GOVERNMENT COLLEGE OF TECHNOLOGY

(An Autonomous Institution Affiliated to Anna University)

Coimbatore - 641 013

Curriculum & Syllabus For

B.E. DEGREE PROGRAMME FOR WORKING PROFESSIONALS (ELECTRONICS AND COMMUNICATION ENGINEERING)

2025

Regulations

OFFICE OF THE CONTROLLER OF EXAMINATIONS

GOVERNMENT COLLEGE OF TECHNOLOGY

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GOVERNMENT COLLEGE OF TECHNOLOGY, COIMBATORE – 641 013
B.E DEGREE PROGRAMME FOR WORKING PROFESSIONALS

ELECTRONICS AND COMMUNICATION ENGINEERING

FIRST SEMESTER

S. No.	Course Code	Course Title	CA Marks	End Sem Marks	Total Marks	Hours/Week			
						L	T	P	C
THEORY									
1	25WPL1Z1	Applied Mathematics I (Common to Civil, Mech & EEE Branches)	40	60	100	3	0	0	3
2	25WPL1Z2	Environmental Science and Engineering (Common to Civil, Mech & EEE Branches)	40	60	100	3	0	0	3
3	25WPL103	Electric Circuits and Electron Devices	40	60	100	3	0	0	3
4	25WPL104	C Programming	40	60	100	3	0	0	3
PRACTICAL									
5	25WPL105	C Programming Laboratory	60	40	100	0	0	3	1.5
TOTAL			**220**	**280**	**500**	**12**	**0**	**3**	**13.5**

SECOND SEMESTER

S. No.	Course Code	Course Title	CA Marks	End Sem Marks	Total Marks	Hours/Week			
						L	T	P	C
THEORY									
1	25WPL2Z1	Applied Mathematics II (common to Mech & EEE Branches)	40	60	100	3	0	0	3
2	25WPL202	Electronic Circuits	40	60	100	3	0	0	3
3	25WPL203	Analog Integrated Circuits	40	60	100	3	0	0	3
4	25WPL204	Digital System Design	40	60	100	3	0	0	3
PRACTICAL									
5	25WPL205	Analog and Digital Integrated Circuits Laboratory	60	40	100	0	0	3	1.5
TOTAL			**220**	**280**	**500**	**12**	**0**	**3**	**13.5**

25WPL1Z1	APPLIED MATHEMATICS I *(Common to CIVIL, MECH & EEE Branches)*	SEMESTER I

PREREQUISITES	L	T	P	C
NIL	3	0	0	3

Course Objective	This course mainly deals with topics such as linear algebra, single variable calculus and numerical methods and plays an important role in the understanding of engineering science.	
UNIT – I	**LINEAR ALGEBRA**	**9Periods**
Consistency of System of Linear Equations, Eigen values and eigen vectors, Diagonalization of matrices by orthogonal transformation, Cayley-Hamilton Theorem, Quadratic form to canonical forms.		
UNIT – II	**DIFFERENTIAL CALCULUS**	**9Periods**
Radius of curvature, Centre of curvature, Circle of curvature ,Evolutes of a curve, Envelopes		
UNIT – III	**INTEGRAL CALCULUS**	**9Periods**
Evaluation of definite and improper integrals, Applications: surface area and volume of revolution (Cartesian coordinates only).		
UNIT – IV	**NUMERICAL SOLUTIONOF EQUATIONS**	**9Periods**
Algebraic and Transcendental equation: Fixed point iteration method, Bisection method, Newton-Raphson method, Simultaneous equation: Gauss elimination method, Gauss-Jordan method, Gauss Seidal method.		
UNIT – V	**NUMERICAL INTERPOLATION**	**9Periods**
Equal interval: Newton's forward and Backward difference interpolation formulae, Gauss forward and Backward difference interpolation formulae, Unequal interval: Lagrange's interpolation, Newton's divided difference interpolation.		
Contact Periods: **Lecture: 45 Periods Tutorial: 0 Periods Practical: 0Periods Total: 45 Periods**		

TEXT BOOK

1	*Veerarajan T.,"**Engineering Mathematics I"**, TataMcGraw-Hill Education(India)Pvt.Ltd,New Delhi, Ist Edition 2017.*
2	*P.Kandasamy, K. Thilagavathy, K.Gunavathi, "**Numerical Methods"**,S.Chand & Company,3rd Edition, Reprint 2013.*

REFERENCES

1	*B.S.Grewal," **Higher Engineering Mathematics", Khanna Publishers,4th Edition,2021.**
2	*DavidC.Lay,**"Linear Algebra and Its Application",PearsonPublishers,6th Edition,2021.**
3	*HowardAnton,**"Elementry Linear Algebra",11th Edition,Wiley Publication,2013.**
4	*Narayanan.SandManicavachagomPillai. T.K.–**Calculas Vol Iand Vol II,** S.chand&Co,Sixth Edition,2016.*
5	*S.S.Sastry, "**Introductory methods of numerical analysis", PHI,New Delhi,5th Edition, 2015.**
6	*WardCheney, David Kincaid, **"Numerical Methods and Computing",** Cengage Learning**,** Delhi,7th Edition 2013.*
7	*JainR.K.and Iyengar S.R.K.,-**Advanced Engineering Mathematics**, Narosa Publicaitons, Eighth Edition,2012.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		**Bloom's Taxonomy Mapped**
CO1	Use the essential tool of matrices and linear algebra in a comprehensive manner.	K3
CO2	Explain the fallouts of circle of curvature, evolute and envelops that is fundamental to application of analysis to Engineering problems.	K3
CO3	Interpret the integral calculus to notions of definite and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.	K3
CO4	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions to polynomial and transcendental equations.	K3
CO5	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations.	K3

25WPL1Z2	ENVIRONMENTAL SCIENCE AND ENGINEEREING *(Common to CIVIL, MECH & EEE Branches)*	SEMESTER I

PREREQUISITES	L	T	P	C
NIL	3	0	0	3

Course Objectives	The course is aimed at creating awareness among the students and also inseminates thecritical ideas of preserving environment.	
UNIT – I	**ENVIRONMENTAL ENERGY RESOURCES**	**9 Periods**
Food-effects of modern agriculture, fertilizers, pesticides, eutrophication & biomagnifications-Energy resources: renewable resources - Hydro Energy, Solar & Wind. Non-renewable resources – Coal and Petroleum - harnessing methods.		
UNIT – II	**ECO SYSTEM AND BIODIVERSITY**	**9 Periods**
Eco system and its components - biotic and abiotic components. Biodiversity: types and values of biodiversity, hot spots of biodiversity, endangered and endemic species, conservation of biodiversity: In situ and ex situ conservation. Threats to biodiversity-destruction of habitat, habit fragmentation, hunting, over exploitation and man-wildlife conflicts. The IUCN red list categories.		
UNIT – III	**ENVIRONMENTAL POLLUTION**	**9 Periods**
Air pollution, classification of air pollutants – sources, effects and control of gaseous pollutants SO_2, NO_2, H_2S, CO, CO_2 and particulates. Water pollution - classification of water pollutants, organic and inorganic pollutants, sources, effects and control of water pollution. Noise pollution - decibel scale, sources, effects and control.		
UNIT – IV	**ENVIRONMENTAL THREATS**	**9 Periods**
Global warming-measure to check global warming - impacts of enhanced Greenhouse effect, Acid rain- effects and control of acid rain, ozone layer depletion- effects of ozone depletion, disaster management - flood, drought, earthquake and tsunami.		
UNIT – V	**SOCIAL ISSUES AND ENVIRONMENT**	**9 Periods**
Water conservation, rain water harvesting, e-waste management, Pollution Control Act, Wild life Protection Act. Population growth- exponential and logistic growth, variation in population among nations, population policy. Women and Child welfare programs. Role of information technology in human and health, COVID-19 -effects and preventive measures.		
Contact Periods: **Lecture:45 Periods Tutorial: 0 Periods Practical: 0 Periods Total:45 Periods**		

TEXT BOOKS:

1	*Sharma J.P., **"Environmental Studies"**, 4th Edition, University Science Press, New Delhi, 2016.*
2	*AnubhaKaushik and C.P.Kaushik, **"Environmental Science and Engineering"**, 7th Edition, New age international publishers, New Delhi, 2021.*

REFERENCES:

1	*A k de, **"Environmental Chemistry"**, 8th edition, New age international publishers, 2017.*
2	*G. Tyler miller and scott e. Spoolman, **"Environmental Science"**, cengage learning india pvt. Ltd., delhi, 2014.*
3	*Erach Bharucha, **"Textbook of Environmental Studies"**, Universities press(I) pvt, Ltd., Hydrabad, 2015.*
4	*Gilbert M.Masters, **"Introduction to Environmental Engineering and Science"**, 3rd Edition, Pearson Education, 2015.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		**Bloom's Taxonomy Mapped**
CO1	Recognize and understand about the various environmental energy resources and the effective utility of modern agriculture.	K2
CO2	Acquire knowledge about the interaction of biosphere with environment and conservation methods of bio diversity.	K2
CO3	Be aware of the sources of various types of pollution, their ill effects and preventive methods.	K2
CO4	Identify and take the preventive measures to control the environmental threats and effects of Global warming, Ozone depletion, Acid rain, and natural disasters.	K2
CO5	Demonstrate an idea to save water and other issues like COVID -19.	K2

25PTL103	ELECTRIC CIRCUITS AND ELECTRON DEVICES	SEMESTER I

PREREQUISITES	L	T	P	C
NIL	3	0	0	3

Course Objectives	To learn the concepts of circuit analysis and various semiconductor devices.	
UNIT – I	**CIRCUIT ANALYSIS TECHNIQUES**	**9Periods**
Kirchoff's current and voltage laws – Voltage and Current division – Mesh and Nodal Analysis (dc analysis) – Network Theorems – Thevenin, Superposition, Norton and Maximum power transfer theorem (dc analysis) – Star-delta conversion.		
UNIT – II	**TRANSIENT AND RESONANCE CONCEPTS**	**9Periods**
Basic RL, RC and RLC circuits and their responses to pulse inputs – Series and Parallel resonance – Resonant frequency, Voltage and Current, Impedance, Bandwidth, Q factor – single tuned and double tuned circuits.		
UNIT – III	**SEMICONDUCTOR DIODES**	**9Periods**
Review of intrinsic & extrinsic semiconductors – Theory of PN junction diode – Energy band structure – current equation – space charge and diffusion capacitance – effect of temperature and breakdown mechanism – Zener diode and its characteristics.		
UNIT – IV	**TRANSISTORS**	**9Periods**
PNP and NPN transistors Operation – CE, CB and CC configuration and comparison of their characteristics – Breakdown in transistors – operation and characteristics of N-ChannelJFET – drain current equation – MOSFET – Enhancement and depletion mode – structure and operation – Comparison of BJT with FET- CMOS:Operation and Characteristics.		
UNIT – V	**SPECIAL SEMICONDUCTOR DEVICES**	**9Periods**
Tunnel diode – PIN diode – Varactor diode – SCR, UJT, Diac and Triac – Operation and Characteristics – Solar Cell, Photodiode, Phototransistor, Photoconductive and Photovoltaic cells – LED, LCD, Laser diode.		
Contact Periods: **Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods**		

TEXT BOOK:

1	*A.Sudhakar and Shyammohan S.Palli, "**Circuits and Networks: Analysis and Synthesis**", Tata McGraw Hill, 3rd Edition (2008).*
2	*S. Salivahanan, N. Suresh kumar and A.Vallavanraj, **"Electronic Devices and Circuits",** TataMcGraw Hill, 2nd Edition, (2018).*

REFERENCES:

1	*Joseph A. Edminister, Mahmood, Nahri, "**Electric Circuits**" – Shaum series, TataMcGraw Hill, 6th Edition, (2013).*
2	*William H. Hayt, J.V. Jack, E. Kemmebly and steven M. Durbin, "**Engineering Circuit Analysis**", Tata McGraw Hill, 6thEdition, (2011).*
3	*David A. Bell, "**Electronic Devices and Circuits**", Oxford University Press, 5thEdition, (2017).*
4	*J. Millman & Halkias, Satyebranta Jit, "**Electronic Devices & Circuits**",Tata McGraw Hill, 2nd Edition, (2013).*
5	*Robert Boylestad and Louis Nashelsky, **"Electron Devices and Circuit Theory**" Pearson,Prentice Hall, 11th Edition, (2015).*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		**Bloom's Taxonomy Mapped**
CO1	Apply network laws and theorems in circuit analysis	K3
CO2	Analyze resonance and transient response in RLC circuits	K3
CO3	Understand Semiconductor diode characteristics	K2
CO4	Understand BJT, JFET and MOSFET characteristics	K2
CO5	Understand special semiconductor devices Characteristics	K2

25PTL104	C PROGRAMMING	SEMESTER I

PREREQUISITES	L	T	P	C
NIL	3	0	0	3

Course Objective	The students will be able to acquire knowledge about the basic concepts of Computer and programming fundamentals, Data types in C and Flow control statements, Functions, Arrays, Pointers and Strings, Bitwise Operators, Preprocessor Directives, Structures and Unions, List Processing, Input and Output.

UNIT – I	**COMPUTER AND PROGRAMMINGFUNDAMENTALS**	**9 Periods**

Computer fundamentals – Evolution, classification, Anatomy of a computer: CPU, Memory, I/O – Introduction to software – Generation and classification of programming languages – Compiling – Linking and loading a program – Translator – loader – linker – develop a program – software Development – Introduction to OS –Types of OS – Algorithms – Structured programming- Object Oriented Programming Concepts – C Vs C++.

UNIT – II	**DATA TYPES AND FLOW OF CONTROL**	**9 Periods**

An overview of C – Programming and Preparation-The use of #include, printf(), scanf() ,Program output. The fundamental data types and variables. Expressions, Operators, Flow of control and branching statements. Data Structures – Introduction, Examples of Linear and non linear data structures –applications in real life.

UNIT – III	**FUNCTIONS, ARRAYS, POINTERS AND STRINGS**	**9 Periods**

Functions and storage classes - 1D Arrays – Pointers – Call by reference – Relationship between Arrays and Pointers – Pointer arithmetic and element size – Arrays as function argument – Dynamic Memory allocation – Strings – String handing functions – Multidimensional Arrays.

UNIT – IV	**ARRAY OF POINTERS, BITWISE OPERATORS, PREPROCESSOR DIRECTIVES**	**9 Periods**

Arrays of Pointers – Arguments to main () - Ragged Arrays – Functions as Arguments – Arrays of Pointers to Functions - Type qualifiers.-Bitwise operators and expressions – Masks – Software tools – Packing and unpacking – Enumeration types – The preprocessor directives.

UNIT – V	**STRUCTURES AND UNIONS, I/O AND FILE OPERATIONS**	**9 Periods**

Structures and Unions – Operator precedence and associativity – Bit fields – Accessing bits and bytes- Input and Output functions – File Processing Functions – Environment variables – Use of make and touch.

Contact Periods:

Lecture: 45 Periods Tutorial: 0 Periods Practical: 0 Periods Total: 45 Periods

TEXT BOOK:

1	*Pradip Dey, Manas Ghosh, "**Computer Fundamentals and Programming in C**", Second Edition, Oxford University Press, 2013.*
2	*Al Kelley, Ira Pohl, "**A Book on C-Programming in C**", Fourth Edition, Addison Wesley, 2001.*
3	Narasimha Karumanchi, *"**Data Structures and Algorithms Made Easy**", Fifth Edition, CareerMonk Publications, 2011*
4	*Ira Pohl, :**Object Oreiented Programming Uisng C++**", Second Edition, Pearson Publisher, 2012.*

REFERENCES :

1	*Yashavant P. Kanetkar, "**Let Us C**", 14th edition, BPB Publications, 2016.*
2	*Herbert Schildt., "**C: The Complete Reference**", Fourth Edition. McGraw Hill Education, 2017.*
3	*Brian W. Kernighan and Dennis Ritchie, "**The C Programming Language**", Second Edition, Prentice Hall Software Series, 1988.*
4	*E. Balagurusamy, "**Programming in Ansi C**", 6th Edition Tata McGraw-Hill Education, 2012*

COURSEOUTCOMES: Upon completion of the course, the students will be able to:		**Bloom's Taxonomy Mapped**
CO1	Explain the fundamental of computers programming and algorithmic design and fundamentals of data structures.	K3
CO2	Reproduce and explain the operation of various data types and flow control statements	K2
CO3	Design and Compute programs using functions, arrays, pointers and strings	K3
CO4	Illustrate the different right storage classes, preprocessor directives, bitwise operators in programs	K2
CO5	Describe the concept of structures, unions and files in C programming.	K2

25PTL105	C PROGRAMMING LABORATORY	SEMESTER I

PREREQUISITES	L	T	P	C
NIL	0	0	3	1.5

Course Objective	The students will be able to write program and compile C programming using, Data types and Flow control statements, Functions, Arrays, Pointers and Strings, Dynamic memory allocation and command line arguments, Files, Structures and Unions.

LIST OF EXPERIMENTS:

1. Operators , Expressions and IO formatting
2. Decision Making and Looping
3. Arrays and Strings
4. Functions and Recursion
5. Pointers
6. Dynamic Memory Allocation
7. Structures
8. Unions
9. Files
10. Command line arguments
11. Mini Project

Contact Periods:
Lecture: 0 Periods Tutorial: 0 Periods Practical: 45 Periods Total: 45 Periods

REFERENCES :

1	*Yashavant P. Kanetkar, "**Let Us C**", 14th edition, BPB Publications, 2016.*
2	*Herbert Schildt., "**C: The Complete Reference**", Fourth Edition. McGraw Hill Education, 2017.*
3	*Brian W. Kernighan and Dennis Ritchie, "**The C Programming Language**", Second Edition, Prentice Hall Software Series, 1988.*
4	*E. Balagurusamy, "**Programming in Ansi C**", 6th Edition Tata McGraw-Hill Education, 2012*

COURSEOUTCOMES: Uponcompletion ofthe course,the studentswill beable to:		**Bloom's Taxonomy Mapped**
CO1	Reproduce and explain the operation of various data types and flow control statements using simple programming.	K2
CO2	Write programs using functions, arrays, pointers and strings.	K3
CO3	Write programs using dynamic memory allocation	K3
CO4	Implement programs using command line arguments, structures, unions, and files	K4
CO5	Develop applications using C.	K5

25WPL2Z1	**APPLIED MATHEMATICS II** *(Common to Mech & EEE Branches)*	**SEMESTER II**

PREREQUISITES	**L**	**T**	**P**	**C**
NIL	**3**	**0**	**0**	**3**

Course Objectives	To focus on differential equations and Numerical Techniques which is important for comprehending engineering science.	
UNIT–I	**ORDINARY DIFFERENTIAL EQUATIONS**	**9 Periods**
Higher order linear differential equations with constant coefficients –variable coefficients: Cauchy Euler equation, Cauchy-Legendre equation-Method of variation of parameters.		
UNIT–II	**PARTIAL DIFFERENTIAL EQUATIONS**	**9 Periods**
Formation of partial differential equations – First order partial differential equations: Standard types and Lagrange's linear equation – Homogeneous linear partial differential equations of second and higher order with constant coefficients.		
UNIT–III	**NUMERICAL DIFFERENTIATION AND INTEGRATION**	**9 Periods**
Numerical Differentiation (using Newton's interpolation formula) – Numerical integration: Trapezoidal rule and Simpson's rules (Both single and double integrals).		
UNIT–IV	**NUMERICAL SOLUTION OF FIRST ORDINARY DIFFERENTIAL EQUATIONS**	**9 Periods**
Single Step Methods: Taylor's series Method-Euler's and modified Euler's methods–Runge–Kutta method of fourth order Multi Step methods - Milne's and Adam's predicator-corrector methods.		
UNIT–V	**NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS**	**9 Periods**
Finite difference solution of two dimensional Laplace equation and Poisson equation- Implicit and explicit methods for one dimensional heat equation (Bender-Schmidt and Crank-Nicholson methods)–Finite difference explicit method for one dimensional wave equation.		
Contact Periods: **Lecture:45 Periods Tutorial:0 Periods Practical:0 Periods Total:45 Periods**		

TEXTBOOK

1	*Veerarajan.T,* ***"Engineering Mathematics"****, Tata McGraw Hill Education (India) Private Limited, New Delhi, 2018*
2	*P. Kandasamy, K. Thilagavathy, K. Gunavathi,* ***"Numerical Methods"****, S. Chand & Company, 3rd Edition, Reprint 2013.*

REFERENCES

1	*B.S.Grewal,* ***"Higher Engineering Mathematics"****, Khanna Publishers, New Delhi, 45th Edition, 2024.*
2	*SrimantaPal,* ***"Numerical Methods Principles, Analyses and Algorithms"****, Oxford University Press, New Delhi, I Edition 2012.*
3	*Raisinghania.M..D,* ***"Ordinary And Partial Differential Equations"****, 20th Edition, S. Chand Publishing, 2020.*
4	*S.Larsson and V.Thomee,* ***"Partial Differential Equations with Numerical Methods"****, Springer,* ***2003, 2nd printing 2008 Edition***

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		**Bloom's Taxonomy Mapped**
CO1	Solve higher order linear differential equation with constant and variable coefficients and simultaneous differential equation.	K3
CO2	Form partial differential equations and find solutions of first and higher order partial differential equations	K3
CO3	Obtain approximate solutions for transcendental equations and problems on interpolation, differentiation, integration.	K3
CO4	Find the numerical solutions of first order ordinary differential equations using single and multi-step techniques.	K3
CO5	Solve second order partial differential equations using explicit and implicit methods.	K3

25WPL202	ELECTRONIC CIRCUITS	SEMESTER II

PREREQUISITES	L	T	P	C
NIL	3	0	0	3

Course Objective	To understand the functions and response of Basic Electronic circuits.	
UNIT–I	**BJT AND FET AMPLIFIER**	**9 Periods**
Small Signal Hybrid π equivalent circuit of BJT–Early effect-CE, CC and CB amplifiers.-AC Load Line Analysis- Darlington Amplifier-Bootstrap technique-Cascade, Cascode configurations-FETs AMPLIFIERS: CS, CD and CG amplifiers.		
UNIT–II	**FREQUENCY RESPONSE OF BJT AND FET AMPLIFIERS**	**9 Periods**
General Frequency Considerations-Low and High Frequency response of BJT and FET amplifiers–Short circuit current gain-cut off frequency–f_α, f_β and unity gain bandwidth–Miller Effect Capacitance-Multistage Frequency Effects.		
UNIT–III	**FEEDBACK AMPLIFIERS AND OSCILLATORS**	**9 Periods**
Feedback Concepts–effect of feedback on gain stability, distortion, bandwidth, input and output impedances; Types of feedback amplifiers- stability- Gain and Phase margins- Frequency compensation. OSCILLATORS: Barkhausen criterion for oscillation - Hartley & Colpitt's oscillators – crystal oscillators.		
UNIT–IV	**TUNED AMPLIFIERS AND WAVE SHAPING CIRCUITS**	**9 Periods**
Single Tuned Amplifier: Capacitor coupled single tuned amplifier – double tuned amplifier – effect of cascading single tuned and double tuned amplifiers on bandwidth– Stagger tuned amplifiers-Stability of tuned amplifiers .WAVE SHAPING CIRCUITS: Pulse circuits–RC integrator and differentiator circuits–diode clampers and clippers.		
UNIT–V	**POWER SUPPLIES AND POWER AMPLIFIERS**	**9 Periods**
Linear mode power supply – Half Wave and Full Wave Rectifiers – Filters- Voltage regulators- Over voltage protection - Switched mode power supply (SMPS) - Regulated DC Power Supply. Power amplifiers: Class A-Class B-Class AB-Class C – Power MOSFET-Temperature Effect.		
Contact Periods: **Lecture:45 Periods Tutorial:0 Periods Practical:0 Periods Total:45 Periods**		

TEXT BOOK

1	*Robert L. Boylestad and Louis Nasheresky, "**Electronic Devices and Circuit Theory**", 11th Edition, Pearson Education, 2013.*
2	*Salivahanan and N.Suresh Kumar, **Electronic Devices and Circuits**,4th Edition, Mc Graw Hill Education (India) Private Ltd.,2017.*

REFERENCES

1	*Millman J,Halkias.C. and SathyabradaJit,**Electronic Devices and Circuits**,4th Edition, Mc Graw Hill Education (India) Private Ltd.,2015.*
2	*Donald.A.Neamen**, Electronic Circuits Analysis and Design**,3rd Edition, Mc Graw Hill Education (India) Private Ltd., 2010.*
3	*Floyd, **Electronic Devices**, Ninth Edition, Pearson Education,2012.*
4	*David A.Bell, **Electronic Devices & Circuits**,5th Edition, Oxford University Press,2008.*
5	*Anwar A.Khan and Kanchan K.Dey, **A First Course on Electronics**,PHI,2006.*
6	*Rashid M, **Microelectronics Circuits**, Thomson Learning,2007.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		**Bloom's Taxonomy Mapped**
CO1	Explain the Working principles, characteristics and applications of BJT and FET amplifiers.	K2
CO2	Explain the Frequency response characteristics of BJT and FET amplifiers	K2
CO3	Describe the performance of Feedback Amplifiers and Oscillators	K2
CO4	Analyze the operation of Tuned Amplifiers and Wave Shaping circuits	K4
CO5	Describe the working principles of Power supplies and Power Amplifiers.	K2

25WPL203	ANALOG INTEGRATED CIRCUITS	SEMESTER II

PREREQUISITES	L	T	P	C
ELECTRIC CIRCUITS AND ELECTRON DEVICES	3	0	0	3

Course Objective	To understand the characteristics and applications of Operational amplifiers, data converters and applications of special function ICs.	
UNIT–I	**BASICS OF OPERATIONAL AMPLIFIERS**	**9 Periods**
Differential amplifier-Differential mode gain, common mode gain and CMRR -current mirror-Widlar current mirror - Building blocks of 741 operational amplifier-I/O stages, gain stage and level translator stage of 741op-amp -Characteristics of an Ideal and practical Operational Amplifier-Op- amp parameters, DC &AC performance characteristics-frequency response–frequency compensation.		
UNIT–II	**APPLICATIONS OF OPERATIONAL AMPLIFIERS**	**9 Periods**
Linear applications: Voltage follower - inverting, non-inverting amplifiers-summing, scaling, averaging amplifiers-instrumentation amplifiers-difference amplifier **Non linear applications**: Integrator-differentiator-precision half wave & full wave rectifiers-peak detector-sample & hold circuit- log & anti-log amplifiers. **Open loop applications**: Comparator-zero crossing detector- Window detector-Schmitt trigger.		
UNIT–III	**OSCILLATORS AND MULTIVIBRATORS**	**9 Periods**
Barkhausen criterion- loop gain -Design of Oscillators: RC phase shift oscillator- Wien bridge oscillator–Square wave generator - Triangular wave generator-Saw tooth wave generator - IC 555 timer: Functional block diagram and description of Astable & Mono-stable multi-vibrators using IC 555 –Applications: Missing pulse detector, PWM ,FSK generator, Schmitt trigger.		
UNIT–IV	**ACTIVE FILTERS AND DATA CONVERTERS**	**9 Periods**
Active filters- Sallen-Key filter structure- Design of I order and II order Butterworth filters: Low pass, High pass, Band pass filters - Data Converters: D/A converter – specifications- weighted resistor type,R2R Ladder types- switches for D/A converters - A/D Converters – specifications - Flash type - Successive Approximation type-Dual Slope type A/D converters.		
UNIT–V	**PLL AND SPECIAL FUNCTIONICS**	**9 Periods**
Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK demodulation and Frequency synthesizing-IC Voltage regulators–Three terminal fixed and adjustable voltage regulators-IC723 General purpose regulator.		
Contact Periods: **Lecture:45 Periods** **Tutorial:0 Periods** **Practical:0 Periods** **Total:45 Periods**		

TEXT BOOKS:

1	*D.Roy Choudhry and Shai lJain,* ***"Linear Integrated Circuits",*** *New Age International Pvt.Ltd., 4th Edition 2010*
2	*Ramakant A. Gayakwad,* ***"OP-AMPs and Linear Integrated Circuits",*** *4th Edition, Prentice Hall/Pearson Education, 2015.*

REFERENCES:

1	*Sergio Franco,* ***"Design with Operational Amplifiers and Analog Integrated Circuits"****, 4th Edition, Tata Mc Graw-Hill, 2014*
2	*Gray and Meyer,* ***"Analysis and Design of Analog Integrated Circuits",*** *Wiley International, 2009.*
3	*S.Salivahanan and V.S.Kanchana Bhaaskaran,* ***"Linear Integrated Circuits",*** *Tata McGraw Hill Publishing company Ltd, 1st Edition, 2009.*
4	*Somanathan Nair,* ***"Linear Integrated Circuits, Analysis, Design and Applications",*** *Wiley India Publishers,1st Edition,2009*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		**Bloom's Taxonomy Mapped**
CO1	Explain DC & AC characteristics and Building blocks of OP AMP.	K2
CO2	Explain Linear, Nonlinear and open loop applications of OP AMP	K2
CO3	Design and construct oscillators and Multi-vibrators.	K3
CO4	Design and analyze active filters and data converters using OP AMP	K3
CO5	Describe the operation & applications of PLL and special function ICs	K2

25WPL204	DIGITAL SYSTEM DESIGN	SEMESTER II

PREREQUISITES	L	T	P	C
NIL	3	0	0	3

Course Objective	To understand the theoretical and design aspects of digital circuits for designing digital systems	
UNIT-I	**DIGITAL FUNDAMENTALS**	**9 Periods**
Codes: Binary, BCD, Excess 3, Gray, Alphanumeric codes, Boolean theorems, Logic gates, Universal gates, Sum of products and product of sums, Minterms and Maxterms, Karnaugh map Minimization and Quine-McCluskey method of minimization. Introduction to Verilog HDL.		
UNIT-II	**COMBINATIONAL CIRCUIT DESIGN**	**9 Periods**
Design of Half and Full Adders, Half and Full Subtractors, Binary Parallel Adder-Carry look ahead Adder, BCD Adder, Binary Multiplier, Multiplexer, Demultiplexer, Magnitude Comparator, Decoder, Encoder, Priority Encoder.		
UNIT-III	**SYNCHRONOUS SEQUENTIAL CIRCUITS**	**9 Periods**
Flip flops - SR, JK, T, D, and Master/Slave FF operation and excitation tables, Triggering of FF, Analysis and design of clocked sequential circuits - Moore/Mealy models, state minimization, state assignment, circuit implementation. Design of Counters- Ripple Counters: Binary, BCD, Modulo n, Up/Down counters-Counter for Random Sequence-Shift registers:-Universal Shift Register-Synchronous counters-Ring counter-Johnson counter.		
UNIT-IV	**ASYNCHRONOUS SEQUENTIAL CIRCUITS**	**9 Periods**
Analysis and Design of Asynchronous Sequential Circuits-Reduction of Flow Tables- Stable and Unstable states, state reduction, cycles and races, race free assignments, Hazards: Essential Hazards, Pulse mode sequential circuits, Design of Hazard free circuits.		
UNIT-V	**MEMORY AND PROGRAMMABLE LOGIC DEVICES**	**9 Periods**
Basic memory structure: ROM –PROM, EPROM, EEPROM, EAPROM, RAM: Static and dynamic RAM – Programmable Logic Devices: Programmable Logic Array(PLA)-Programmable Array Logic(PAL)-Field Programmable Gate Arrays(FPGA)-Implementation of combinational logic circuits using PLA, PAL,CPLD's. TTL and CMOS Logic families.		
Contact Periods: **Lecture:45 Periods** **Tutorial:0 Periods** **Practical:0 Periods** **Total:45 Periods**		

TEXT BOOK

1	*M.Morris R.Mano and Michael D.Ciletti,"**Digital Design",**4th Edition, Pearson Education,2011.*
2	*Charles H.Roth.,"**Fundamentals of Logic Design",**6th Edition, Thomson Learning,2013*

REFERENCES:

1	*Thomas L.Floyd,"**Digital Fundamentals**",10thEdition, Pearson Education Inc,2011*
2	*S.Salivahanan and S.Arivazhagan,"**Digital Electronics**',I Edition,Vikas Publishing House pvt Ltd,2012.*
3	*Anil K.Maini,"**Digital Electronics",**Wiley,2014.*
4	*Soumitra Kumar Mandal,"**Digital Electronics",**Mc Graw Hill Education Private Limited,2016.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		**Bloom's Taxonomy Mapped**
CO1	Understand number Systems and digital fundamentals.	K2
CO2	Design Combinational circuits used in digital systems.	K3
CO3	Design Synchronous sequential circuits in digital system.	K3
CO4	Analyze and design Explain Asynchronous sequential circuits in digital system.	K4
CO5	Describe memory device and implement the combinational circuits using programmable logic devices.	K3

25WPL205	ANALOG AND DIGITAL INTEGRATED CIRCUITS LABORATORY	SEMESTER II

PREREQUISITES	L	T	P	C
ANALOG CIRCUITS AND DIGITAL CIRCUTS DESIGN	0	0	3	1.5

Course Objective	To Design and construct analog circuits using ICs 741 and 555, Digital Circuits using Logic gates, Flip Flops and MSI devices.
PRACTICALS	**LIST OF EXPERIMENTS** **ANALOG IC EXPERIMENTS** 1. DC and AC Characteristics of OP-AMP. 2. Simple Applications of OP-AMP – Inverting and non-inverting Amplifier, Voltage Follower, Adder, Integrator and Differentiator. 3. Design and testing of Oscillators, Comparator and Schmitt Trigger Circuit. 4. Design and Testing of Astable and mono-stable Multivibrator using 555Timer IC. **DIGITAL IC EXPERIMENTS** 5. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters. 6. Design and implementation of Half/Full Adder and Subtractor using Logic Gates. 7. Design and implementation of combinational circuits using MSI devices: (i)4–bit binary adder/subtractor (ii)Parity generator/checker (iii)Magnitude Comparator (iv)Application using multiplexers 8. Verification of Flip-Flops. 9. Design and Testing of Shift register, synchronous and asynchronous counters.
Contact Periods: **Lecture: 0 Periods** **Tutorial:0 Periods** **Practical:45 Periods** **Total:45 Periods**	

REFERENCES

1.	*D.Roy Choudhry and Shail Jain,* ***"Linear Integrated Circuits",*** *New Age International Pvt. Ltd.,4th Edition 2010.*
2.	*Ramakant A.Gayakwad,* ***"OP-AMPs and Linear Integrated Circuits",*** *4th Edition,Prentice Hall/Pearson Education,2015.*
3.	*Morris Mano* ***,"Digital Design****",4th Edition, Pearson Education,2011.*
4.	*A.Anand Kumar,* ***"Fundamentals of Digital Circuits",*** *2nd Edition, PHI Learning Pvt. Ltd, New Delhi, 2011.*

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		**Bloom's Taxonomy Mapped**
CO1	Familiarization with characteristics and applications of Op-amp	K2
CO2	Ability to design circuits using IC 723 and IC 555 Timer.	K3
CO3	Implement simplified combinational circuits using logic gates	K3
CO4	Design and Implement combinational and sequential circuits	K3
CO5	Implement combinational and sequential logic circuits using HDL	K3