UNIVERSITY OF JAMMU

(NAAC ACCREDITED A + GRADE UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

NOTIFICATION

(23/Sept/Adp/79)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Competent Bodies, has been pleased to authorize the adoption of the revised Syllabi and Courses of Studies in **Bachelor of Technology (B.Tech.) in Electronics and Communication Engineering** for Semester III & IV under the **Credit Based System** as per the new **AICTE** Model Curriculum **(as given in the Annexure)** for the candidates of **Govt./Pvt. Engineering Colleges affiliated with the University of Jammu** for the Examinations to be held in the years indicated against each Semester as under:-

Branch	Semester	For the Examination to be held in the years
E&C	**Semester-III**	**December 2023, 2024, 2025 and 2026**
	Semester-IV	**May 2024, 2025, 2026 and 2027**

The Syllabi of the course are available on the University Website: www.jammuuniversity.in.

Sd/-
DEAN ACADEMIC AFFAIRS

No. F.Acd/III/23/10001-10011
Dated: 13/09/2023
Copy for information & necessary action to:-

1. Dean, Faculty of Engineering
2. Principal, GCET/MBSCET/BCET/YCET
3. C.A to the Controller of Examinations
4. Joint/Assistant Registrar (Exams Prof./Eval Prof./Confidential)
5. Incharge University Website

Endorsed 13/Sept/23
Assistant Registrar (Academic)
13/9/23 Today 13/09/23

UNIVERSITY OF JAMMU

B.Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

B.Tech 3rd Semester **Contact Hrs: 24**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS	%CHANGE
			L	T	P	INTERNAL	EXTERNAL			
ECT1301	Professional Core Courses	**Electronic Circuits- I**	2	1	0	50	100	150	3	**75%**
ECT1302	Professional Core Courses	**Digital Electronics**	2	1	0	50	100	150	3	**10%**
ECT1303	Professional Core Courses	**Signal and Systems**	2	1	0	50	100	150	3	**100%**
EET2305	Engineering Science Course	**Network Theory**	2	1	0	50	100	150	3	**0%**
BST8301	Basic Science Course	**Numerical Methods and Transform Calculus**	2	1	0	50	100	150	3	**5%**
HMT7301	Humanities & Social Science & Management Course	**Entrepreneurship and Business Strategies**	2	1	0	50	100	150	3	**15%**
ECP1311	Professional Core Courses	**Electronic Circuits- I Lab**	0	0	2	50	0	50	1	**75%**
ECP1312	Professional Core Courses	**Digital Electronics Lab**	0	0	2	50	0	50	1	**0%**
MOC1311	Massive open online course	**MOOCs**	0	0	2	50	0	50	1	**0%**
TOTAL			**12**	**6**	**6**	**450**	**600**	**1050**	**21**	

B.Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

CLASS: B.E. 3RD SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG.

COURSE NO: ECT1301
COURSE TITLE: ELECTRONIC CIRCUITS- I
DURATION OF EXAM: 3 HOURS

Credits: 3

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Understand the use of hybrid parameters in designing low and high frequency amplifiers.
CO2	Identify the need for cascading, frequency response and different coupling methods of multistage amplifiers.
CO3	Identify the topology of feedback amplifiers and its need for feedback amplifiers
CO4	Identify and need of different types of tuned and power amplifiers using transistors and monolithic Ic's.

Detailed Syllabus

Section-A

Hybrid Parameters & Single stage Amplifier: Introduction. Two port network, hybrid model for CE, CC, CB configuration and their analysis, Single stage RC coupled Amplifier and its Analysis for various parameters, Analysis of transistor CE amplifier with & without emitter resistance, approximate model of h-Parameter, Amplifier and their analysis using h-parameters Miller theorem. Introduction to hybrid pie-model, relationship between h-parameters and hybrid pie-parameters, Current Gain with and without resistive load, single stage CE transistor amplifiers response. Numerical Problems **(11 hrs)**

Multistage Amplifiers: Need for cascading, method of coupling multistage amplifiers (RC coupling, DC coupling, transformer coupling), Frequency response of Multistage amplifiers. Analysis of Multistage RC Coupled Amplifier, Techniques for improving input resistance, Effect of emitter and bypass capacitors on the bandwidth and frequency response of a cascaded amplifiers. Square wave testing of an amplifier, Bandwidth of multistage amplifiers. Numerical Problems. **(10 hrs)**

Section-B

Feedback Amplifiers: Classification of amplifiers, Limitation of basic amplifier, Distortion in amplifier, need for feedback, Feedback concept, Advantages of negative feedback, Ways of introducing negative feedback in amplifiers, Gain with & without feedback, Effect of negative feedback on input, output resistance & bandwidth of the amplifiers, Their respective analysis for feedback amplifiers, Procedure for analysis of feedback amplifiers, Analysis of different Topologies of Feedback Amplifiers. Numerical Problems. **(12 hrs)**

Tuned and Power Amplifiers: General features of power transistor, Difference between power transistor & a voltage amplifier, Need for power amplifier, Classification of power amplifiers with necessary load lines concept & derivations (Efficiency, power dissipation), Class A, B & AB amplifier, their types &analysis, Transformer Coupled Audio Power Amplifier and Push-Pull Amplifier, Cross over distortion & its remedy, Determination of harmonic distortion, Monolithic power amplifier, Tuned amplifier-Introduction, Classification of tuned amplifiers (single tuned & double tuned) with respective analysis. **(12 hrs)**

RECOMMENDED BOOKS:

1. Integrated Electronics — Millman Halkias
2. Electronics Devices — Bolystead
3. Electronics Devices — Malvino Leach
4. Microelectronics Circuits — Adel S. Sedra

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B.Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

CLASS: B.E. 3RD SEMESTER **Credits: 3**

BRANCH: ELECTRONICS & COMMUNICATION ENGG.

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE NO: ECT1302
COURSE TITLE: DIGITAL ELECTRONICS
DURATION OF EXAM: 3 HOURS

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Understand the basic logic operations and combinational logic elements.
CO2	Design and analyze combinational circuits
CO3	Design and analyze synchronous/asynchronous sequential logic circuits
CO4	Formulate problems and simplify with state minimizing techniques.

Detailed Syllabus

Section-A

Number System, Radix conversion, Arithmetic with base other than ten, Binary codes – weighted/Non-weighted codes, alphanumeric code, Subtraction of signed/unsigned number. (07 **hrs)**

Logic Design: Logic Gates, Boolean algebra, Simplification of Boolean expressions, Minimization techniques, Karnaugh map (up to five variables), Quine Mc-Clusky method **(11hrs)**

Logic families and Characteristics: Fan in, Fan out, Propagation delay , Noise margin, RTL, DTL, Tristate TTL, ECL & CMOS families and their characteristics. **(05 hrs)**

Section-B

Combinational logic circuits: Half and Full Adders, Subtractors, BCD Adder, Comparators, Multiplexer, Realization of function using MUX, Demultiplexer, Decoder, Encoder, Priority encoders, Code converters, General problems, PLA, Design of combinational circuit using PLA & PAL. **(10 hrs)**

Sequential logic circuits: Synchronous and Asynchronous operation, Flip-Flops– R-S, J-K, D, T & Master-Slave flip-flop, Edge Triggered flip flop, Conversion of flip-flops, Shift register Analysis of asynchronous & synchronous sequential counter, Design of sequential logic circuits: Problem formulations, State minimization techniques. **(12 hrs)**

RECOMMENDED BOOKS:

01. Digital Electronics By R.P Jain
02. Digital Electronics & Microcomputer By R.K. Gaur
03. Computer System Architecture By M.M. Mano

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions will have to be attempted, selecting at least two from each section. Use of calculator is allowed.

B.Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

B.E. 3RD SEMESTER **CREDITS: 3**
BRANCH: ELECTRONICS & COMMUNICATION ENGG.

COURSE NO: ECT1303
COURSE TITLE: SIGNALS AND SYSTEMS
DURATION OF EXAM: 3

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES At the end of the course student will be able to:	
CO1	Understand Mathematical description and representation of continuous and discrete time signals and systems
CO2	Characterize different types of signals and systems
CO3	Analyze system behaviour using time and frequency domain techniques. .
CO4	Compute the output of an LTI system given the input and the impulse response through convolution sum and convolution integral

Detailed Syllabus

Section-A

Representation / Classification of Signals and Systems: Continuous time signals –Discrete time signals – Representation of signals – Step, Ramp, Pulse, Impulse, Sinusoidal, Exponential signals, Operation on the signals – Classification of continuous time and discrete time signals – Periodic, Aperiodic, Deterministic, Random, Even, Odd, Energy and Power Signals – Continuous time and discrete time systems – Classification of systems –Properties of systems. **(12 hrs)**

Continuous Time Signal Representation / Analysis: Fourier series analysis –Representation of periodic signals in trigonometric and exponential forms – Fourier transform analysis of aperiodic signals – Spectral analysis of periodic and aperiodic signals– Parseval's theorem for periodic and aperiodic signals. **(11 hrs)**

Section-B

Discrete Time Signal Representation / Analysis: Discrete time Fourier series – Discrete time Fourier transform – Spectrum of discrete time periodic and aperiodic signals –Parseval relations – Z transform – Properties and application to discrete time signal analysis – Inverse Z transform. **(10 hrs)**

Discrete Time Systems: LTI discrete time systems – Difference equation – Block diagram representation and reduction techniques – impulse response – Convolution Sum –Properties of discrete time LTI systems – Frequency response – Analysis of LTI system using Fourier and Z transform techniques. **(12hrs)**

BOOK RECOMMENDED:

- Fundamentals of Signals & Systems : Michael J Roberts
- Principles of Signal Processing & Linear System : B.P. Lathi
- Signals & Systems : Alan V. Oppenheim, Alan S. Willsky
- Signals & Systems : A. Anand Kumar
- Signals & Systems : Simon Haykin, Barry Van Veen

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B.Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

CLASS: B.E. 3RD SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG/ ELECTRICAL ENGGG
COURSE NO: EET2305
COURSETITLE: NETWORK THEORY
DURATION OF EXAM: 3 HOURS

CREDITS: 3

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES At the end of the course student will be able to:	
CO1	Apply the knowledge of basic circuital law, dot convention and topological description of Electrical networks.
CO2	Acquire knowledge about the application of differential equation method and Laplace transform in electrical circuits.
CO3	Understand pole-zero configuration and determine parameters of two port network.
CO4	Understand concept and design of filters and synthesize circuits using Foster and Cauer forms.

Detailed Syllabus

Section-A

Conventions for describing networks: Reference directions for currents and voltages, Conventions for Magnetically Coupled Circuits, Circuit Topology. **(5 hrs)**

First order differential equation and Laplace Transformations: Differential equations as applied in solving networks, Application of initial conditions, evaluating initial conditions in networks. Laplace Transformations: Initial and final value theorems, convolution integral, convolution as summation, Solution of network problems with Laplace transformation. **(10 hrs)**

Network Functions-poles and zeroes: Ports or terminal pairs, Network functions for one port and two port networks, Poles and Zeros of network functions, Restriction on pole and Zero locations for driving point and transfer functions. Time domain behaviour from pole-Zero plot. **(8 hrs)**

Section-B

Two port parameters: Impedance, Admittance, transmission and hybrid parameters, Relationship between parameter sets, parallel, series & Cascade connection of two port Networks, Characteristics impedance of two port networks. **(10 hrs)**

Filters: Filter fundamentals, filter classification, Constant K & m Derived Filters, Design of filters. **(5 hrs)**

Network Synthesis: Synthesis problem formulation, properties of positive real functions. Hurwitz polynomials properties of RC, LC and RL driving point, functions. Foster and Cauer synthesis of LC, RL and RC circuits **(7hrs)**

RECOMMENDED BOOKS:

1.	Network Analysis	Van Valkenberg
2.	Network Analysis & Synthesis	F.F. Kuo
3.	Introduction to Circuit Synthesis & Design	Temes & La Patra
4.	Fundamentals of Network Analysis & Synthesis	Perikari
5.	Network Theory & Filter Design	V. Atre
6.	Network analysis and Synthesis	Sudhakar Shyam Mohan

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

B.Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

BRANCH: ELECTRONICS & COMMUNICATION ENGG/ ELECTRICAL ENGGG
CLASS: B.E. 3RD SEMESTER **CREDITS:3**
COURSE TITLE: NUMERICAL METHODS & TRANSFORM CALCULUS
COURSE CODE – BST8301
DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES: - At the end of the semester the Student will be able to	
CO1	Develop skills in analyzing the methods of interpolating a given data
CO2	Find out the real roots of algebraic, transcendental equations and differential equations.
CO3	Determine the Laplace Transform, inverse Laplace transform of various functions
CO4	Understand the idea of Fourier transform, Fourier sine and cosine transform and their property.

Detailed Syllabus

Section -A

NUMERICAL METHODS

Finite and divided difference, Interpolation using Newton's and Lagrange's formulae. Solution of polynomial and transcendental equations – Newton-Raphson method, Iteration method and Regula-Falsi method. Numerical integration: Trapezoidal rule and Simpson's 1/3rd rule. **(12 hrs)**

Taylor's method, Picard's method, Euler and modified Euler's methods. Runge Kutta method of fourth order for solving first and second order equations. **(10 hrs)**

Section-B

LAPLACE TRANSFORM: Laplace Transform, Properties of Laplace Transform: Linear property, change of scale property, first shifting property, second shifting property, Multiplication & Division by t property, convolution property, Laplace transform of periodic functions, Laplace transform of derivatives. Finding inverse Laplace transform by different methods. Evaluation of integrals by Laplace transform, solving differential equations of higher order by Laplace Transform. **(12hrs)**

FOURIER TRANSFORM: Fourier Integrals, Fourier transforms, Fourier integral theorem, Fourier sine and cosine integrals, and their inverses. Properties of Fourier transforms. Application of Fourier transform to solve integral equations. Fourier sine and cosine integrals, and their inverses. **(11 hrs)**

Books Recommended:

N.P. Bali and M. Goyal,	A text book of Engineering Mathematics, Laxmi Publications
B.S. Grewal,	Higher Engineering Mathematics, Khanna Publishers, 2010.
Dr. Bhopinder Singh,	Engineering Mathematics III
Dr. Bhopinder Singh,	A textbook on Complex analysis and Numerical Methods, Kirti Publications.

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

B.Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

CLASS: B.E. 3RD SEMESTER

BRANCH: ELECTRONICS & COMMUNICATION ENGG /COMPUTER ENGG/COMPUTER SCIENCE &ENGG

CREDITS:3

COURSE NO: HMT7301

COURSE TITLE: ENTREPRENEURSHIP AND BUSINESS STRATEGIES

DURATION OF EXAM: 3 HOURS

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Understand in detail entrepreneurial skills and hence may opt entrepreneurship as a career option.
CO2	Understand women/social entrepreneur & legal forms of industrial ownership
CO3	Apply proper knowledge about lean startups, business pitching, business strategy, project initiation, execution and implementation.
CO4	Start their own SSI unit with adequate knowledge of schemes and policies for entrepreneurship development.

Detailed Syllabus

Section-A

Entrepreneurship: Definition and Types of entrepreneurs; Qualities of an entrepreneur; factors affecting entrepreneurship; Role of an entrepreneur in economic development; Difference between entrepreneur and manager; Barriers to entrepreneurship. **(8 hrs)**

New Generations of Entrepreneurship: Women Entrepreneur: Classification of Women Entrepreneur in India, Problems of Women Entrepreneur, steps for promoting women entrepreneurship; Social Entrepreneur: Problems and steps for promoting social entrepreneurship. **(8 hrs)**

Legal Forms of Industrial Ownership: Sole Proprietorship, Partnership, Joint Stock Company (Features, Merits and Demerits); Introduction to business **models** **(7 hrs)**

Section-B

Lean Startups: Introduction to lean startups and Business pitching, Concept, nature and importance of Business Strategy, Five Generic competitive strategy **(7 hrs)**

Starting a New Project/ Venture: Scanning the environment, product development and selection, project report preparation, project resourcing, project planning and scheduling using networking techniques of PERT/CPM (concepts only). **(8 hrs)**

Small Scale Industries and policies for entrepreneurship development:
Definition of small scale industries; objectives, Role of SSI in economic Development of India, SSI registration process; Schemes and Policies for entrepreneurship development. **(7 hrs)**

RECOMMENDED BOOKS:

- Fundamentals of Entrepreneurship: H. Nandan.
- Osterwalder, Alex and pigneur,Yves, Business model generation.
- Small scale industries and Entrepreneurship, Vasant Desai.
- Management of small scale Industries, Himalaya publishing house, Vasant Desai.
- Entrepreneurial Development: S S Khanka
- Entrepreneur Revolution: How to Develop your Entrepreneurial Mindset and Start a Business that works, Daniel Priestley
- Business Policy and Strategic Management, Azhar Kazmi

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

B. Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

CLASS: B.E. 3RD SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG

COURSE NO: ECP1311
COURSE TITLE: ELECTRONIC CIRCUITS- I LAB

CREDITS: 1

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
0	0	2	0	50

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Plot H-parameters of transistor configuration and determine various hybrid parameters
CO2	Determine the gain and frequency response of single and multistage amplifiers.
CO3	Determine the gain and frequency response of feedback amplifiers.
CO4	Determine the frequency response of Class C tuned amplifier.

LIST OF PRACTICALS

1. Determination of h parameter from transistor characteristics Determination of h- parameter from CE/CB transistor characteristics.
2. Study of single stage RC coupled amplifier and to determine gain and bandwidth
3. Study of two stage RC coupled amplifier and determine of voltage gain with and without feedback and plot the frequency response.
4. To determine the effect of emitter and bypass capacitors on the bandwidth and frequency response of a single/ cascaded amplifiers.
5. To study the Square wave testing of an amplifier and find the percentage tilt in output response.
6. To study and determination of frequency response of Class-C tuned amplifier.
7. Study of complimentary symmetry push pull amplifier and determine its gain.
8. Study of Class B push pull amplifier and its determine gain.
9. To Identify the topology of feedback amplifier and determine its effect on the gain and Input/output resistance and bandwidth of the Amplifier.
10. To study and determine the output of monolithic power amplifiers.

NOTE: Each student has to perform atleast eight experiments. Additional Practical/Experiments will be performed based on the course content requirements.

B.Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

CREDITS: 1

CLASS: B.E. 3RD SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG

Hours/ Week			Marks Distribution	
L	T	P	Theory	Practical
0	0	2	0	75

COURSE NO: ECP1312
COURSE TITLE: DIGITAL ELECTRONIC LAB

COURSE OUTCOMES At the end of the course student will be able to:	
CO1	Implement and verify Boolean expressions using Logic Gates.
CO2	Design and implement various combinational circuits using digital IC's.
CO3	Design encoder / decoder using Logic Gates.
CO4	Design and implement various sequential circuits using digital IC's

LIST OF PRACTICALS

01. Verification of truth tables of Logical Gates AND / OR / NOT, NAND, NOR, EXOR, EXNOR, Gates.
02. Implementation of Boolean expression using AND, OR, NOT, NAND, & NOR logic.
03. Implementation of Decoder, Encoder using IC's & Gates.
04. To implement Half Adder, Half Subtractor, Full Adder, Full Subtractor using different IC's & Gates.
05. Implementation of multiplexer, Demultiplexer using IC's & gates.
06. Design of BCD to seven segment display using logical gates & IC's.
07. To design & verify truth table of Flip Flops.
08. To design various asynchronous counters using flip flops, gates & IC's.
09. To design various synchronous counters using flip flops, gates & IC's.
10. To design & verify truth tables of shift Registers.

NOTE: Each student has to perform atleast eight experiments out of which 40% shall be simulation based. Additional Practical / Experiments will be performed based on the course content requirements.

B.Tech Electronics & Communication Engineering 3rd Semester Examination to be held in the year Dec 2023, 2024,2025, 2026

CLASS: B.E. 3RD SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG
COURSE TITLE: MOOC
COURSE NO: MOC1311

CREDIT:1

Hours/ Week			Marks Distribution	
L	T	P	Theory	Practical
0	0	2	0	50

MOOCS: A massive open online course (MOOC) is a model for delivering learning content to any person who wants to take a course by means of the web. It has been incorporated in the 3rd semester.

Breakup of Marks:

- **Attendance-** **10 marks**
  Students will have to visit the lab twice a week as per the time table and pursue their respective online course.
- **Report file-** **15 marks**
  A detailed report of about 20-25 pages has to be submitted to the department at the end of the semester. It should contain details about the course that was undertaken by the student. A copy of the assignments with solutions that have been uploaded on the MooC platform should also be included in the final report. A copy of the certificate if awarded should also be appended to the report.
- **Presentation-** **15 marks.**
  The presentation should be given to the peers/students focusing on the key points of the course with an aim to share the knowledge.
- **Certification-** The students must attach the MooC certificate of 30 hours with the report.

10 marks

B. Tech Electronics & Communication Engineering 4th Semester Examination to be held in the year May 2024, 2025, 2026, 2027

B.E 4th Semester **Contact Hrs: 25**

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATIONS			MARKS DISTRIBUTION		TOTAL MARKS	CREDITS	%CHANGE
			L	T	P	INTERNAL	EXTERNAL			
ECT1401	Professional Core Courses	Communication Engineering-I	2	1	0	50	100	150	3	100%
ECT1402	Professional Core Courses	Electronic Circuits -II	2	1	0	50	100	150	3	80%
ECT1403	Professional Core Courses	Electromagnetic Field Theory	2	1	0	50	100	150	3	18%
ECT1404	Professional Core Courses	Digital Signal Processing	2	1	0	50	100	150	3	100%
EET2402	Engineering Science Courses	Control System	2	1	0	50	100	150	3	100%
MOC1401	Professional Core Courses	SWAYAM / NPTEL	3	0	0	100	0	100	3	100%
ECP1412	Professional Core Courses	Electronic Circuits-II Lab	0	0	3	75	0	75	1.5	80%
ECP1413	Professional Core Courses	MATLAB Programming	0	0	2	50	0	50	1	0%
NCC3401	Non-Credit Course	Cyber Ethics & Laws	2	0	0	Satisfactory / Un-satisfactory			Non-credit	0%
TOTAL			15	5	5	475	500	975	20.5	

B.Tech Electronics & Communication Engineering 4th Semester Examination to be held in the year May 2024,2025, 2026,2027

CLASS: B.E. 4TH SEMESTER
BRANCH: ELECTRONICS & COMMUNICATION ENGG

COURSE NO: ECT1401
COURSE TITLE: COMMUNICATION ENGINEERING-I
DURATION OF EXAM: 3 HOURS

Credits: 3

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Apply statistical techniques to analyze random processes, such as calculating moments and power spectral density.
CO2	Analyze the impact of noise on communication system performance, such as signal-to-noise ratio and bit error rate
CO3	Recall the fundamental concepts and terminology related to communication engineering
CO4	Interpret the frequency spectrum and bandwidth requirements of modulated signals.
CO5	Evaluate the performance of analog and pulse modulated systems

Detailed Syllabus

Section-A

Random Variable & Processes: Probability, Random variable, Commulative Density Function Probability density function, Marginal Densities Variance, Tchebycheff's inequality, Gaussian probability density, Rayleigh probability density, Central-limit theorem, Random process. **(12 hrs)**

Noise: Source of Noise, Type of Noise, Resistor Noise, Noise temperature, Probability of error, Optimum filter, White Noise, The matched filter, Probability of error of the matched filter **(10 hrs)**

Section-B

Continuous Wave Modulation:: Introduction to Communication Systems – Modulation – Types – Need for Modulation. Different types of Analog modulation. Principle of Amplitude Modulation DSB, SSB and VSB modulations. Modulator and Demodulator of AM DSB and SSB signals. FM Modulation, Representation of FM signals, Spectral characteristics of FM signals. Modulator using varactor diode and Demodulator of FM using Phase discriminator. Pre-emphasis and De-emphasis Comparison of AM and FM. Introduction to super heterodyne receivers. **(12 hrs)**

Pulse Modulation Techniques: Sampling Theorem, Types of Sampling, Principle, Generation and Detection of PAM, PWM, Quantization Process, PCM, Companding , Differential Pulse-Code Modulation, Delta Modulation, Adaptive Delta Modulation. **(10hrs)**

BOOK RECOMMENDED:

01.	Principle of Communication System	Taub & Shilling
02.	Communication System	Haykin
03.	Communication System	Singh &Sapre
04.	Random Process	Peebles
05.	Electronic Communication System	G.Kennedy

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

B. Tech Electronics & Communication Engineering 4th Semester Examination to be held in the year May 2024,2025, 2026,2027

CLASS: B.E. 4TH SEMESTER **Credits: 3**

BRANCH: ELECTRONICS & COMMUNICATION ENGG

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE NO: ECT1402
COURSE TITLE: ELECTRONIC CIRCUITS- II
DURATION OF EXAM: 3 HOURS

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Study of different types of oscillators and to find its gain and frequency.
CO2	Design of series, shunt, voltage regulators along with monolithic IC regulators..
CO3	Attain knowledge about the concepts of MOS and CMOS ICs
CO4	Attain knowledge about the concepts of NMOS and CMOS fabrication techniques.

Detailed Syllabus

Section - A

Sinusoidal Oscillators: Introduction, Necessity of oscillator, Gain with feedback, Barkhausein criteria, Requirements of oscillator, Types of oscillators, RC oscillators & phase shift oscillators, Wien bridge oscillators, LC oscillators, with necessary derivations to determine gain required for oscillation & frequency of oscillation, Amplitude & frequency stability of oscillators, Piezo electric effect, Crystal oscillators. Numerical Problems **(12 Hrs)**

Voltage Regulators: Introduction & necessarily of voltage regulators, Difference between unregulated & regulated power supply, Factor affecting unregulated power supply, Stabilization, Basic representation of voltage regulators Type of voltage regulators-series & shunt voltage regulators, Series voltage regulators using emitter follower & its expressions for Sv & Ro, Pre-regulators, Short circuit protection-simple & fold back current limiting, Monolithic & IC regulators(78XX,79XX,LM317,LM337) and design, Switching Regulator. Numerical Problems. **(10 Hrs)**

Section-B

Fundamental MOS & its Characteristics: Overview of Classification of IC Technologies-Trades off, Necessity of CMOS IC, MOS structure, MOS System under different bias, Types and principles of MOSFETs, Threshold Voltage, Channel length modulation, substrate bias effect, Current voltage characteristics, Static and Dynamic characteristics, Resistive, Depletion and Enhancement load NMOS inverters, CMOS inverter-voltage transfer characteristics& design, logic threshold, Noise margins. Dynamic behaviour, transition time, Propagation Delay, Power Consumption. **(12 Hrs)**

P-Well & Twin-Tub processes, MOS layers, Combinational MOS Logic Design, Static MOS design, Complementary MOS, Ratioed logic, Pass Transistor logic, Complex nMOS & CMOS logic circuits, CMOS Transmission gate & Circuit design. Pseudo nMOS gates **(11 Hrs)**

BOOK RECOMMENDED:

- Integrated Electronics : Millman Halkais
- Electronics Devices : Bolystead
- Electronics Devices: Malvino Leach
- CMOS Digital Integrated Circuits-Analysis & Design : S.M. Kang & Y. Leblibici, TMH.
- Principles of CMOS VLSI Design: A System Perspective : NHE Weste & K. Eshraghian,
- Introduction to VLSI : Eshraghian & Pucknell, PHI.
- Op-Amps and Linear Integrated Circuits : Ramakant A. Gayakward

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

B.Tech Electronics & Communication Engineering 4th Semester Examination to be held in the year May 2024,2025, 2026,2027

CLASS: B.E. 4TH SEMESTER **Credits: 3**

BRANCH: ELECTRONICS & COMMUNICATION ENGG

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
2	1	0	100	50

COURSE NO: ECT1403

COURSE TITLE: ELECTROMAGNETIC FIELD THEORY

DURATION OF EXAM: 3 HOURS

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Attain knowledge about the vector analysis, coordinate system, electric and magnetic fields and calculation of flux density, potential and energy densities.
CO2	Analyse the Maxwell's equations and the wave propagation equation in free space and in different media.
CO3	Study the Transmission line and its parameters.
CO4	Solve for transmission line parameters at high frequencies and principles of impedance matching and Smith Chart.

Detailed syllabus

Section-A

ELECTROSTATICS: Rectangular, cylindrical, Spherical & polar coordinates system, Electric Field Intensity, Field due to line Charge, Sheet charge and Continues volume charge distribution, Electrostatic Potential, Potential gradient, Energy stored in an electrostatic field, Boundary conditions, Method of images, Energy density in electrostatics field, Electric field in dielectric media, Capacitance, Solution of Electrostatic problems using Poisson's & Laplace equation. **(10 hrs)**

MAGNETOSTATICS AND TIME VARYING FIELDS: Magnetic flux density, & Magnetic potential, Energy density in the magnetic field. Equation of continuity in time varying field, Uniform Plane wave and relation between E and H, Wave motion in perfect dielectric, Plane wave in Lossy dielectric, Propagation in good conduction, Polarization, Depth of penetration and Brewster angle, Reflection of uniform plane wave. (12**hrs**)

Section – B

TRANSMISSION LINE: Basic principles of T.L, Equivalent circuit of T.L, Basic transmission line equation, Input impedance, infinite T.L, Characteristics impendence (Zo), Propagation constant, attenuation constant, Phase constant, open and short circuits T.L, Velocity, wavelength, Voltage and power on line. Distortion in line Reflection and its coefficient. **(11hrs)**

LINE AT HIGH FREQUENCIES: Line Equation, Waveform on line terminated in various impedances, SWR, & its relation with reflection coefficient. Impedance of short Circuit and open Circuit line. Characteristic of λ/2 &λ/4 lines. Principle of Impedance matching & use of Smith chart for impedance matching using λ/4 transformer & single stub. **(12 hrs)**

BOOK RECOMMENDED:

01. Engineering Electromagnetic By Jseph A. Edminister
02. Introduction to Electromagnetic By Griffith
03. Engineering Electromagnetic By Jr. Hyat
04. Network Line & Filters By J. D. Ryder
05. Antenna & Wave Propagation By K. D. Prasad

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

B.Tech Electronics & Communication Engineering 4th Semester Examination to be held in the year May 2024,2025, 2026,2027

CLASS: B.E. 4TH SEMESTER **CREDITS: 3**
BRANCH: ELECTRONICS & COMMUNICATION ENGG

				Marks Distribution	
COURSE NO: ECT1404	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE TITLE: DIGITAL SIGNAL PROCESSING	**2**	**1**	**0**	**100**	**50**
DURATION OF EXAM: 3 HOURS					

COURSE OUTCOMES **At the end of the course student will be able to:**	
CO1	Interpret and analyse discrete time signals & system and its importance
CO2	Realization of Discrete linear systems
CO3	Compute DFT, FFT and its properties
CO4	Design FIR and IIR filters

Detailed Syllabus

Section-A

Discrete Time Signal & System:
Introduction and analysis of LTI system, Properties of LTI system, System described by difference equations, Correlation of discrete time system, Recursive & Non-recursive structures, Properties of Z-Transform, Evaluation of the Inverse Z-Transform. **(12 hrs)**

Realisation of Digital linear systems:
Introduction, Basic realisation Block diagram and signal flow graph, Basic structures for IIR systems; direct form-I, direct form- II, cascade form and parallel form realisation. Basic structure for FIR systems; direct form and cascade form realisation **(11 hrs)**

Section-B

Discrete & Fast Fourier Transform:
Introduction, Properties of DFT, Linear convolution using DFT, Circular convolution, Discrete time Fourier transform (DTFT), Fast fourier transform (FFT), FFT Algorithms–Decimation in time FFT algorithms & decimation in frequency algorithms, Computational consideration. **(12 hrs)**

Digital Filter Design:
Generation consideration, Design of FIR filter, Design of IIR filter-Impulse Invariant method, Bilinear transformation, Butterworth filter, Application of DSP, Radar, Image processing. **(10 hrs)**

RECOMMENDED BOOKS:

- Digital Signal Processing — S. Salivaharan
- Digital Signal Processing — John G. Proakes
- Digital Signal Processing — A.V Oppenheim and R.W.Schafer

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed

B.Tech Electronics & Communication Engineering 4th Semester Examination to be held in the year May 2024,2025, 2026,2027

CLASS: B.E. 4TH SEMESTER **CREDITS: 3**
BRANCH: ELECTRONICS & COMMUNICATION ENGG

				Marks Distribution	
COURSE NO: EET2402	**L**	**T**	**P**	**Theory**	**Sessional**
COURSE TITLE: CONTROL SYSTEM	**2**	**1**	**0**	**100**	**50**
DURATION OF EXAM: 3 HOURS					

COURSE OUTCOMES: **At the end of the course student will be able to:**	
CO1	Understand linear control system and mathematical modeling of physical systems
CO2	Understand the concept of time domain analysis of control system and the operational characteristics of various control system components.
CO3	Analyze frequency domain analysis using different stability criterions.
CO4	Design compensation techniques using different plots and understand the concept of Feedback Controllers.

Detailed Syllabus

Section-A

Introduction to Linear Control System: Control, Types of Control systems, Feedback and its effects, Mathematical modeling of physical systems. **(5 hrs)**

System Representation: Block diagrams, Transfer functions, Signal flow graphs. **(5hrs)**

Time domain analysis: Time domain analysis of first & second order Control systems. Typical test signals for time response of control systems, time domain performance of first and second order control systems, (steady state response and transient response). **(10 hrs)**

Control Components: AC and DC servomotors, ac tachometer, synchro transmitter and receiver, synchro pair as control transformer, ac and dc position control system, stepper motor, magnetic amplifier and adaptive control. **(5 hrs)**

Section-B

Frequency Domain Analysis : Stability characteristic equation, stability of linear time invariant systems, Routh-Hurwitz stability, Polar plot, Nyquist Criterion, Bode Plot, Root Locus plot **(12 hrs)**

Compensation Techniques: Phase lead, Lag and Lead-Lag Compensation and their design using Bode plot and root locus techniques, Introduction to P, PI and PID controllers. **(8 hrs)**

RECOMMENDED BOOKS:

Modern Control Engineering :	K.Ogatta
Automatic Control Systems:	B.C. Kuo
Control System Engineering:	Nagrath and Gopal

NOTE: There shall be total eight questions, four from each section. Each question carries 20 marks. Five questions have to be attempted, selecting at least two from each section. Use of calculator is allowed

B. Tech Electronics & Communication Engineering 4th Semester Examination to be held in the year May 2024,2025, 2026,2027

CLASS: B.E. 4TH SEMESTER
BRANCH: ELECTRONICS AND COMMUNICATION ENGG.

COURSE NO: ECP1412
COURSE TITLE: Electronic Circuits -II LAB

Credits: 1.5

Hours/ Week			Marks Distribution	
L	T	P	Theory	Sessional
0	0	2	0	75

COURSE OUTCOMES	
At the end of the course student will be able to:	
CO1	Determine the output and frequency response of Colpitts, Clap,Hartley, Wein bridge oscillator.
CO2	Designing of voltage regulator using Zener, transistor and monolithic IC. Find its output voltage and output resistance.
CO3	To attain the knowledge of the fundamentals of MOS devices.
CO4	To study and design MOS/CMOS complex logic circuits.

LIST OF PRACTICALS

01. Design & determination of stability factor series of Zener shunt Regulator / IC Regulator.
02. Study and design of Series and Shunt Voltage Regulator voltage regulator. Find their regulation
03. Study and design of IC regulators using IC 78XX, 79XX, LM317 and LM337
04. Study of Colpitt, Hartley and Clapp Oscillators Determine the frequency of Oscillations/output waveform and find % error in the frequency generation
05. Study of Wein bridge and Phase shift Oscillators. Determine the frequency of Oscillations/output waveform and find % error in the frequency generation
06. Plot & Study of MOSFET (Depletion/Enhanced) Characteristics. Determine its parameters
07. Plot & Study of CMOS (PMOS and NMOS) Characteristics. Determine its parameters
08. Design of PCB for a given circuit.

NOTE: Each student has to perform at least six experiments. Additional Practical / Experiments will be performed based on the course content requirements.