier.

Guidelines for Simulation Experiments (eSim/LTSpice)

1. Simulation of and implementation for junction analysis
2. Simulation of and implementation for BJT characteristics
3. Simulation of and implementation for JFET characteristics
4. Simulation for MOSFET characteristics
5. Simulation of Half wave/Full wave/Bridge rectifier with LC/pi filter.
6. Simulation of CE amplifier
7. Simulation of CS MOSFET amplifier.

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Program: Second Year Electronics Engineering	Semester : III
Course: Electrical Network Analysis and Synthesis	Course Code:DJ19ELXC303
Course : Electrical Network Analysis and Synthesis Laboratory	Course Code:DJ19ELXL303

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			
3	2	--	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	Total Term work	50
				25	--	--	--	25	25	

Objectives:

1. To make the students understand DC and AC electrical networks and analyze the networks in time and frequency domain.
2. To understand synthesis of electrical networks.

Outcomes:

1. Students will be able to apply their understanding of network theorems in analyzing complex circuits.
2. Students will be able to evaluate the time and frequency response of electrical circuits and thereby understand the behaviour of electrical networks.
3. Students will be able to evaluate the inter-relationship among various circuit parameters and solve complex networks using these parameters.
4. Students will be able to synthesize electrical networks for a given network function.

Detailed Syllabus: (unit wise)

Unit	Description	Duration
1	**Analysis of DC Circuits** **1.1 DC Circuit Analysis:** Analysis of DC circuits with dependent sources using generalized loop, node matrix analysis. **1.2 Application of Network Theorems to DC Circuits:** Superposition, Thevenin's, Norton's, maximum power transfer theorem.	06

2	**Analysis of AC Circuits** **2.1 Analysis of Steady State AC circuits:** Analysis of AC circuits with independent sources using generalized loop, node matrix analysis. **2.2 Application of Network Theorems to AC Circuits:** Superposition, Thevenin's, Norton, maximum power transfer theorem. **2.3 Analysis of Coupled Circuits:** Self and mutual inductances, coefficient of coupling, dot convention, equivalent circuit, solution using loop analysis.	**08**
3	**Time and Frequency Domain Analysis of Electrical Networks** **3.1 Time-domain Analysis of R-L, R-C and R-L-C circuits:** Forced and natural responses, time constant, initial and final values, transient and steady-state time response, solution using universal formula. **3.2 Frequency-domain Analysis of R-L, R-C and R-L-C circuits:** S-domain representation, concept of complex frequency, applications of Laplace transform in solving electrical networks, driving point and transfer function, poles and zeros, calculation of residues by analytical and graphical method.	**12**
4	**Two Port Networks** **4.1 Parameters:** Open Circuit, Short Circuit, Transmission and Hybrid parameters, relationships among parameters, reciprocity and symmetry conditions **4.2 Series/parallel connection:** T and Pi representations, interconnection of two-port networks.	**08**
5	**Synthesis of RLC Circuits** **5.1 Positive Real Functions:** Concept of positive real function, testing for Hurwitz polynomials, testing for necessary and sufficient conditions for positive real functions. **5.2 Synthesis of RC, RL, LC circuits:** Concepts of synthesis of RC, RL, LC driving point functions.	**08**
	Total hours	**42**

Books Recommended:

Textbooks:

1. A. Sudhakar and S.P. Shyammohan, *"Circuits and Networks: Analysis and Synthesis"*, Tata McGraw-Hill Publishing Company Ltd., 5th edition.
2. William Hayt, Jack Kemmerly, Steven M. Durbin, *"Engineering Circuit Analysis"*, McGraw-Hill.

Reference Books:

1. D. Roy Choudhury, *"Networks and Systems"*, New Age International Publications, 1st edition.
2. Franklin F. Kuo, *"Network Analysis and Synthesis"*, Wiley Publications, 2nd edition.
3. M.E. VanValkenburg, *"Network Analysis"*, PHI, 3rd edition.
4. John O'Malley, *"Schaum's Outline of Theory and Problems of Basic Circuit Analysis"*, McGraw-Hill.

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Oral Examination:

Oral examination of 25 marks should be conducted at the end of the semester based on entire syllabus.

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
2. on live problems or a course project.
3. Total duration allotted for writing each of the paper is 1 hr.
4. Average of the marks scored in both the two tests will be considered for final grading.

Term work:

Term work shall consist of minimum three experiments, five tutorials and two assignments.

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

Experiments/tutorials:	15 Marks
Assignment/Quiz:	10 Marks
Total:	25 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.

Suggested List of Experiments:

(*However Instructor is free to design his/her own experiments as per the guidelines)*

List of experiments (any three using hardware lab/simulation lab)

1. To verify maximum power transfer theorem (ac or dc circuits)
2. To study transfer functions of a network
3. a) To study Z parameters of a two-port network.
   b) To study Y parameters of a two-port network.
4. Interconnection of two-port networks
5. To study the second order frequency response of an RLC circuit.

List of tutorials (any five)

1. Mesh and Node Analysis (D.C. Circuits)
2. Network Theorems (A.C. Circuits)

3. Coupled Circuits
4. Time domain analysis
5. Frequency domain analysis (Application of Laplace Transforms)
6. Frequency domain analysis (poles and zeros)
7. Fundamentals of Network Synthesis (Hurwitz polynomials and Positive real functions)
8. Fundamentals of Network Synthesis (Driving Point Synthesis with L-C, R-C, R-L and R-L- C networks)

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Program: Second Year Electronics Engineering	Semester : III
Course : Digital Circuit Design	Course Code: DJ19ELXC304
Course : Digital Circuit Design Laboratory	Course Code: DJ19ELXL304

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	--	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal		
				--	--	25	15	10	25	

Objectives:

1. To introduce the students to various logic gates, minimization techniques and logic families for implementation of logical operations using combinational logic circuits.
2. To perform analysis and design of sequential circuits and synchronous state machines.
3. To introduce the students to develop ASM charts, designs using RTL description and various types of programmable logic devices.

Outcomes:

1. Learner will be able to design, implement combinational logic circuits, and differentiate between logic families TTL and CMOS.
2. Learner will be able to analyse, design and implement sequential logic circuits as well as synchronous state machines.
3. Learner will be able to develop ASM charts and design data units from RTL description.
4. Learner will be able to differentiate between various programmable logic devices.

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**1.1 Number Systems and Logic Gates:** Review of number system, binary code, binary coded decimal, octal code, hexadecimal code and their conversions. Basic gates, universal gates, Boolean algebra, de Morgan's theorem, sum of products and products of sum representation, minimization with Karnaugh map (up to four variables) and realizations. **1.2 Combinational Circuit Design using basic gates and MSI devices:** Half adder, full adder, half subtractor, full subtractor, ripple carry adder, multiplexer, function implementation using multiplexer, demultiplexer, decoder, comparator (multiplexer and decoder gate level upto 4:1, 2:4). MSI IC 7483 and 7485 based design. **1.3 Logic Families:** Types of logic families (TTL and CMOS), characteristic parameters (propagation delays, power dissipation, Noise Margin, Fan-out and Fan-in), interfacing CMOS to TTL and TTL to CMOS.	**12**
2	**2.1 Latches and Flip flops:** Difference between latches and flip flops, RS, JK, T, D flip-flops with various triggering methods, Conversion of flip-flops. **2.2 Counters and Registers:** Asynchronous and synchronous counters, Up-Down counters, MOD-N counter, ring counter, Johnson counter, shift registers, universal shift register. **2.3 MSI counters and registers:** MSI asynchronous counters (IC 7490, 7493), MSI synchronous counters (IC 74163, 74169), MSI shift register (IC 74194) and their applications.	**10**
3	**Sequential Logic Design:** Mealy and Moore machines, clocked synchronous state machine analysis, construction of state diagram, state reduction techniques (inspection and implication chart method), clocked synchronous state machine design.	**09**
4	**Algorithmic State Machine (ASM) Chart and Register Transfer Language (RTL):** Standard symbols for ASM chart, realization techniques for sequential/logic functions using ASM chart, RTL, construction of data unit using RTL description, design examples of waveform controllable generator.	**06**
5	**Programmable Logic Devices:** Concepts of PAL and PLA, introduction to CPLD and FPGA architectures, numerical based on PLA and PAL.	**05**
	Total hours	**42**

Books Recommended:

Textbooks:

1. John F. Wakerly, *"Digital Design Principles and Practices",* Pearson Education, 4th edition, 2008.
2. R. P. Jain, *"Modern Digital Electronics",* Tata McGraw Hill, 4th edition.
3. Hill, Frederick J. and Gerald R. Peterson. *"Digital Logic and Microprocessors",* 1984.

Reference Books:

1. Morris Mano, *"Digital Design",* Pearson Education, 4th edition, 2008.

2. William I. Fletcher, *"An Engineering Approach to Digital Design",* PHI, 1st edition.
3. John M. Yarbrough, *"Digital Logic: Applications and Design",* Cengage Learning India, 1st edition, 2006.
4. Parag K.Lala, *"Digital System design using PLD",* BS Publications, 2003.
5. Charles H. Roth Jr., *"Fundamentals of Logic design",* Thomson Learning, 7th edition, 2013.
6. A. Anand Kumar, *"Fundamentals of Digital Circuits"*, PHI, 4th edition, 2016.

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Oral & Practical Examination:

Oral and practical examination of 25 marks 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.

Term Work:

Term work shall consist of minimum eight experiments and mini-project.

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

Experiments:	15 marks
Mini-project:	10 marks
Total:	25 marks

The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.

Suggested List of Experiments:

(*However Instructor is free to design his/her own experiments as per the guidelines)*

1. To implement the combinational logic for given function using basic gates/SSI ICs.
2. To implement 4-bit, 5-bit and 8 bit comparator using given MSI IC 7485.
3. To implement 4-bit, 8-bit, BCD adder using MSI IC 7483.
4. To design and implement given functions using MSI multiplexers and decoders.

5. To design and implement Mod-XX asynchronous counter using JK flip-flops.
6. To design Mod 4 synchronous up/down counter using D flip-flop.
7. To design and implement a sequence detector circuit for given sequence.
8. To design and implement Mod-XX counter using MSI asynchronous counters, MSI synchronous counters and MSI shift register.
9. Mini-Project: Design and implement an application using digital circuit concepts.

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Program: Second Year Electronics Engineering	Semester : III
Course : Database Management System	Course Code:DJ19ELXC305
Course : Database Management System Laboratory	Course Code:DJ19ELXL305

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			
3	2	--	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	Total Term work	50
				25	--	--	--	25	25	

Objectives:

1. Learn and practice data modeling using the entity-relationship (ER) and developing database designs.
2. Understand the use of Structured Query Language (SQL) and learn SQL syntax.
3. Understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access.

Outcomes: Students should be able to

1. Understand the fundamentals of a database system and design an optimized database.
2. Create and populate a Relational Database and retrieve any type of information from the database by formulating SQL queries.
3. Analyze and apply concepts of normalization to relational database design.
4. Understand the concept of transaction, concurrency and recovery.

Detailed Syllabus: Module wise

Unit	Description	Duration
1	**Introduction Database Concepts:** **1.1** Introduction, characteristics of database, database system applications, file system v/s database system.	04

	1.2 View of data, data independence, data models, database languages, database design, DBMS system architecture, database users and DBA.	
2	**Entity–Relationship Data Model:** **2.1** Introduction, The Entity-Relationship (ER) Model: Entity types, Entity sets, types of attributes, keys, and relationships. **2.2** Relationship constraints: cardinality and participation, Entity-Relationship (ER) diagram.	**08**
3	**Relational Model and Relational Algebra:** **3.1** Introduction, structure of relational databases, database schema, keys. relational operations, mapping the ER model to the relational model **3.2** Relational Algebra – unary and set operations, relational algebra queries.	**06**
4	**Structured Query Language (SQL):** **4.1** Introduction, SQL data definition, basic structure of SQL and basic operations **4.2** Set and string operations, aggregate functions: group by having nested and complex queries, modification of the database **4.3** Views in SQL, Joins, integrity constraints: Key constraints, domain constraints, referential integrity constraints. **4.4** Authorization, functions and procedures, triggers, cursors.	**14**
5	**Relational–Database Design:** **5.1** Concept of normalization, decomposition, function dependencies, first normal form to third normal form, BCNF, pitfalls in relational-database design.	**06**
6	**Transactions Management and Concurrency:** **6.1** Transaction concept, transaction model, ACID properties, transaction atomicity and durability, concurrent executions. **6.2** Recovery system: Failure classification, log based recovery, checkpoint, shadow paging	**04**
	Total hours	**42**

Books Recommended:

Textbooks:

1. Korth, Slberchatz, Sudarshan, *"Database System Concepts",* McGraw – Hill, 6th edition
2. Elmasri and Navathe, *"Fundamentals of Database Systems",* Pearson education, 5th edition.
3. G. K. Gupta *"Database Management Systems",* McGraw – Hill.

Reference Books:

1. Peter Rob and Carlos Coronel, *"Database Systems Design, Implementation and Management",* Thomson Learning, 5th edition.

2. P.S. Deshpande, *"SQL and PL/SQL for Oracle 10g",* Black Book, Dreamtech Press, 2009.
3. Mark L. Gillenson, Paulraj Ponniah, *"Introduction to Database Management",* Wiley
4. Sharaman Shah, *"Oracle for Professional",* SPD.
5. Raghu Ramkrishnan and Johannes Gehrke, *"Database Management Systems",* TMH.
6. Debabrata Sahoo *"Database Management Systems",* Tata McGraw Hill, Schaum's Outline.

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Oral Examination:

Oral examination of 25 marks should be conducted at the end of the semester based on entire syllabus.

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.

Term work:

Term work shall consist of minimum eight experiments and two assignments.

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

Experiments:	15 marks
Assignments:	10 marks
Total:	25 marks

The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.

Suggested List of Experiments:

(*However Instructor is free to design his/her own experiments as per the guidelines)*

1. To draw an ER diagram for a problem statement and design a relational schema for the same
2. To implement DDL SQL queries / commands
3. To implement DML SQL queries / commands
4. To implement arithmetic operations
5. To implement aggregate functions
6. To implement Integrity Constraints
7. To implement Joins and Views

8. To implement nested queries and sub-queries
9. To implement triggers.
10. To implement procedures, functions and cursors.
11. **Case Study:** Conceptual and Database design for Library Management System, Banking System, Inventory System, etc.

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

<table>
<tr><td colspan="8">Program: Second Year Electronics Engineering</td><td colspan="3">Semester: III</td></tr>
<tr><td colspan="8">Course: Python Programming Laboratory</td><td colspan="3">Course Code:DJ19ELXL306</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">--</td><td>--</td><td>--</td><td>--</td><td>---</td></tr>
<tr><td colspan="4">Laboratory Examination</td><td colspan="2">Term work</td><td rowspan="2">Total Term work</td><td rowspan="3">50</td></tr>
<tr><td rowspan="2">--</td><td rowspan="2">2</td><td rowspan="2">--</td><td rowspan="2">1</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory Work</td><td>Mini project/ Quiz</td></tr>
<tr><td>--</td><td>--</td><td>25</td><td>15</td><td>10</td><td>25</td></tr>
</table>

Objectives:

1. Install & run Python Interpreter to create & execute programs.
2. Comprehend the concepts file I/O management.
3. Create visualization & plots using appropriate libraries.
4. Apply problem solving techniques & expose students to application development /prototyping.

Outcomes:

1. Learner will be able to describe python syntax and implement different data structures.
2. Learner will be able to write functions, use different modules and packages and also perform file handling
   operations in python
3. Learner will be able to interpret object-oriented programming concepts in Python
4. Learner will be able to apply various advanced modules of Python for data analysis, develop applications in various fields like data science, machine learning, numerical techniques etc.

Detailed Syllabus: Module wise	
Unit	**Description**
1	**Introduction to Python**: **1.1** Introduction to Python: Installation, identifiers and keywords, comments, indentation and multi-lining, variables (local and global), data types, arithmetic, comparative, logical and identity operators, bitwise operators, expressions, print statement and formats, input statements in python. **1.2** Strings, lists, tuples, dictionaries, sets, accessing elements, properties, operations and methods on these data structures.

	1.3 Decision flow control statement: if and else statement, Nested-If statement, Loop statement: while loop, do and while loop, for loop statement, continue, break and pass statement, conditional statements
2	**Functions, File Handling and Exception Handling:** **2.1** Functions: Built-in-functions, library functions, defining and calling the functions, return statements, passing the arguments, Lambda Functions, recursive functions, modules and importing packages in python code. **2.2** File input/output: Files I/O operations, read / write operations, file opening modes, with keywords, moving within a file, manipulating files and directories, OS and SYS modules. Regular expression in python **2.3** Exception Handling-Try, exception, else, finally blocks.
3	**Object Oriented Programming:** Classes and objects, public and private members, class declaration and object creation, object initialization, class variables and methods, accessing object and class attributes. Inheritance, constructor in inheritance.
4	**Numpy, Pandas, Matplotlib, Scipy:** **4.1** Introduction to Numpy, creating and printing Ndarray, class and attributes of Ndarray, basic operation, copy and view, mathematical functions of Numpy. **4.2** Introduction to Pandas, understanding Dataframe, View and select data, missing values, data operations, file read and write operation. **4.3** Introduction to Matplotlib library, Line properties, Plots and subplots, Types of Plots **4.4** Introduction to Scipy, Scipy sub packages – Integration and Optimization, Eigen values and Eigen Vectors, Statistic.

Books Recommended:

Textbooks:

1. Dr. R. Nageswara Rao, *"Core Python Programming"*, Dreamtech Press.
2. James Payne, *"Beginning Python: Using Python 2.6 and Python 3.1"*, Wrox publication.
3. E Balagurusamy, *"Introduction to computing and problem solving using python"*, McGraw Hill Education.

Reference Books:

1. *"Learn Python the Hard Way"*, Zed Shaw's Hard Way Series, 3rd edition.
2. Laura Cassell, Alan Gauld, *"Python Projects"*, Wrox publication.

Digital Material:

1. *"The Python Tutorial"*, http://docs.python.org/release/3.0.1/tutorial/
2. http://spoken-tutorial.org

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Evaluation Scheme:

Semester End Examination (A):

Oral & Practical Examination:

Oral and practical examination of 25 marks will be based on the entire syllabus including, the practicals performed during laboratory sessions.

The distribution of marks for oral examination shall be as follows:

Implementation:	15 Marks
Oral:	10 Marks
Total:	25 Marks

Continuous Assessment (B):

Term work:

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

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

Laboratory work:	15 marks
Mini Project/Quiz:	10 Marks
Total:	25 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.

Suggested List of Experiments:

(*However Instructor is free to design his/her own experiments as per the guidelines)*

1. Write python program to understand expressions, variables, quotes, basic math operations, list, tuples, dictionaries, arrays etc.
2. Write Python program to implement byte array, range, set and different STRING Functions (len, count, lower, sorted etc.)
3. Write Python program to implement control structures (for, if-else, while)
4. Exploring Files and directories
    a. Python program to append data to existing file and then display the entire file.
    b. Python program to count number of lines, words and characters in a file.
    c. Python program to display file available in current directory
5. Demonstrate exception handling
6. Make use of RE module to do text processing
7. Write Python program to implement classes, objects
8. Writing functions:
    a. Write Python program to find factorial of a number (using function) (using recursive function)
    b. Write a program to count the number of lower case & uppercase alphabets in a string by defining function.
9. Write Python program to study define, edit arrays and perform arithmetic operations. (Numpy)
10. Write python program to study selection, indexing, merging, joining, and concatenation in data frames (Pandas)
11. Write python program to use SciPy to solve a linear algebra problem.

12. Write a program to plot company year wise profit data using different types of plots & subplot functions from matplotlib module.
13. Mini project based on AIML, Data analytics, Numerical methods etc.

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

<table>
<tr><td colspan="8">Program: Second Year Electronics Engineering</td><td colspan="3">Semester : III & IV (combined)</td></tr>
<tr><td colspan="8">Course : Innovative Product Development – I</td><td colspan="3">Course Code: DJ19A2</td></tr>
<tr><td colspan="4" rowspan="2">Teaching Scheme (Hours/week)</td><td colspan="7">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="3">Semester review</td><td rowspan="2">Total</td><td rowspan="3">100</td></tr>
<tr><td rowspan="2">--</td><td rowspan="2">--</td><td rowspan="2">--</td><td rowspan="2">--</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>50</td><td>50</td><td>100</td></tr>
</table>

Objectives:

1. To acquaint the students with the process of identifying the need (considering a societal requirement) and ensuring that a solution is found out to address the same by designing and developing an innovative product.
2. To familiarize the students with the process of designing and developing a product, while they work as part of a team.
3. To acquaint the students with the process of applying basic engineering fundamentals, so as to attempt at the design and development of a successful value added product.
4. To inculcate the basic concepts of entrepreneurship and the process of self-learning and research required to conceptualize and create a successful product.

Outcome:

Learner will be able to:

1. Identify the requirement for a product based on societal/research needs.
2. Apply knowledge and skills required to solve a societal need by conceptualising a product, especially while working in a team.
3. Use standard norms of engineering concepts/practices in the design and development of an innovative product.
4. Draw proper inferences through theoretical/ experimental/simulations and analyse the impact of the proposed method of design and development of the product.
5. Develop interpersonal skills, while working as a member of the team or as the leader.
6. Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare them to be successful entrepreneurs.
7. Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

Guidelines for the proposed product design and development:

- Students shall form a team of 3 to 4 students (max allowed: 5-6 in extraordinary cases, subject to the approval of the department review committee and the Head of the department).
- Students should carry out a survey and identify the need, which shall be converted into conceptualization of a product, in consultation with the faculty supervisor/head of department/internal committee of faculty members.
- Students in the team shall understand the effective need for product development and accordingly select the best possible design in consultation with the faculty supervisor.
- Students shall convert the best design solution into a working model, using various components drawn from their domain as well as related interdisciplinary areas.
- Faculty supervisor may provide inputs to students during the entire span of the activity, spread over 2 semesters, wherein the main focus shall be on self-learning.
- A record in the form of an activity log-book is to be prepared by each team, wherein the team can record weekly progress of work. The guide/supervisor should verify the recorded notes/comments and approve the same on a weekly basis.
- The design solution is to be validated with proper justification and the report is to be compiled in a standard format and submitted to the department. Efforts are to be made by the students to try and publish a technical paper, either in the institute journal, "Techno Focus: Journal for Budding Engineers" or at a suitable publication, approved by the department research committee/ Head of the department.
- The focus should be on self-learning, capability to design and innovate new products as well as on developing the ability to address societal problems. Advancement of entrepreneurial capabilities and quality development of the students through the year long course should ensure that the design and development of a product of appropriate level and quality is carried out, spread over two semesters, i.e. during the semesters III and IV.

Guidelines for Assessment of the work:

- The review/ progress monitoring committee shall be constituted by the Head of the Department. The progress of design and development of the product is to be evaluated on a continuous basis, holding a minimum of two reviews in each semester.
- In the continuous assessment, focus shall also be on each individual student's contribution to the team activity, their understanding and involvement as well as responses to the questions being raised at all points in time.
- Distribution of marks individually for the both reviews as well as for the first review during the subsequent semester shall be as given below:
    - Marks awarded by the supervisor based on log-book : 20
    - Marks awarded by review committee : 20
    - Quality of the write-up : 10

In the last review of the semester IV, the marks will be awarded as follows.

- Marks awarded by the supervisor (Considering technical paper writing) : 30
- Marks awarded by the review committee : 20

Note: Although it's an audit course student will have to mandatorily qualify for the evaluation and clear the same.

Review/progress monitoring committee may consider the following points during the assessment.

- In the semester III, the entire design proposal shall be ready, including components/system selection as well as the cost analysis. Two reviews will be conducted based on the presentation given by the student's team.
    - First shall be for finalization of the product selected.
    - Second shall be on finalization of the proposed design of the product.

- In the semester IV, the expected work shall be procurement of components/systems, building of the working prototype, testing and validation of the results based on work completed in semester III.
    - First review is based on readiness of building the working prototype.
    - Second review shall be based on a presentation as well as the demonstration of the working model, during the last month of semester IV. This review will also look at the readiness of the proposed technical paper presentation of the team.

The overall work done by the team shall be assessed based on the following criteria;

1. Quality of survey/ need identification of the product.
2. Clarity of Problem definition (design and development) based on need.
3. Innovativeness in the proposed design.
4. Feasibility of the proposed design and selection of the best solution.
5. Cost effectiveness of the product.
6. Societal impact of the product.
7. Functioning of the working model as per stated requirements.
8. Effective use of standard engineering norms.
9. Contribution of each individual as a member or the team leader.
10. Clarity on the write-up and the technical paper prepared.

- The semester reviews (III and IV) may be based on relevant points listed above, as applicable.

Guidelines for Assessment of Semester Reviews:

- The write-up should be prepared as per the guidelines given by the department.
- The design and the development of the product shall be assessed through a presentation and demonstration of the working model by the student team to a panel of Internal and External Examiners, preferably from industry or any research organisations having an experience of more than five years, approved by the Head of the Institution. The presence of the external examiner is desirable only for the 2nd presentation in semester IV. Students are compulsorily required to present the outline of the technical paper prepared by them during the final review in semester IV.

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester III (Autonomous)

Program: Second Year Electronics Engineering *(Common for All programs)*										Semester : III			
Course : Constitution of India (Non-credit)										Course Code:DJ19A3			
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		--	
1	--	--	--	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal					
				--	--	--	--	--		--			

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.	03

	Union Executives – President, Prime Minister Parliament Supreme Court of India.	
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 Provision**s: 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, Panchayats 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
	Total hours	14

Books Recommended:

Textbooks:

1. Durga Das Basu, *"Introduction to the Constitution on India",* (Students' Edition) Prentice Hall EEE, 19th / 20th edition., 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, 3rd edition, 2003.
2. M.Govindarajan, S.Natarajan, V.S.Senthilkumar, *"Engineering Ethics",* Prentice Hall of India Pvt. Ltd. New Delhi, 2013
3. Brij Kishore Sharma, *"Introduction to the Constitution of India",* PHI Learning Pvt. Ltd., New Delhi, 7th edition 2015.
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

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

<table>
<tr><td colspan="8">Program: Second Year Electronics Engineering</td><td colspan="3">Semester : IV</td></tr>
<tr><td colspan="8">Course : Advanced Engineering Mathematics</td><td colspan="3">Course Code:DJ19ELXC401</td></tr>
<tr><td colspan="8">Course : Advanced Engineering Mathematics Tutorial</td><td colspan="3">Course Code:DJ19ELXT401</td></tr>
<tr><td colspan="4" rowspan="3">Teaching Scheme (Hours / week)</td><td colspan="11">Evaluation Scheme</td></tr>
<tr><td colspan="5">Semester End Examination Marks (A)</td><td colspan="5">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="5">Theory</td><td>Term Test 1</td><td>Term Test 2</td><td>Avg.</td></tr>
<tr><td colspan="5">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">1</td><td rowspan="3">4</td><td colspan="5">Laboratory Examination</td><td colspan="3">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 Work</td><td colspan="2">Tutorial / Mini project / presentation/ Journal</td></tr>
<tr><td>--</td><td>--</td><td>--</td><td>--</td><td colspan="2">25</td><td>25</td></tr>
</table>

Objectives:

1. To develop analytical insight of the student to prepare them for graduates' studies in Electronics Engineering.
2. To enhance their ability to solve and analyze Electronics Engineering problem.
3. To provide learner with a strong mathematical foundation to acquire the professional competence knowledge and skills.

Outcomes:

1. It is expected that learner will develop the proactive approach towards the selection of methods to a solution of Electronics Engineering problems.
2. Learner will be able identify different probability distribution, learn sampling technique, compute Eigen values and Eigen vectors and use their application in Electronics Engineering problems.
3. Learner will be able to know new subjects that are required to solve in industry.

Detailed Syllabus: (unit wise)

Unit	Description	Duration
1	***Z* Transform:** Definition, Some standard Z −transforms, Linearity property, Inverse Z transform, Unilateral and Bilateral Ztransform, ROC, Poles and zeros of transfer function.	**07**
2	**Linear Algebra:** Vector Spaces:	**14**

	2.1 Vector spaces over real field, properties of vector spaces over real field, subspaces. 2.2 The Cauchy-Schwarz inequality, Gram Schmidt process. Matrix Theory: 2.3 Characteristic equation, Eigen values and Eigen vectors, properties of Eigen values and Eigen vectors 2.4 Cayley-Hamilton theorem (without proof), examples based on verification of Cayley-Hamilton theorem. 2.5 Similarity of matrices, diagonalization of matrices Functions of square matrix, Singular value decomposition (SVD) and Principle of component analysis (PCA).	
3	**Probability:** 3.1 Baye's Theorem (without proof) 3.2 Random variable: Probability distribution for discrete and continuous random variables, Density function and distribution function, expectation, variance. 3.3 Moments, Moment Generating Function. 3.4 Probability distribution: Binomial distribution, Poisson & Normal distribution (For detailed study).	**10**
4	**Sampling Theory:** 4.1 Test of hypothesis, Level of significance, critical region, One tailed and Two tailed test, Test of significance of large samples: Mean of the samples and test of significance of two large samples. 4.2 Test of significance of small samples: Students $t-$ distribution for dependent and independent samples. 4.3 Chi-square test: Test of goodness of fit and independence of attributes, contingency table. **Correlation:** 4.4 Karl Pearson's coefficient of correlation, Covariance, Spearman's Rank correlation. Lines of Regression	**11**
	Total hours	**42**

Books Recommended:

Textbooks:

1. H.K. Das, *"Advanced engineering mathematics",* S. Chand, 10th edition, 2014.
2. Kanti B. Datta, *"Mathematical Methods in Science and Engineering",* Cengage India, 1st edition, 2012.
3. B.S. Grewal, *"Higher Engineering Mathematics",* Khanna Publication, 40th edition, 2014.
4. P.N. Wartilar & J.N. Wartikar, *"A Text Book of Applied Mathematics",* Vol. I & II, Vidyarthi Griha Prakashan., Pune.

Reference Books:

1. B. V. Ramana, *"Higher Engineering Mathematics",* Tata Mc-Graw Hill Publication.
2. Wylie and Barret, *"Advanced Engineering Mathematics",* Tata Mc-Graw Hill, 6th edition.
3. Erwin Kreysizg, *"Advanced Engineering Mathematics",* John Wiley & Sons, Inc, 10th edition.
4. Seymour Lipschutz, *"Beginning Linear Algebra‖ Schaum's 's outline series",* Mc-Graw Hill Publication, 3rd edition.
5. Seymour Lipschutz, *"Probability Schaum's 's outline series",* Mc-Graw Hill Publication, 2nd edition.

Syllabus for SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper 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.

Term work:

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 SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

Program: Second Year Electronics Engineering	Semester : IV
Course : Electronic Devices and Circuits – II	Course Code:DJ19ELXC402
Course : Electronic Devices and Circuits - II Laboratory	Course Code:DJ19ELXL402

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			
3	2	--	4	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	Total Term work	50
				--	--	25	15	10	25	

Objectives:

1. To perform DC and AC analysis of single stage and multistage amplifiers.
2. To introduce students to the use of advanced microelectronic devices and design electronic circuits using semiconductor devices.

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

1. Perform DC and AC analysis of single stage and multistage amplifiers, oscillators, differential amplifiers and power amplifiers.
2. Understand performance parameters in terms of circuit and device parameters.
3. Select appropriate circuit for given specifications/applications.
4. Demonstrate knowledge of working and construction details of special, semiconductor devices.

Detailed Syllabus: (unit wise)

Unit	Description	Duration
1	**Single stage amplifiers:** **1.1** High frequency equivalent circuit of BJT and MOSFET, MOSFET capacitance, Miller's theorem, effect of Miller's capacitance, unity gain bandwidth. **1.2** Effect of coupling, bypass and load capacitors on single stage BJT and MOSFET amplifiers	08

2	**Multistage Amplifiers:** **2.1**. Effect of parasitic capacitances on BJT and MOSFET amplifiers. **2.2.** Low, mid and high frequency response of multistage amplifiers (CE-CE, CS-CS, CS-CG)	**10**
3	**Feedback Amplifiers and Oscillators:** **3.1**. Types of negative feedback block diagram representation, effect of negative feedback on input impedance, output impedance, gain and bandwidth of the amplifier. **3.2**. Various feedback topologies (introduction only).	**05**
4	**Positive feedback and principle of oscillations:** **4.1**. RC Phase shift oscillators, Wien bridge oscillators. **4.2**. LC Oscillators Hartley, Colpitts and Clapp, Tuned oscillator, Crystal oscillator (BJT circuit analysis).	**05**
5	**Differential Amplifiers:** **5.1**. MOSFET current sources, Cascode current mirror, advanced MOSFET active load, small signal analysis: MOSFET active load. **5.2**. Basic MOSFET differential amplifier, DC characteristics, transfer characteristics, differential and common mode input impedances. **5.3**. MOSFET differential amplifier with active load, MOSFET differential amplifier with cascode active load.	**08**
6	**6.1 Power Amplifiers:** Power BJTs, heat sinks, Power MOSFETs, Class A, Class B, Class C and Class AB operation, power efficiency, Darlington configuration. **6.2 Special Semiconductor Devices - II** SCR, DIAC, TRIAC & IGBT, optoisolators and optocouplers	**06**
	Total hours	**42**

Books Recommended:

Text books:

1. Adel S. Sedra, Kenneth C. Smith and Arun N Chandorkar, *"Microelectronic Circuits Theory and Applications",* International Version, OXFORD International Students Edition, 5th edition.
2. Donald A. Neamen, *"Electronic Circuit Analysis and Design",* TATA McGraw Hill, 2nd edition.
3. R. L. Boylestad,*" Electronic Devices and Circuit Theory"*, Pearson, 10th edition.

Reference Books:

1. David A. Bell, *"Electronic Devices and Circuits",* Oxford, 5th edition.
2. Muhammad H. Rashid, *"Microelectronics Circuits Analysis and Design",* Cengage, 2nd edition.
3. S. Salivahanan, N. Suresh Kumar, *"Electronic Devices and Circuits",* Tata McGraw Hill,
4. Millman and Halkias, *"Integrated Electronics",* TATA McGraw Hill.
5. Muhammad H. Rashid, "*Power Electronics Handbook Devices circuits and applications",* 3rd edition.

Syllabus for SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Oral & Practical Examination:

Oral and practical examination of 25 marks will be based on the entire syllabus including, the practical 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.

Term work:

Term work shall consist of minimum eight experiments/simulations and mini project.
The distribution of marks for term work shall be as follows:

Laboratory work:	15 Marks
Mini project :	10 Marks
Total :	25 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.

Suggested List of Experiments:

(*However Instructor is free to design his/her own experiments as per the guidelines)*

Laboratory Experiments

1. To perform frequency response of single stage CE amplifier.
2. To perform frequency response of single stage CS MOSFET amplifier.
3. To perform frequency response of Cascode amplifier.
4. To perform frequency response of two stage RC coupled CE amplifier
5. To perform RC phase shift oscillator
6. To perform Wein Bridge/ Hartley/ Colpitts oscillator.
7. To perform crystal oscillator.
8. To perform Class B push pull amplifier
9. To perform Class AB amplifier

Guidelines for Simulation Experiments(Any Simulation software can be used)

1. Simulation of various oscillators
2. Simulation of and implementation for Class A amplifier characteristics
3. Simulation of and implementation for Class B amplifier characteristics.
4. Simulation of and implementation for Class C amplifier characteristics.
5. Simulation of and implementation for Class AB amplifier characteristics.
6. Simulation of CS MOSFET differential amplifier.

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

Program: Second Year Electronics Engineering	Semester: IV
Course: Analog and Digital Communication	Course Code:DJ19ELXC403
Course: Analog and Digital Communication Laboratory	Course Code:DJ19ELXL403

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	--	4	Oral	Practical	Oral & Practical	Laboratory Work	Assignment		
				25	--	--	15	10	25	

Objectives: The objectives of this course are to:

1. Understand the need for various analog modulation techniques and analyse the characteristics of the radio transmitters and receivers
2. Understand pulse modulation methods and identify the necessity of multiplexing
3. Analyze various digital modulation techniques
4. Identify the necessity of source coding and channel coding in digital communication

Outcomes: Learner will be able to

1. Understand and analyze various analog modulation methods and communication systems
2. Assess different pulse modulation techniques and recognize the need for multiplexing techniques in communication.
3. Analyze various digital modulation methods and assess them based on various parameters
4. Understand the basics of information theory, analyse source coding techniques and evaluate different channel coding techniques

Detailed Syllabus: (unit wise)

Unit	Description	Duration
1	**Analog Modulation:** **1.1 Analog Communication:** Block diagram of analog communication systems **1.2 Principle of Amplitude Modulation (AM)**: Representation of AM wave (mathematical & graphical), frequency spectrum of AM wave, AM power distribution, AM for a complex modulating signal.	12

	1.3 Types of AM: Generation of DSB-SC using diode based balanced modulator, generation of SSB using phase shift method. **1.4 Principles of Angle Modulation:** Theory of Frequency Modulation (FM) & Phase Modulation (PM) - basic Concepts, spectrum analysis of FM wave, noise triangle, pre-emphasis, de-emphasis **1.5 Comparison of AM, FM and PM** **1.6 Radio Transmitters and Receivers:** Block diagram of AM & FM transmitters, Radio receivers: Receiver characteristics, super-heterodyne receiver, automatic gain control	
2	**Pulse Modulation and Multiplexing Techniques:** **2.1 Pulse Modulation:** Sampling theorem, generation and detection of Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM), Pulse Position Modulation (PPM), Pulse Code Modulation (PCM) and Delta Modulation (DM) **2.2 Multiplexing Techniques:** Principle of Time Division Multiplexing (TDM) & Frequency Division Multiplexing (FDM)	**06**
3	**Digital Modulation Techniques:** **3.1** Bandpass digital transmitter and receiver model, Line codes and their desirable properties. **3.2 Generation, detection, signal space diagram, power spectral density and spectrum efficiency analysis of:** Binary Phase Shift Keying (BPSK), Quaternary Phase Shift Keying (QPSK), M-ary PSK, Binary Amplitude Shift Keying (BASK), Quadrature Amplitude Modulation (QAM), Binary Frequency Shift Keying (BFSK), Minimum Shift Keying (MSK).	**12**
4	**Information Theory, Source &Channel Coding:** **4.1 Information Theory**: Measure of information, entropy, information rate, channel capacity theorem, Shannon Hartley theorem. **4.2 Source Coding**: Shannon-Fano encoding, Huffman encoding, code efficiency and redundancy. **4.3 Channel Coding**: Need for channel encoding, concept of error detection and correction, Linear block codes: Hamming distance, Hamming weight, systematic codes, syndrome testing. Cyclic codes: Generator polynomial for cyclic codes, systematic cyclic codes, feedback shift register for polynomial division. Convolution codes: Time domain and transform domain approach, graphical representation, code tree, trellis diagram, state diagram, decoding methods	**12**
	Total hours	**42**

Books Recommended:

Textbooks:

1. Kennedy and Davis, *"Electronics Communication System",* Tata McGraw Hill, 5th edition.
2. T. L. Singal, *"Analog and Digital Communication",* Tata Mc-Graw Hill, New Delhi, 1st edition, 2012.
3. Sklar B, and Ray P. K., *"Digital Communication: Fundamentals and Applications",* Pearson, Dorling Kindersley (India), Delhi, 2nd edition, 2009.
4. H. Taub, D. Schilling and G. Saha, *"Principles of Communication Systems",* Tata Mc-Graw Hill, New Delhi, 3rd edition, 2012.

Reference Books:

1. Wayne Tomasi, *"Electronics Communication Systems",* Pearson Education, 3rd edition, 2001.
2. R P Singh and S. Sapre, *"Analog and Digital Communication",* Tata McGraw Hill, 2nd, edition.
3. Haykin Simon, *"Digital Communication Systems",* John Wiley and Sons, New Delhi, 4th edition, 2014.
4. Proakis and Salehi, *"Communication System Engineering",* Pearson Education.

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Oral Examination:

Oral examination of 25 marks should be conducted at the end of the semester based on entire syllabus.

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.

Term work:

Term work shall consist of minimum eight experiments/simulations and two assignments.
The distribution of marks for term work shall be as follows:

Laboratory work:	15 Marks
Assignment:	10 Marks
Total:	25 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.

Suggested List of Experiments:

(*However Instructor is free to design his/her own experiments as per the guidelines)*

Suggested experiments based on laboratory setups:

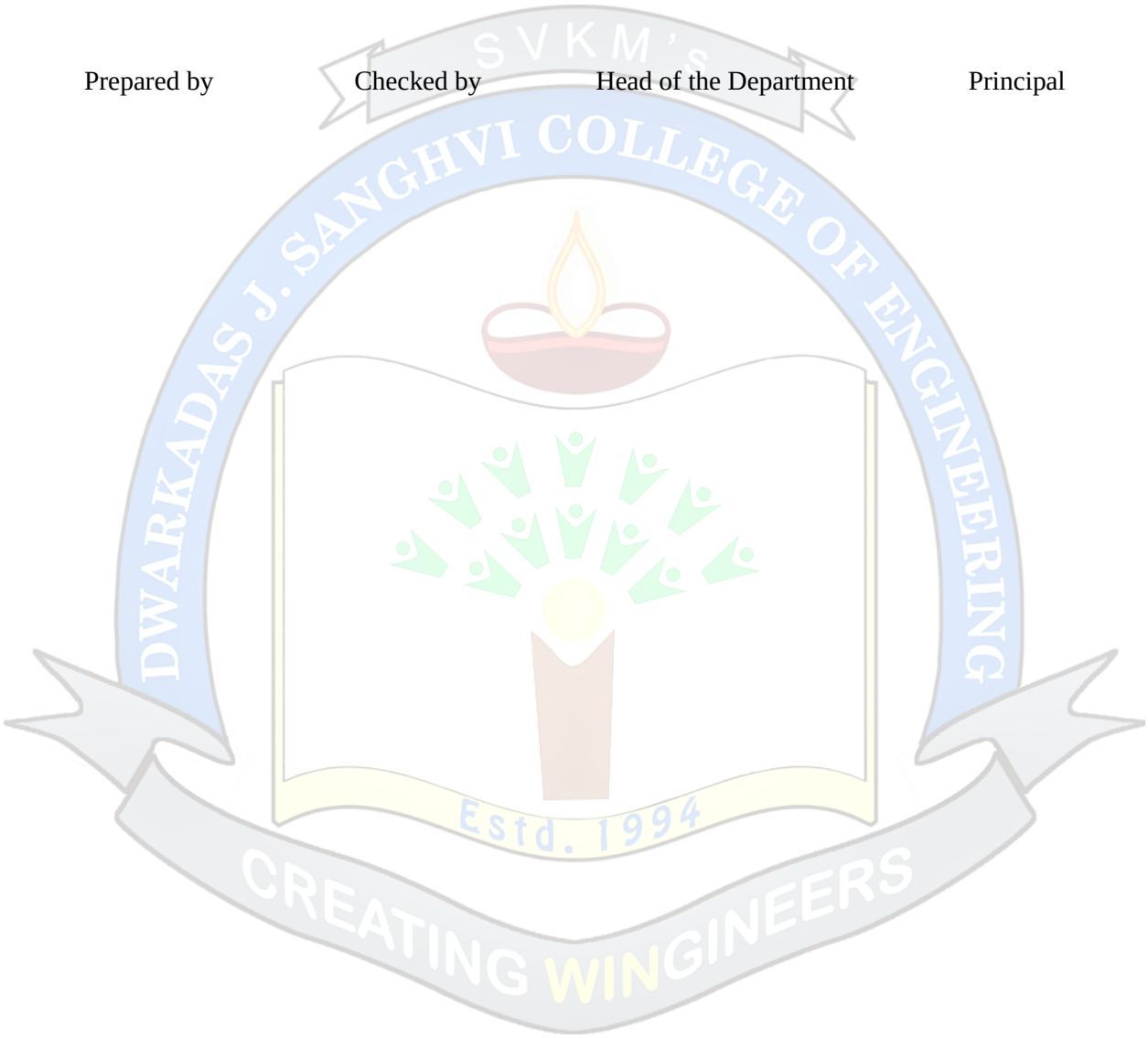
1. Analog Modulation: AM/FM
2. Pre-emphasis and De-emphasis
3. Analog Pulse modulation (PAM/PWM/PPM)
4. Line coding techniques
5. Binary modulation techniques: BASK, BPSK, BFSK

Suggested simulation-based experiments:

1. Simulation of multiplexing techniques-TDM
2. BPSK/BASK modulator & demodulator
3. Effect of SNR on probability of error and constellation diagram of Mary-PSK
4. Effect of SNR on probability of error and constellation diagram of QAM

5. Huffman coding on different types of images
6. Linear block code- coding and decoding
7. Cyclic codes- coding and decoding for given probability of error in channel
8. Convolutional code generation from generator sequences using time domain and transform domain approach

Prepared by Checked by Head of the Department Principal



Syllabus for SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

Program: Second Year Electronics Engineering	Semester : IV
Course : Control Systems and Instrumentation	Course Code:DJ19ELXC404
Course : Control Systems and Instrumentation Laboratory	Course Code:DJ19ELXL404

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	--	4	Oral	Practical	Oral & Practical	Laboratory Work	Assignment		
				25	--	--	15	10	25	

Objectives:

1. To explain the design aspect & performance criterion for measuring instruments.
2. To teach fundamental concepts of control systems and mathematical modeling of the system.
3. To teach the concepts of time response and frequency response analysis of control systems.

Outcomes:

1. Students will be able to derive the mathematical model of different types of control systems and represent them in various forms.
2. Students will be able to analyse systems using time domain analysis techniques.
3. Students will be able to apply concepts of frequency domain techniques in stability analysis of control systems.
4. Students will be able to describe the static & dynamic characteristics of an instrument, components of general instrumentation system & different types of errors in the measurement process.

Detailed Syllabus: (unit wise)

Unit	Description	Duration
1	**Introduction to Control Systems:** **1.1** Types of control systems, Open loop and closed loop systems, examples of control systems. **1.2** Manipulations: Block diagram representation of complex systems, block diagram reduction technique. **1.3** Signal flow graph and the Mason's gain rule for determining overall transfer function of Single Input, Single output systems.	08
2	**Time Response Analysis:**	08

	2.1 Dynamic Response: Standard test signals; transient and steady state behaviour of first and second order systems. **2.2** Performance specifications for a second order system and derivations for rise time, settling time, peak time, peak overshoot and steady state error. **2.3** Steady state errors in feedback control systems and their types, error constants and type of system. **2.4** PID control : Analytical design for ON/OFF, P, PD, PI,PID control systems	
3	**Stability Analysis in Time Domain:** **3.1** Concepts of Stability: Concept of absolute, relative and robust stability; Routh stability criterion. **3.2** Root Locus Analysis: Root-locus concepts; general rules for constructing root-locus; Root-locus analysis of control systems.	**08**
4	**Stability Analysis in Frequency Domain:** **4.1 Frequency** domain specifications, response peak and peak resonating frequency; relationship between time and frequency domain specifications of system; stability margins. **4.2** Bode Plot: Magnitude and phase plot; method of plotting Bode plot; Gain margin and Phase margin on the Bode plots; stability analysis using Bode plot.	**08**
5	**Principles of Measurements & Instrumentation:** **5.1** Static characteristics (accuracy, precision, linearity, sensitivity, resolution, etc.) and dynamic characteristics (speed of response, lag and dynamic error), **5.2 Errors in Measurement**: Classification of errors, remedies to eliminate or to minimize errors, statistical analysis of errors. **5.3 Basics of Transducers / Sensors: -** Characteristics of transducers and sensors, requirements of transducers, classification of transducers, criteria for selection of transducers.	**10**
	Total hours	**42**

Books Recommended:

Textbooks:

1. M. Gopal, "*Control Systems: Principle and design"*, Tata McGraw Hill, 1st edition, 1998.
2. I. J. Nagrath, M. Gopal, "*Control Systems Engineering"*, New Age International, 5th edition, 2012.
3. David A. Bell, "*Electronic Instrumentation & Measurements"*, Oxford Publishing, 2nd edition.
4. H. S. Kalsi, "*Electronic Instrumentation"*, McGraw Hill, 4thedition.

Reference Books:

1. Smarajit Ghosh, *"Control Systems: Theory and Applications",* Pearson India, 2nd edition, 2012.
2. K. Ogata, "*Modern Control Engineering"*, Pearson Education India, 5th edition, 2015.
3. Norman S. Nise, "*Control Systems Engineering"*, John Wiley and Sons, 5th edition, 2010.
4. K. Sawhney, "*Electrical & Electronic Instruments & Measurement"*, Dhanpat Rai & Sons, 11th edition.

Evaluation Scheme:

Semester End Examination (A):

Theory:

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

Oral Examination:
Oral examination of 25 marks should be conducted at the end of the semester based on entire syllabus.

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.

Term Work:
Term work shall consist of minimum eight experiments/simulations and two assignments/quiz.

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

Laboratory work:	15 Marks
Assignment/Quiz:	10 Marks
Total:	25 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.

Suggested List of Experiments:
(*However Instructor is free to design his/her own experiments as per the guidelines)*

Laboratory Experiments:

1. Study of CRO and DSO
2. Study of LVDT
3. Study of strain gauge
4. Transient response of 1st order and 2nd order system
5. Steady state error analysis of different types of systems

Simulation Experiments:

1. Block diagram reduction technique
2. Time response analysis of 1st order and 2nd order system
3. Frequency response analysis of 1st order and 2nd order system
4. Root Locus technique
5. Bode plot technique

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

<table>
<tr><td colspan="8">Program: Second Year Electronics Engineering</td><td colspan="3">Semester : IV</td></tr>
<tr><td colspan="8">Course : HDL Programming Laboratory</td><td colspan="3">Course Code:DJ19ELXL405</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="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>
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<tr><td colspan="4">Laboratory Examination</td><td colspan="3">Term work</td><td rowspan="3">Total Term work</td><td rowspan="3">50</td></tr>
<tr><td rowspan="2">--</td><td rowspan="2">2</td><td rowspan="2">--</td><td rowspan="2">1</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory Work</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>

Objectives:

1. To introduce the students to the basics of Hardware Description language.
2. To understand the steps involved in digital circuit implementation using FPGA and CPLD.
3. To verify combinational and sequential circuit designs using VHDL simulation.

Outcomes:

1. Learner will be able to verify the behaviour of given hardware/function using VHDL simulation.
2. Learner will be able to write synthesizable VHDL code and perform physical verification on FPGA or CPLD device.
3. Learner will be able to write, simulate, synthesize and implement VHDL code with behavioural, dataflow and structural modelling styles.
4. Learner will be able to interface the external peripherals with FPGA and design hardware to create an application.

Books Recommended:

1. Volnei A. Pedroni, *"Circuit Design with VHDL"* MIT Press, 2004.
2. J. Bhaskar, *"VHDL Primer"*, Pearson Education
3. Gaganpreet Kaur, *"VHDL Basic to Programming",* Pearson
4. Douglas Perry, *"VHDL: Programming by Example"* McGraw Hill, 4th edition.
5. Application notes by Xilinx and Altera
6. Stephen Brown and ZvonkoVranesic, *"Fundamentals of digital logic design with VHDL",* McGraw Hill, 2nd edition

Evaluation Scheme:

Semester End Examination (A):

Oral & Practical Examination:

Oral and practical examination of 25 marks will be based on the entire syllabus including, the practical performed during laboratory sessions.

Continuous Assessment (B):

Term Work:

Term work shall consist of minimum eight experiments and Mini-project.

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

Experiments:	15 marks
Mini-project:	10 marks
Total:	25 marks

The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.

Suggested List of Experiments:

(*However Instructor is free to design his/her own experiments as per the guidelines)*

1. Design, synthesize and simulate adder and subtractor circuits using dataflow modeling and carry out physical verification on given FPGA board.
2. Design, synthesize and simulate switch based designs such as multiplexer, de-multiplexer, encoder and decoder circuits using different concurrent statements and carry out physical verification on given FPGA board.
3. Design, synthesize and simulate sequential circuits such as flip-flops, counters and registers using behavioral modeling and carry out physical verification on given FPGA board.
4. Design, synthesize and simulate combinational network such as ripple carry adder and carry-look-ahead adder using structural modeling and carry out physical verification on given FPGA board.
5. Design, synthesize and simulate sequential circuits such as 4-bit counter and 4-bit register using structural modeling and carry out physical verification on given FPGA board.
6. FPGA implementation of sequence detector, traffic light controller in VHDL using Finite State Machine.
7. Design, simulate and synthesize a stepper motor control hardware using Johnson counter. Use behavioral modeling for designing this hardware. Carry out physical verification on given FPGA.
8. Interface ADC/ DAC with FPGA. Give analog input signal to ADC, digitally process/amplify the input signal, and observe output on CRO through DAC interface.

9. Develop an application like ALU/Memory array / Design a system like microcomputer using existing IP.
10. Mini project as an application of HDL.

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

<table>
<tr><td colspan="8">Program: Second Year Electronics Engineering</td><td colspan="3">Semester : IV</td></tr>
<tr><td colspan="8">Course : Java Programming Laboratory</td><td colspan="3">Course Code:DJ19ELXL406</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">--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
<tr><td colspan="4">Laboratory Examination</td><td colspan="3">Term work</td><td rowspan="3">Total Term work</td><td rowspan="3">100</td></tr>
<tr><td rowspan="2">--</td><td rowspan="2">2+2*</td><td rowspan="2">--</td><td rowspan="2">2</td><td>Oral</td><td>Practical</td><td>Oral & Practical</td><td>Laboratory Work</td><td colspan="2">Tutorial / Mini project / presentation/ Journal</td></tr>
<tr><td>--</td><td>--</td><td>50</td><td>--</td><td colspan="2">--</td><td>50</td></tr>
</table>

**** 2 hours class wise and 2 hours batch wise***

Objectives: Students will try:

1. To understand how to design, implement, test, debug, and document programs using Classes methods and objects.
2. Discuss the different programming principles like inheritance, interface and packages Multi-threading, exception handling and demonstrate though problem analysis.
3. To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using MVC architecture.

Lab Outcomes: Upon Completion of the course the learner should be able to:

1. Identify classes, objects, members of a class, control structures and the relationships among them needed for a finding the solution to specific problem
2. Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.
3. Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.
2. Identify, Design & develop complex Graphical user interfaces using principal Java Swing classes based on MVC architecture

Syllabus for SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
1	**Fundamental of Java Programming:** Introduction to the principles of object-oriented programming: Classes, keywords, Data types, variables, operators, expressions, types of variables and methods. Control statements: If statement, if-else, nested if, switch statement, break, continue. Iteration statements: for loop, while loop, and do-while loop, features of Java.	**04**
2	**Classes, Objects, Arrays and Recursion:** Classes & Objects: Class fundamentals: assigning object reference variables, passing parameters to methods and returning parameters from the methods, nested and inner classes. Constructors: parameterized constructors, finalize () method, method overloading, constructors overloading, recursion, command-line arguments. Arrays & vectors: one dimensional arrays, two dimensional array, irregular arrays, dynamic arrays, array list and array of object.	**06**
3	**Inheritance, Interface and Packages:** Inheritance basics, types of inheritance in Java, concept of super and sub class, inheriting data members and methods, role of constructors in inheritance, making methods and classes final, method overriding, dynamic method dispatch, abstract classes and methods, defining an interface, extending interfaces, implementing interfaces, accessing implementations through interface references, interfaces vs. abstract classes. Packages – steps for defining, creating and accessing a package, importing packages.	**06**
4	**Exception Handling and Multithreading:** Exception handling Mechanism: try, catch, throw, throws and finally. Multithreading: need of multithreading , Java thread model, thread life-cycle, thread class methods, implementing runnable, extending thread, synchronizing threads, synchronized statement, critical factor in thread –deadlock.	**04**
5	**GUI development, Event handling and Database connectivity:** Introducing Swing: AWT vs Swings, components and containers, swing packages, a simple swing application, painting in swing, designing swing GUI application using buttons, JLabels, checkboxes, radio buttons, JScrollPane, JList, JComboBox, tables scroll pane menus and toolbars adding a menu to window, extending GUI features event-driven programming in Java, event handling process, event-handling mechanism, delegation model of event handling, event classes, event sources, event listeners, adapter classes as helper classes in event handling, database connectivity using Java.	**08**
	Total hours	**28**

Books Recommended:

Textbooks:

1. Sachin Malhotra, *"Programming in Java",* Oxford Publication, 7th edition.
2. Herbert Schildt, *"Java-The Complete Reference",* Tata McGraw Hill Publication, 7th edition.
3. E. Balguruswamy, *"Programming with Java A primer",* Tata McGraw Hill Publication, 5th edition.

Reference Books:

1. eBook: Jeanne Boyarsky, Scott Selikoff, *"Oracle Certified Professional Java SE 8 Programmer II Study Guide: Exam 1Z0-809"*

2. *H. M. Deitel, P. J. Deitel, S. E. Santry, "Advanced Java 2 Platform How to Program" Prentice Hall, 2nd edition.*
3. *Learn to Master JAVA, from Star EDU solutions*, by Script Demics,

Evaluation Scheme:

Semester End Examination (A):

Oral & Practical Examination:

Oral and practical examination of 50 marks will be based on the entire syllabus including, the practical performed during laboratory sessions.

Continuous Assessment (B):

Term work shall consist of minimum eight experiments/simulations, two assignments/quiz and a mini project.

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

Laboratory work:	15 Marks
Assignment/Quiz:	10 Marks
Project:	25 Marks
Total:	50 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.

Suggested List of Experiments:

(*However Instructor is free to design his/her own experiments as per the guidelines)*

EXP. 1 (Basic programs)

i. Write a Java program to understand how to accept input using Scanner or BufferedReader and print output using System.out.println statement.
ii. Write a Java program to display the default value of all primitive data types in Java.
iii. Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c = 0$. Read in a, b, c and use the quadratic formula. If the discriminate b^2-4ac is negative, display a message stating that there are no real solutions.
iv. Write a Java program to test whether string is palindrome or not using StringBuffer class
v. Write a Java program to count number of alphabets, digits, special symbols, blank spaces and words from the given sentence.
vi. Write a Java program to count number of vowels and consonants from the given strings.

EXP. 2 (Classes and objects)

i. Write a Menu driven program in Java to implement simple banking application. Application should read the customer name, account number, initial balance, rate of interest, contact number and address field etc. Application should have following methods.
    1. createAccount()
    2. deposit()
    3. withdraw()

4. computeInterest()
5. displayBalance()

ii. Write a Java program to demonstrate Method overloading
iii. Write a Java program to demonstrate constructors, parameterized constructors and constructor overloading
iv. Write a Java program to demonstrate command line arguments
v. Write a Java program to demonstrate array and vectors operations

EXP. 3 (methods and 2-D arrays)

i. Write menu driven program to implement recursive functions for following tasks.
   1. To find GCD and LCM
   2. To find X to the power Y
   3. To print n Fibonacci numbers
   4. To find reverse of number
   5. To 1+2+3+4+……..+(n-1)+n
ii. Write the Menu driven program to perform
   1. Addition of two matrices of order m*n and p*q
   2. Multiplication of two matrices of order m*n and p*q
   3. Transpose of matrix of order m*n
   4. Addition of diagonal and non-diagonal elements

Exp. 4 (Inheritance and packages)

i. Write a Java programs to demonstrate hierarchical inheritance
ii. Write a Java program to demonstrate extending & implementing Interfaces
iii. Write a Java program to demonstrate modules and packages
iv. Write a Java program to create user defined packages

Exp. 5 (Exception Handling)

i. Write Java programs to demonstrate Exception handling using try, catch, throw, throws and finally statements.
ii. Write a Java Program to input the data through command Line and Find out total valid and in-valid integers. (Hint: use exception handling).
iii. Write a Java program to implement use of nested try-catch concept using appropriate example.
iv. Write a Java program to identify whether inputted data is byte/short/int/long/float/double/String/char type. (Use Exception Handling)

Exp. 6 (Multithreading)

i. Write Java program to print Table of Five, Seven and Thirteen using Multithreading (Use Thread class for the implementation)
ii. 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.
iii. Write Java program to create the child thread. Comment on the execution of main and Child Thread.
iv. Write Java program to implement the concept of Thread Synchronization.

Exp. 7 (GUI)

i. Create an applet to display any figure.
ii. Create and design a simple calculator using Java swings

Exp. 8 (Event Handling and Databases)

i. Implement mouse and keyboard listener
ii. Create Java form to store and retrieve the user information from the database

Prepared by Checked by Head of the Department Principal

Syllabus for SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

Program: Second Year Electronics Engineering *(Common for all programs)*	Semester : IV
Course : Universal Human Values	Course Code: DJ19IHC1
Course : Universal Human Values Tutorial	Course Code: DJ19IHT1

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			
2	--	1	3	Oral	Practical	Oral & Practical	Laboratory Work	Tutorial / Mini project / presentation/ Journal	Total Term work	25
				--	--	--	--	--	25	

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, and 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.

Detailed Syllabus: (unit wise)		
Unit	**Description**	**Duration**
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;	**05**

	'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.	
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 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**
	Total hours	**28**

Books Recommended:

Textbooks:

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

Reference Books:

1. A. Nagaraj, *"Jeevan Vidya: Ek Parichaya"*, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. A.N. Tripathi, *"Human Values",* New Age Intl. Publishers, New Delhi, 2004.
3. A. Leonard, *"The Story of Stuff: The Impact of Overconsumption on the Planet, Our Communities, and Our Health-And How We Can Make It Better",* 2011.
4. M. K. Gandhi, *"The Story of My Experiments with Truth*", B.N. Publishing, 2008.
5. E. F. Schumacher, *"Small is Beautiful*", Abacus, 1975
6. C. Andrews, *"Slow is Beautiful*", New Society Publisher, 2007.
7. J. C. Kumarappa, *"Economy of Permanence*", C.P., All India Village Industries Assn., 1946.
8. Pandit Sunderlal, *"Bharat Mein Angreji Raj"*, Ministry of Information, 2016.
9. Dharampal, *"Rediscovering India: Collection of Essays and Speeches"*, Society for Integrated Development of Himalayas, 2003.
10. M. K. Gandhi, *"Hind Swaraj",* Delhi Open Books, 2019.
11. M. K. Gandhi*," Indian Home Rule"*, Prabhat Books, 2008.
12. A.K. Azad, *"India Wins Freedom"*, Orient Longman Pvt. Ltd., 1988.
13. R. Rolland, *"The Life of Vivekananda"*, Prabhat.
14. R. Rolland, *"Mahatma Gandhi: The Man who Became One with the Universal Being",* The Century Company 1924.

Evaluation Scheme:

Semester End Examination (A):

Theory:

1. Question paper 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 SY B.Tech. (Electronics Engineering) - Semester IV (Autonomous)

<table>
<tr><td colspan="8">Program: Second Year Electronics Engineering</td><td colspan="3">Semester : III & IV (combined)</td></tr>
<tr><td colspan="8">Course : Innovative Product Development – II</td><td colspan="3">Course Code: DJ19A4</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="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">--</td><td>--</td><td>--</td><td>--</td><td>--</td></tr>
<tr><td rowspan="3">--</td><td rowspan="3">--</td><td rowspan="3">--</td><td rowspan="3">--</td><td colspan="4">Laboratory Examination</td><td colspan="2">Semester review</td><td rowspan="2">Total</td><td rowspan="3">100</td></tr>
<tr><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>50</td><td>50</td><td>100</td></tr>
</table>

Objectives:

1. To acquaint the students with the process of identifying the need (considering a societal requirement) and ensuring that a solution is found out to address the same by designing and developing an innovative product.
2. To familiarize the students with the process of designing and developing a product, while they work as part of a team.
3. To acquaint the students with the process of applying basic engineering fundamentals, so as to attempt at the design and development of a successful value added product.
4. To inculcate the basic concepts of entrepreneurship and the process of self-learning and research required to conceptualize and create a successful product.

Outcome:

Learner will be able to:

1. Identify the requirement for a product based on societal/research needs.
2. Apply knowledge and skills required to solve a societal need by conceptualizing a product, especially while working in a team.
3. Use standard norms of engineering concepts/practices in the design and development of an innovative product.
4. Draw proper inferences through theoretical/ experimental/simulations and analyse the impact of the proposed method of design and development of the product.
5. Develop interpersonal skills, while working as a member of the team or as the leader.
6. Demonstrate capabilities of self-learning as part of the team, leading to life-long learning, which could eventually prepare themselves to be successful entrepreneurs.
7. Demonstrate product/project management principles during the design and development work and also excel in written (Technical paper preparation) as well as oral communication.

Guidelines for the proposed product design and development:

- Students shall form a team of 3 to 4 students (max allowed: 5-6 in extraordinary cases, subject to the approval of the department review committee and the Head of the department).
- Students should carry out a survey and identify the need, which shall be converted into conceptualization of a product, in consultation with the faculty supervisor/head of department/internal committee of faculty members.
- Students in the team shall understand the effective need for product development and accordingly select the best possible design in consultation with the faculty supervisor.
- Students shall convert the best design solution into a working model, using various components drawn from their domain as well as related interdisciplinary areas.
- Faculty supervisor may provide inputs to students during the entire span of the activity, spread over 2 semesters, wherein the main focus shall be on self-learning.
- A record in the form of an activity log-book is to be prepared by each team, wherein the team can record weekly progress of work. The guide/supervisor should verify the recorded notes/comments and approve the same on a weekly basis.
- The design solution is to be validated with proper justification and the report is to be compiled in a standard format and submitted to the department. Efforts are to be made by the students to try and publish a technical paper, either in the institute journal, "Techno Focus: Journal for Budding Engineers" or at a suitable publication, approved by the department research committee/ Head of the department.
- The focus should be on self-learning, capability to design and innovate new products as well as on developing the ability to address societal problems. Advancement of entrepreneurial capabilities and quality development of the students through the year long course should ensure that the design and development of a product of appropriate level and quality is carried out, spread over two semesters, i.e. during the semesters III and IV.

Guidelines for Assessment of the work:

- The review/ progress monitoring committee shall be constituted by the Head of the Department. The progress of design and development of the product is to be evaluated on a continuous basis, holding a minimum of two reviews in each semester.
- In the continuous assessment, focus shall also be on each individual student's contribution to the team activity, their understanding and involvement as well as responses to the questions being raised at all points in time.
- Distribution of marks individually for the both reviews as well as for the first review during the subsequent semester shall be as given below:
    - Marks awarded by the supervisor based on log-book : 20
    - Marks awarded by review committee : 20
    - Quality of the write-up : 10

In the last review of the semester IV, the marks will be awarded as follows.

- Marks awarded by the supervisor (Considering technical paper writing) : 30
- Marks awarded by the review committee : 20

Note: Although it's an audit course student will have to mandatorily qualify for the evaluation and clear the same.

Review/progress monitoring committee may consider the following points during the assessment.

- In the semester III, the entire design proposal shall be ready, including components/system selection as well as the cost analysis. Two reviews will be conducted based on the presentation given by the student's team.
    - First shall be for finalization of the product selected.
    - Second shall be on finalization of the proposed design of the product.

- In the semester IV, the expected work shall be procurement of components/systems, building of the working prototype, testing and validation of the results based on work completed in semester III.
    - First review is based on readiness of building the working prototype.
    - Second review shall be based on a presentation as well as the demonstration of the working model, during the last month of semester IV. This review will also look at the readiness of the proposed technical paper presentation of the team.

The overall work done by the team shall be assessed based on the following criteria;

1. Quality of survey/ need identification of the product.
2. Clarity of Problem definition (design and development) based on need.
3. Innovativeness in the proposed design.
4. Feasibility of the proposed design and selection of the best solution.
5. Cost effectiveness of the product.
6. Societal impact of the product.
7. Functioning of the working model as per stated requirements.
8. Effective use of standard engineering norms.
9. Contribution of each individual as a member or the team leader.
10. Clarity on the write-up and the technical paper prepared.

- The semester reviews (III and IV) may be based on relevant points listed above, as applicable.

Guidelines for Assessment of Semester Reviews:

- The write-up should be prepared as per the guidelines given by the department.
- The design and the development of the product shall be assessed through a presentation and demonstration of the working model by the student team to a panel of Internal and External Examiners, preferably from industry or any research organisations having an experience of more than five years, approved by the Head of the Institution. The presence of the external examiner is desirable only for the 2nd presentation in semester IV. Students are compulsorily required to present the outline of the technical paper prepared by them during the final review in semester IV.

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