HINDUSTHAN COLLEGE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution, Affiliated to Anna University, Chennai
Approved by AICTE, New Delhi & Accredited by NAAC with 'A' Grade)
Coimbatore – 641 032

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

HINDUSTHAN
EDUCATIONAL AND CHARITABLE TRUST
HICET

Curriculum & Syllabus

2017-2018

CHOICE BASED CREDIT SYSTEM

VISION AND MISSION OF THE INSTITUTION

VISION

To become a premier institution by producing professionals with strong technical knowledge, innovative research skills and high ethical values.

MISSION

IM1: To provide academic excellence in technical education through novel teaching methods.

IM2: To empower students with creative skills and leadership qualities.

IM3: To produce dedicated professionals with social responsibility.

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ECE - HiCET

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VISION AND MISSION OF THE DEPARTMENT

VISION

To evolve as a centre of excellence in Electronics and Communication Engineering, to cater the global industrial needs.

MISSION

M1. To expand frontiers of knowledge through the provision of inspiring learning environment.

M2. To develop the intellectual skills towards employability by fostering innovation, and creativity in learning.

M3. To provide a quality system for wholesome learning to achieve progress and prosperity in life along with moral values

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PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO 1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

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PO 6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10.**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports anddesign documentation, make effective presentations, and give and receive clear instructions.

PO11.**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12.**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1. Graduates will be able to disseminate the knowledge in Electronics and Communication Engineering towards Technical Incubation.

PSO 2. Graduates will have the perseverance to learn the modern design tools for electronic system design and analysis.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1. Exhibit their technical skills and knowledge in their working environment, higher studies and research.

PEO 2. Succeed in multidisciplinary dimensions by excelling through life-long learning.

PEO 3. Become leaders and innovators by devising engineering solutions for social issues and problems.

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CURRICULUM

DETAILS OF CHANGES CARRIED OUT IN CURRICULUM & SYLLABUS

CBCS PATTERN

UNDERGRADUATE PROGRAMMES

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING (UG)

REGULATION-2016

For the students admitted during the academic year 2017-2018 and onwards

SEMESTER I

S. No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
THEORY									
1	16MA1101	Engineering Mathematics I	3	1	0	4	25	75	100
2	16PH1101	Engineering Physics	3	0	0	3	25	75	100
3	16CY1101	Engineering Chemistry	3	0	0	3	25	75	100
4	16HE1101R	Essential English for Engineers -I	3	1	0	4	50	50	100
5	16GE1101	Computer Programming	3	0	0	3	25	75	100
6	16EC1201	Electron Devices	3	0	0	3	25	75	100
PRACTICAL									
7	16PS1001	Physical Sciences Lab - I	0	0	2	1	50	50	100
8	16GE1001	Computer Programming Lab	0	0	4	2	50	50	100
9	16GE1002	Engineering Practices Laboratory	0	0	4	2	50	50	100
10	16GE1003	Value Added Course – I: Language Competency Enhancement Course-I	0	0	2	1	0	100	100
		Total Credits	**18**	**2**	**12**	**26**	**325**	**675**	**1000**

SEMESTER II

S. No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
THEORY									
1	16MA2102	Engineering Mathematics-II	3	1	0	4	25	75	100
2	16PH2102	Physics of Materials	3	0	0	3	25	75	100
3	16CY2102	Environmental Sciences	3	0	0	3	25	75	100
4	16HE2102R	Essential English for Engineers - II	3	1	0	4	50	50	100

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5	16GE2102	Engineering Graphics	2	0	4	4	25	75	100
6	16EC2201	Circuit Theory	3	1	0	4	25	75	100
PRACTICAL									
7	16PS2001	Physical Sciences Lab - II	0	0	2	1	50	50	100
8	16EC2001	Electric Circuits and Electron Devices Lab	0	0	4	2	50	50	100
9	16GE2001	Value Added Course – II: Language Competency Enhancement Course-II	0	0	2	1	0	100	100
		Total Credits	**17**	**3**	**12**	**26**	**275**	**625**	**900**

For the students admitted during the academic year 2016-2017 and onwards

SEMESTER III

S. No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
THEORY									
1	16MA3106	Numerical Methods for Electronics Engineers	3	1	0	4	25	75	100
2	16EC3201	Digital Electronics	3	0	0	3	25	75	100
3	16EC3202	Signals and Systems	3	1	0	4	25	75	100
4	16EC3203	Electronic Circuits	3	0	0	3	25	75	100
5	16EC3204	Semiconductor Fabrication Technology	3	0	0	3	25	75	100
6	16CS3231	Data Structures and Algorithms	3	0	0	3	25	75	100
PRACTICAL									
7	16EC3001	Electronic Circuits Lab	0	0	4	2	50	50	100
8	16CS3031	Data Structures and Algorithms Lab	0	0	4	2	50	50	100
		Total Credits	**18**	**2**	**8**	**24**	**250**	**550**	**800**

SEMESTER IV

S. No.	Course Code	Course Title	L	T	P	C	CIA	ESE	TOTAL
THEORY									
1	16MA4109	Probability and Random Processes	3	1	0	4	25	75	100
2	16EC4201	Electro Magnetic Fields	3	0	0	3	25	75	100
3	16EC4202	Control Systems	3	0	0	3	25	75	100
4	16EC4203	Measurement and Instrumentation	3	0	0	3	25	75	100
5	16EC4204	Linear Integrated Circuits	3	0	0	3	25	75	100
6	16CS4232	Object Oriented Programming and Structures	3	0	0	3	50	50	100
PRACTICAL									

7	16EC4001	Digital Electronics Lab	0	0	4	2	50	50	100
8	16EC4002	Linear Integrated Circuits Lab	0	0	4	2	50	50	100
		Total Credits	**18**	**1**	**8**	**23**	**275**	**525**	**800**

CREDIT DISTRIBUTION

R2016

Semester	I	II	III	IV	V	VI	VII	VIII	Total
Credits	26	26	24	23	25	24	23	16	187

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SYLLABUS

Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16MA1101	ENGINEERING MATHEMATICS I (COMMON TO ALL BRANCHES)	3	1	0	4

Course Objective

1. Develop the skill to use matrix algebra techniques that is needed by engineers for practical applications.
2. Find curvature, evolutes and envelopes using the concept of differentiation.
3. Solve ordinary differential equations of certain types using Wronskian technique.
4. Familiarize the functions of several variables which are needed in many branches of engineering.
5. Understand the concept of double and triple integrals.

Unit	Description	Instructional Hours
I	**MATRICES** Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors (without proof) – Cayley - Hamilton Theorem (excluding proof) – Orthogonal matrices – Diagonalization of matrices by orthogonal transformation–Reduction of a quadratic form to canonical form by orthogonal transformation.	12
II	**DIFFERENTIAL CALCULUS** Curvature in cartesian co-ordinates – Radius and Centre of curvature - Circle of curvature – Involutes and Evolutes(parabola, ellipse, cycloid, asteroid) – Envelopes - single parameter and two parameter family of curves.	12
III	**ORDINARY DIFFERENTIAL EQUATIONS** Second and higher order linear differential equations with constant coefficients and with RHS of the form e^{ax} , x^n, sinax or cosax , $e^{ax}f(x)$ and $xf(x)$ where $f(x)$ is sinbx or cosbx – Method of variation of parameters – Linear differential equations with variable coefficients (Euler's equation)	12
IV	**FUNCTIONS OF SEVERAL VARIABLES** Total differentiation (excluding implicit functions) - Partial derivatives of composite functions - Taylor's series for functions of two variables- Maxima and minima of functions of two variables - Lagrange's method of undetermined multipliers – Jacobians.	12
V	**MULTIPLE INTEGRALS** Double integrals in Cartesian coordinates – Change of order of integration – Area enclosed by the plane curves (excluding surface area) – Triple integrals in Cartesian co-ordinates – Volume of solids using Cartesian co-ordinates.	12
	Total Instructional Hours	**60**

Course Outcome

CO1: Calculate Eigen values and Eigen vectors for a matrix which are used to determine the natural frequencies (or Eigen frequencies) of vibration and the shapes of these vibrational modes.
CO2: Apply the concept of differentiation to find the radius, centre and circle of curvature of any curve
CO3: Develop sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
CO4: Identify the maximum and minimum values of surfaces.
CO5: Computation of area of a region in simpler way by changing the order of integration and evaluation of triple integrals to compute volume of three dimensional solid structures.

TEXT BOOKS:

T1- Ravish R Singh, Mukul Bhatt, "Engineeing Mathematics", McGraw Hill education (India) Private Ltd.,Chennai,2017.
T2- Veerarajan T, "Engineering Mathematics–I", McGraw Hill Education(India) Pvt Ltd, New Delhi, 2016

REFERENCE BOOKS :

R1-Bali N.P & Manish Goyal, "A Text book of Engineering Mathematics", 8th Edition, Laxmi Pub. Pvt. Ltd. 2011.
R2-Grewal B.S, "Higher Engineering Mathematics", 42nd Edition, Khanna Publications, Delhi, 2012.
R3- Peter V. O'Neil, "Advanced Engineering Mathematics", 7th Edition, Cengage learning,2012.
R4-Sivarama Krishna Das P and Rukmangadachari E., "Engineering Mathematics" Vol I, Second Edition, Pearson publishing, 2011.
R5-Wylie & Barett, "Advanced Engineering Mathematics", McGraw Hill Education, 6th edition, 2003

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16PH1101	ENGINEERING PHYSICS (COMMON TO ALL BRANCHES)	3	0	0	3

Course Objective

1. Illustrate the fundamental knowledge in mechanical properties of matter and thermal physics.
2. Gain knowledge about laser and their applications.
3. Conversant with principles of optical fiber, types and applications of optical fiber.
4. Discuss the architectural acoustics and applications of Ultrasonics.
5. Extend dual nature of matter and the Necessity of quantum mechanics to explore the behavior of sub atomic particles.

Unit	Description	Instructional Hours
	PROPERTIES OF MATTER AND THERMAL PHYSICS	
I	Elasticity – Hooke's law – Stress-strain diagram - Relation between three modulii of elasticity (qualitative) — Poisson's ratio – Bending moment – Depression of a cantilever – Derivation of Young's modulus of the material of the beam by Uniform bending – I-shaped girder. Modes of heat transfer – Thermal conductivity – Newton's law of cooling - Lee's disc method - Conduction through compound media (series and parallel).	9
	LASER AND APPLICATIONS	
II	Spontaneous emission and stimulated emission – Population inversion – Pumping methods – Derivation of Einstein's coefficients (A&B) – Types of lasers – Nd:YAG laser, CO2 laser, Semiconductor lasers:(homojunction and heterojunction) – Laser Applications – Industrial applications: laser welding, laser cutting, laser drilling – Holography – Construction and reconstruction of images.	9
	FIBER OPTICS AND APPLICATIONS	
III	Principle and propagation of light through optical fibers – Derivation of numerical aperture and acceptance angle – Classification of optical fibers (based on refractive index, modes and materials) – Crucible-crucible technique for fiber fabrication – Sources (LED and LASER) and detectors (p-i-n photodiode and avalanche photodiode) for fiber optics - Fiber optical communication link –Fiber optic sensors – Temperature and displacement sensors.	9
	ACOUSTICS AND ULTRASONICS	
IV	Classification of sound – Weber–Fechner law – Sabine's formula (no derivation) - Absorption coefficient and its determination –Factors affecting acoustics of buildings and their remedies. Production – Magnetostrictive generator – Piezoelectric generator – Determination of velocity using acoustic grating – Non destructive testing – Ultrasonic pulse echo system.	9
	QUANTUM PHYSICS AND APPLICATIONS	
V	Black body radiation – Planck's theory (derivation) –Compton effect experimental verification only - Matter waves – Physical significance of wave function – Schroedinger's wave equations – Time independent and time dependent wave equations –Particle in a box (One dimensional) – Scanning electron microscope – Transmission electron microscope.	9
	Total Instructional Hours	**45**

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Course Outcome

CO1: Enhance the fundamental knowledge in Properties of Matter and Thermal Physics.
CO2: Understand the advanced technology of LASER in the field of Engineering and medicine.
CO3: Exposed the fundamental knowledge of Optical fiber in the field of communication Engineering.
CO4: Understand the production of ultrasonics and its applications in NDT.
CO5: Impart the fundamental knowledge on Quantum Physics.

TEXT BOOKS:

T1 - Rajendran V, Applied Physics, Tata McGraw Hill Publishing Company Limited, New Delhi, 2011.
T2- Gaur R.K. and Gupta S.L., Engineering Physics, 8th edition, Dhanpat Rai Publications (P) Ltd., New Delhi, 2013.

REFERENCE BOOKS:

R1 - Arthur Beiser, "Concepts of Modern Physics" Tata McGraw Hill, New Delhi – 2010
R2 - M.N Avadhanulu and PG Kshirsagar, "A Text Book of Engineering physics" S. Chand and Company ltd., New Delhi 2014
R3 - Dr. G. Senthilkumar, "Engineering Physics – I" VRB publishers Pvt Ltd., 2013

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16CY1101	ENGINEERING CHEMISTRY (COMMON TO ALL BRANCHES)	3	0	0	3

Course Objective

1. The student should be conversant with boiler feed water requirements, related problems and water treatment techniques.
2. The student should be conversant with the principles of polymer chemistry and engineering applications of polymers and composites
3. The student should be conversant with the principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
4. To acquaint the student with important concepts of spectroscopy and its applications.
5. To acquaint the students with the basics of nano materials, their properties and applications

Unit	Description	Instructional Hours
I	**WATER TECHNOLOGY** Hard water and soft water- Disadvantages of hard water- Hardness: types of hardness, calculations, estimation of hardness of water – EDTA method - scales and sludges – boiler corrosion – priming and foaming – caustic embrittlement; Conditioning methods of hard water – External conditioning - demineralization process- Internal conditioning - domestic water treatment: screening, sedimentation, coagulation, filtration, disinfection – chlorine – UV method; desalination: definition, reverse osmosis.	9
II	**POLYMER & COMPOSITES** Polymerization – types of polymerization – addition and condensation polymerization – mechanism of free radical addition polymerization – copolymers – plastics: classification – thermoplastics and thermosetting plastics, preparation, properties and uses of commercial plastics – PVC, Teflon – moulding of plastics (extrusion and compression); rubber: vulcanization of rubber, synthetic rubber – butyl rubber, SBR; composites: definition, types of composites – polymer matrix composites – FRP.	9
III	**ENERGY SOURCES AND STORAGE DEVICES** Introduction- nuclear energy- nuclear fission- controlled nuclear fission- nuclear fusion differences between nuclear fission and fusion- nuclear chain reactions- nuclear reactor power generator- classification of nuclear reactor- light water reactor- breeder reactor- solar energy conversion- solar cells- wind energy. Batteries and fuel cells: Types of batteries- alkaline battery lead storage battery- nickel-cadmium battery- lithium battery- fuel cell H_2 -O_2 fuel cell applications.	9
IV	**ANALYTICAL TECHNIQUES** Beer-Lambert's law – UV-visible spectroscopy and IR spectroscopy – principles – instrumentation (block diagram only) – estimation of iron by colorimetry – flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry – atomic absorption spectroscopy – principles – instrumentation (block diagram only) – interferences - estimation of nickel by atomic absorption spectroscopy.	9
V	**NANOMATERIALS** Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nanoparticles: definition, carbon nanotubes (CNT), types of carbon nano tubes – single walled and multi walled carbon nanotubes – synthesis of carbon nanotubes: chemical vapour deposition – laser ablation – arc-discharge method; properties of CNT: mechanical, electrical, thermal and optical properties; applications of carbon nanotubes in chemical field, medicinal field, mechanical field and current applications.	9
	Total Instructional Hours	**45**

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Course Outcome	CO1:Illustration of the basic parameters of water, different water softening processes and effect of hard water in industries. CO2: Knowledge on basic properties and application of various polymers and composites as an engineering material. CO3 :Summarize the various energy sources and energy storage devices CO4 :Analyze various analytical skills in handling various machines, instruments, apart from understanding the mechanism involved. CO5 :Describe the basic properties and application of nanomaterials.

TEXT BOOKS

T1 - P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi (2015).
T2 - O.G.Palanna, "Engineering chemistry" McGraw Hill Education India (2017).

REFERENCES

R1 - B.Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi (2008).
R2 - B.K.Sharma "Engineering Chemistry" Krishna Prakasan Media (P) Ltd., Meerut (2005).
R3 - S.S.Dara "A Text book of Engineering Chemistry" S.Chand & Co.Ltd., New Delhi (2010).

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16HE1101R	ESSENTIAL ENGLISH FOR ENGINEERS - I	3	1	0	4
		(COMMON TO ALL BRANCHES)				

Course Objective

1. It fulfills the necessary skills needed in today's global workplaces.
2. Student will be able to interpret and illustrate formal communication.
3. It empowers students in choosing right lexical techniques for effective presentation.
4. It equips the learner to analyze and list out things in logical order.
5. The learner develops the ability to create and integrate ideas in a professional way.

Unit	Description	Instructional Hours
I	Getting to know people – Introduction – Talking about jobs (Present Simple) – Talking about working conditions(Adverb of Frequency) - Talking about company history and structure (Past simple, Prepositions of Time) – Talking about company activities (Connectors of addition and contrast, Present Continuous) – Focus on language – Parts of Speech – Gerund and Infinitives – Instruction-**General Vocabulary**.	12
II	Vocabulary practice – (Telephoning Leaving and taking messages) – requests and obligation – Describing trends (Adjectives and Adverbs) – Talking about company performance (present perfect and past simple, Reasons and consequences) – Reading Test Practice Describing products Dimensions, (Comparatives and Superlatives, Question formation) – Talking about product development (Sequencing words, Present continuous and going to) – Articles – Prepositions-Synonyms – Antonyms- Recommendations-**Interpretation of a chart**.	12
III	Talking about business equipment (Giving Instruction) – Letter Phrases- Writing Test Practice-Talking about facilities(Asking for and giving direction)- Presentation on a general topic -Talking about traffic and transport(making predictions)-**Discussion on current affairs**– Tenses- Present – Past-Future-Forms of verbs- Word techniques- Formation-Prefixes-Suffixes.	12
IV	Talking about conference arrangement(checking and confirming) – Talking about a conference before, after, when, until etc. – Listening Test Practice- talking about production process – passive-Talking about quality control Conditional 1 (real) (Making suggestions) – Itinery- Jumbled sentences- Paragraph writing- Essay writing – Checklist- Letter to Inviting Dignitaries – Accepting invitation- Declining Invitation.	12
V	Talking about call centers, insurance and changes in working practices (future possibility/probability)- Talking about banking- Speaking Test practice – Talking about delivery services (preposition of Time)- Talking about trading (Tense review)- Talking about recruitment conditional 2 (hypothetical) – talking about job applications (indirect questions) – Reading, Writing and Listening Test – Job application Letter and Resume Writing- Permission letters.	12
	Total Instructional Hours	**60**

Course Outcome

CO1 - Recognize different parts of speech for better usage.
CO2 - Interpret and illustrate formal communication
CO3 - Choosing right lexical techniques for effective presentation.
CO4 - Analyze and list out things in logical order.
CO5 - Create and integrate ideas in a professional way.

TEXT BOOKS:

T1 - Norman Whitby, Cambridge English: Business BENCHMARK Pre-intermediate to Intermediate – 2nd Edition. 2014.
T2 - Ian Wood and Anne Willams. "Pass Cambridge BEC Preliminary", Cengage Learning press 2013.

REFERENCE BOOKS :

R1 - Meenakshi Raman and Sangeetha Sharma. "Technical Communication-Principles and Practice", Oxford University Press, 2009.
R2 - Rizvi, Ashraf. M. Effective Technical Communication. Tata McGraw-Hill, New Delhi. 2005
R3 - Kamalesh Sadanan "A Foundation Course for the Speakers of Tamil-Part-I &II", Orient Blackswan, 2010.

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16GE1101	COMPUTER PROGRAMMING (COMMON TO ALL BRANCHES)	3	0	0	3

Course Objective

1. Learn the fundamentals of computers.
2. Learn the basics of C programming

Unit	Description	Instructional Hours
I	**BASICS OF COMPUTER** Generation and Classification of Computers- Basic Organization of a Computer –Input and Output Devices–Hardware and Software definitions- Categories of Software- Number System Conversion. Need for logical analysis and thinking – Algorithm -Pseudo code – Flow Chart.	9
II	**BASICS OF 'C' PROGRAMMING** Fundamentals of ' C' programming – Structure of a 'C' program – compilation and linking processes – Constants, Variables – Data Types –Expressions using operators in 'C' – Managing Input and Output operations-Decision making-Branching and Looping-Case study	9
III	**ARRAYS AND STRINGS** Arrays – Initialization – Declaration – One dimensional and Two dimensional arrays. String- String Library functions – String Arrays. Matrix operations-Addition-Subtraction-Multiplication-Transpose-Case study	9
IV	**FUNCTIONS AND POINTERS** Function – definition – Declaration – Types of Function definition – call by value-call by reference- Recursion – Pointers - Definition – Initialization – Pointers arithmetic – Pointers and arrays-Case study	9
V	**STRUCTURES AND UNIONS** Structure- data type – definition – declaration –Nesting of structure - Union – Storage classes, Pre-processor directives-Case study.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Use computers at user level, including operating systems, programming environments and differentiate between basic concepts of computer hardware and software.
CO2: Analyze problems, design and implementing algorithmic solutions.
CO3: Use data representation for the fundamental data types, read, understand and trace the execution of programs written in C language.
CO4: Write the C code using a modular approach and recursive concepts.
CO5: Explain the use of pointers, Structures and union.

TEXTBOOKS:

T1 - Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
T3 - Dr.N.Sengottaiyan and K.Ramya, "Fundamentals of Computer Programming",Cengage Learning (India) Pvt. Ltd.,2016.

REFERENCES:

R1 - Yashavant P. Kanetkar, " Let Us C", BPB Publications, 2011.
R2 - Balagurusamy"Programming in ANSI C", 6th Edition ,Tata McGraw-Hill,
R3 - M.Rajaram and P.Uma maheswari, "Computer Programming with C" Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2014.

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Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC1201	ELECTRON DEVICES	3	0	0	3

Course Objective

1. To be familiar with the theory, construction, and operation of PN junction diodes.
2. To impart knowledge on the configurations, operation and models of BJT.
3. To impart knowledge on the construction, operation and models of FET.
4. To give an insight of the basic operation of special semiconductor devices.
5. To educate about various power devices and display devices.

Unit	Description	Instructional Hours
I	**SEMICONDUCTOR DIODE** Introduction to semiconductor physics- Energy band diagrams-Diffusion and drift current -Continuity equations-Theory of PN junction diode- Diode current equations- Junction Capacitance- Forward and Reverse bias characteristics- Diode Switching Characteristics- Breakdown in PN diodes- Diode Applications.	9
II	**BIPOLAR JUNCTION TRANSISTORS** Basic principle of operation of NPN and PNP configuration-Transistor current relations - Modes of operation-Types of configurations-Transistor as an amplifier - Input and Output characteristics of CE, CB and CC Configurations of BJT-Breakdown in Transistor-Transistor models- h- parameter model , Hybrid- π model .	9
III	**FIELD EFFECT TRANSISTORS** JFET - Construction and working principle – Drain and Transfer characteristics-Characteristic parameters-Drain current equation-Comparison of JFET and BJT-MOSFET: E-MOSFET,D MOSFET -Threshold voltage- Channel length modulation-Comparison of JFET and MOSFET- Equivalent circuit model of JFET and MOSFET.	9
IV	**SPECIAL SEMICONDUCTOR DEVICES** Metal - Semiconductor Junction - -Schottky Barrier Diode - Zener diode - Varactor diode –Tunnel diode -, LASER diode, LDR.	9
V	**POWER DEVICES AND DISPLAY DEVICES** UJT -PNPN Diode-Thyristors-SCR,DIAC,TRIAC,LASCR- LED, LCD, Photo diode, PhotoTransistor, Opto Coupler, Solar cell, CCD.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Ability to explain the theory, construction, and operation of PN junction diodes.
CO2:Ability to demonstrate the theory, construction, and operation of BJT.
CO3;Ability to explain the theory, construction, and operation of FET.
CO4:Understand the basic operation of special semiconductor devices .
CO5:Understand the working of various power devices and display devices

TEXT BOOKS:

T1 - S. Salivahanan, "Electronic Devices", Second Edition, McGraw Hill Education Private Limited.
T2 - Robert Boylestad and Louis Nashelsky, "Electron Devices and Circuit Theory" Prentice Hall, 10th edition, July 2008.

REFERENCE BOOKS :

R1- Jacob Millman,Christos C.Halkias,"Electronic Devices and Circuits" Tata Mc Graw Hill , 1991.
R2 - Yang, "Fundamentals of Semiconductor devices", McGraw Hill International Edition, 1978.
R3 - Donald A Neaman, "Semiconductor Physics and Devices", Third Edition, Tata Mc Graw Hill, 2002.
R4 - R.S. Sedha, "Applied Electronics" S. Chand & Co., 2006.
R5 - Mehta V K, "Principles of Electronics", S.Chand & Company Ltd, (1994).

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16GE1003	VALUE ADDED COURSE - I (COMMON TO ALL BRANCHES)	0	0	2	1

Topic No.	Description of the Experiments
1.	INTRODUCTION TO AERONAUTICAL ENGINEERING
2.	LEADERSHIP FOR ENGINEERS
3.	4G – NETWORK ESSENTIALS
4.	COMPUTER SCIENCE ESSENTIALS FOR SOFTWARE DEVELOPMENT
5.	INTRODUCTION TO ANALYTICS MODELLING
6.	MATERIAL SCIENCE AND ENGINEERING

Total Marks 100

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16PS1001	PHYSICAL SCIENCES LAB - I PHYSICS LAB I (COMMON TO ALL BRANCHES)	0	0	2	1

Course Objective

1. Evaluate the particle size of micro particles and acceptance angle of fibres.
2. Employ instrumental method to determine Young's modulus of a beam of metals.
3. Apply the concept of diffraction and getting ability to calculate the wavelength of the mercury spectrum

Expt. No.	Description of the Experiments
1.	Determination of Wavelength, and particle size using Laser
2.	Determination of acceptance angle and numerical aperature in an optical fiber.
3.	Determination of velocity of sound and compressibility of liquid – Ultrasonic Interferometer.
4.	Determination of wavelength of mercury spectrum – spectrometer grating
5.	Determination of thermal conductivity of a bad conductor – Lee's Disc method
6.	Determination of Young's modulus by Non uniform bending method
7.	Determination of specific resistance of a given coil of wire – Carey Foster's Bridge.
8.	Post office box Measurement of an unknown resistance

Total Practical Hours 30

Course Outcome

CO:1 Point out the particle size of micro particles and acceptance angle of fibres using diode laser.
CO:2 Assess the Young's modulus of a beam using non uniform bending methods.
CO:3 Illustrate the concept of diffraction and getting ability to calculate the wavelength of the mercury spectrum Using spectrometer.
CO:4 Identify the velocity of ultrasonic's in the given liquid.
CO:5 Illustrate phenomena of thermal conductivity of a bad conductor.

*** Student will prepare lab record during the course of the semester.

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16GE1001	COMPUTER PROGRAMMING LAB	0	0	4	2

Course Objective

1. Be familiar with Microsoft office software
2. Be familiar with the basic concepts of writing a program.
3. Be exposed to role of constants, variables, identifiers, operators and other building blocks of C Language.
4. Be familiar with the use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Be familiar with the concept of Array and pointers dealing with memory management.
6. Be exposed to Structures and unions

Expt. No.	Description of the Experiments
1.	**Word Processing:** 1. Document creation, Text manipulation with Scientific notations 2. Table creation, Table formatting and conversion 3. Mail merge and Letter preparation. 4. Flow Chart
2.	**Spread Sheet:** 1. Chart - Line, XY, Bar and Pie. 2. Formula - formula editor. 3. Spread sheet - inclusion of object, picture and graphics, protecting the document and sheet. 4. Sorting and Import / Export features.
3.	**Basic C programming:** 1. C program using I/O Statements 2. C program using arithmetic operations 3. Decision making statement & Looping Concepts • Designing a simple arithmetic calculator. (Use switch statement) • Performing the following operations: (Use loop statement) • Generate Pascal's triangle. • Construct a Pyramid of numbers.
4.	**Arrays and Strings** 1. C program using one dimensional arrays 2. C program using two dimensional arrays. 3. C program using string functions
5.	**Functions and pointers** 1. Perform the following operations: (Use recursive functions) i. Find the factorial of a given integer. ii. Find the GCD (Greatest Common Divisor) of two given integers. iii. Solve Towers of Hanoi problem. 2. Program to swap two numbers using pointers - call by reference.
6.	**Structures and Unions** 1. C Program using Structures 2. C Program using Unions
	Total Practical Hours 45

Course Outcome

CO1: Use office packages for documentation and presentation
CO2: Implement program using control structures
CO3: Handle arrays and strings
CO4: Form heterogeneous data using structure and union

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PROGRAMME	COURSE CODE	NAME OF THE COURSE	L	T	P	C
B.E.	16GE1002	ENGINEERING PRACTICES LABORATORY (COMMON TO ALL BRANCHES)	0	0	4	2

Course Objective

1. To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP A (CIVIL & MECHANICAL)

S. No	Description Of The Experiments	Practical Hours
I CIVIL ENGINEERING PRACTICE		
Study of plumbing and carpentry components of Residential and Industrial buildings.		
(A) PLUMBING WORKS:		
1	Study on pipe joints, its location and functions: Valves, taps, couplings, unions, reducers, elbows in household fittings.	9
2	Study of pipe connection requirements for pumps.	
3	Preparation of plumbing line sketches for water supply and sewage works.	
	Hands-on-exercise:	
4	Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.	
5	Demonstration of plumbing requirements of high-rise buildings.	
(B) CARPENTRY USING POWER TOOLS ONLY:		
1	Study of the joints in roofs, doors, windows and furniture.	13
2	Hands-on-exercise in wood works by sawing, planning and cutting.	
II MECHANICAL ENGINEERING		
(A) Welding:		
1	Preparation of arc welding of Butt joints, Lap joints and Tee joints	
(B) Machining:		
1	Practice on Simple step turning and taper turning	
2	Practice on Drilling Practice	
(C) Sheet Metal Work:		
1	Practice on Models– Trays, cone and cylinder.	
DEMONSTRATION		
(D) Smithy		
➢	Smithy operations: Upsetting, swaging, setting down and bending.	
➢	Demonstration of – Production of hexagonal headed bolt.	
(E) Gas welding		
(F) Foundry Tools and operations.		

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GROUP B (ELECTRICAL & ELECTRONICS)

S.No	Description Of The Experiments	Practical Hours
ELECTRICAL ENGINEERING PRACTICES		
1	Residential house wiring using switches, fuse, indicator, lamp and energy meter.	10
2	Fluorescent lamp wiring	
3	Stair case wiring.	
4	Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.	
5	Measurement of energy using single phase energy meter.	
ELECTRONICS ENGINEERING PRACTICES		
1	Study of Electronic components and equipments – Resistors - colour coding	13
2	Measurement of DC signal - AC signal parameters (peak-peak, RMS period, frequency) using CRO.	
3	Study of logic gates AND, OR, NOT and NAND .	
4	Soldering practice – Components Devices and Circuits – Using general purpose PCB.	
5	Measurement of average and RMS value of Half wave and Full Wave rectifiers.	
	TOTAL INSTRUCTIONAL HOURS	**45**

Course Outcome

At the end of the course the students shall be able to

CO1: Fabricate wooden components and pipe connections including plumbing works.

CO2: Fabricate simple weld joints.

CO3: Fabricate electrical and electronics circuits.

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16MA2102	ENGINEERING MATHEMATICS – II (COMMON TO ALL BRANCHES)	3	1	0	4

Course Objective

1. Learn the basics of vector calculus comprising gradient, divergence, Curl and line, surface, volume integrals.
2. Understand analytic functions of complex variables and conformal mappings.
3. Know the basics of residues, complex integration and contour integration.
4. Apply Laplace transform techniques to solve linear differential equations.
5. Know the effective mathematical tools for the solutions of partial differential equations that model several physical problems in mathematical physics

Unit	Description	Instructional Hours
I	**VECTOR CALCULUS** Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green's theorem in a plane, Gauss divergence theorem and Stokes' theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelopipeds.	12
II	**ANALYTIC FUNCTIONS** Analytic function - Cauchy-Riemann equations - sufficient conditions (excluding proof) – Harmonic - conjugate harmonic functions– Construction of analytic functions (Milne-Thompson method) -- Conformal mapping: w = z+c, cz, 1/z and bilinear transformation without problems related to the concept of conformal mapping.	12
III	**COMPLEX INTEGRATION** Complex integration – Statements of Cauchy's integral theorem – Taylor's and Laurent's series expansions - Singular points – Residues – Cauchy's residue theorem – Evaluation of real definite integrals as contour integrals around unit circle.	12
IV	**LAPLACE TRANSFORM** Laplace transform –Basic properties – Transforms of derivatives and integrals of functions - Transforms of unit step function and impulse function – Transform of periodic functions. Inverse Laplace transform - Convolution theorem (with out proof) – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.	12
V	**PARTIAL DIFFERENTIAL EQUATIONS** Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions-Solution of standard types of first order partial differential equations of the form f(p,q) = 0, Clairaut's type: z = px + qy + f(p, q) – Lagrange's linear equation- Linear homogeneous partial differential equations of second and higher order with constant coefficient.	12
	Total Instructional Hours	**60**

Course Outcome

CO1: Know the gradient, divergence and curl of vectors useful for engineering application like fluid flow, electricity and magnetism.
CO2: Test the analyticity to construct the analytic function and transform complex functions from one plane to another plane graphically.
CO3: Evaluate real and complex integrals over suitable closed paths or contours.
CO4: Know the applications of Laplace transform and its properties and to solve certain linear differential equations using Laplace transform technique.
CO5: Solve the engineering problems using Partial Differential Equations.

TEXT BOOKS:

T1- Ravish R Singh, Mukul Bhatt, "Engineeing Mathematics", McGraw Hill education (India) Private Ltd.,Chennai,2017.
T2- Veerarajan T, "Engineering Mathematics–II", McGraw Hill Education(India) Pvt Ltd, New Delhi, 2016

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BOS - MCET

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Dean (Academics)
MCET

REFERENCE BOOKS :

R1-Bali N.P & Manish Goyal, "A Text book of Engineering Mathematics", 8th Edition, Laxmi Pub. Pvt. Ltd. 2011.
R2- Grewal B.S, "Higher Engineering Mathematics", 42nd Edition, Khanna Publications, Delhi, 2012.
R3- Peter V. O'Neil, "Advanced Engineering Mathematics", 7th Edition, Cengage learning,2012.
R4-Sivarama Krishna Das P and Rukmangadachari E., "Engineering Mathematics" Vol II, Second Edition, Pearson publishing, 2011.
R5- Wylie & Barett, "Advanced Engineering Mathematics", McGraw Hill Education, 6th edition, 2003

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16PH2102	PHYSICS OF MATERIALS (COMMON TO ALL BRANCHES)	3	0	0	3

Course Objective

1. Gain knowledge about conducting materials.
2. Provide fundamental knowledge of semiconducting materials which is related to the engineering program.
3. Extend the properties of magnetic materials, applications and super conducting materials.
4. Defend the various types of dielectric materials and their uses.
5. Expose the students to smart materials and the basis of nano technology.

Unit	Description	Instructional Hours
	CONDUCTING MATERIALS	
I	Introduction – Conductors – Classical free electron theory of metals – Electrical and thermal conductivities – Wiedemann–Franz law – Lorentz number – Draw backs of classical theory – Quantum theory – Fermi distribution function – Effect of temperature on Fermi function – Density of energy states – Carrier concentration in metals.	9
	SEMICONDUCTING MATERIALS	
II	Introduction – Intrinsic semiconductor – carrier concentration derivation – Fermi level – Variation of Fermi level with temperature – electrical conductivity – band gap determination – compound semiconductors –direct and indirect band gap of semiconductors- derivation of carrier concentration in n-type and p-type semiconductor – variation of Fermi level with temperature and impurity concentration — Hall effect –Determination of Hall coefficient – Applications	9
	MAGNETIC & SUPERCONDUCTING MATERIALS	
III	**Magnetic Materials**: Origin of magnetic moment – Bohr magneton – comparison of Dia, Para and Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials – anti ferromagnetic materials – Ferrites and its applications. **Superconducting Materials :** Superconductivity : properties(Messiner effect, effect of magnetic field, effect of current and isotope effects) – Type I and Type II superconductors – BCS theory of superconductivity(Qualitative) - High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.	9
	DIELECTRIC & COMPOSITES MATERIALS	
IV	Introduction – Electrical susceptibility – dielectric constant – polarization - electronic, ionic, orientation and space charge polarization –internal field – Claussius – Mosotti relation (derivation) – dielectric loss and dielectric breakdown (qualitative) Introduction to composites materials – types of composites materials – polymer, metallic and ceramic matrix composites (qualitative). Application in surgery, sports equipment.	9
	SMART MATERIALS AND NANOTECHNOLOGY	
V	**New Engineering Materials:** Metallic glasses – preparation, properties and applications – shape memory alloys (SMA) – characteristics, properties of NiTi alloy applications. **Nano Materials**: Synthesis - plasma arcing – Chemical vapour deposition – properties of nanoparicles and applications. – Carbon nano tubes – fabrication – pulsed laser deposition - Chemical vapour deposition - properties & applications.	9

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Total Instructional Hours 45

Course Outcome

CO1: Illustrate the electrical / thermal conductivity of conducting materials.
CO2: Understand the purpose of the acceptor or donor levels and the band gap of a semiconductor.
CO3: Interpret the basic idea behind the process of magnetism and applications of magnetic materials in every day life
CO4: Identify and compare the various types of dielectric polarization and dielectric breakdown.
CO5: Evaluate the properties and applications of various advanced engineering materials and develop the new ideas to synthesis Nanomaterials.

TEXT BOOKS:

T1 - S.O.Pillai "Solid State Physics" New Age International Publishers, New Delhi – 2011
T2- Rajendran V "Materials Science" McGraw-Hill Education" New Delhi -2016.

REFERENCE BOOKS:

R1 – William D Callister, Jr "Material Science and Engineering" John wiley and Sons, New York, 2014.
R2 - Raghavan, V. "Materials Science and Engineering – A First Course" Prentice Hall of India, New Delhi 2016.
R3 -Dr. G. Senthilkumar "Engineering Physics – II" VRB publishers Pvt Ltd., 2013

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16CY2102	ENVIRONMENTAL SCIENCES COMMON TO AERO, AUTO, CSE, ECE, EEE, E&I, IT, MECH, MECT	3	0	0	3

Course Objective

1. To gain knowledge on the importance of environmental education, ecosystem and biodiversity.
2. To acquire knowledge about environmental pollution – sources, effects and control measures of environmental pollution.
3. To find and implement scientific, technological, economic and political solutions to environmental problems.
4. To study about the natural resources, exploitation and its conservation
5. To be aware of the national and international concern for environment and its protection.

Unit	Description	Instructional Hours
I	**ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY** Importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers- energy flow in the ecosystem – ecological succession processes – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.	9
II	**ENVIRONMENTAL POLLUTION** Definition – causes, effects and control measures of: Air pollution – Air pollution standards – control methods- Water pollution – Water quality parameters- Soil pollution - Marine pollution - Noise pollution- Thermal pollution - Nuclear hazards–role of an individual in prevention of pollution – pollution case studies.	9
III	**NATURAL RESOURCES** Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and Desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.	9
IV	**SOCIAL ISSUES AND THE ENVIRONMENT** From unsustainable to sustainable development – urban problems related to energy- energy conversion – electrical energy calculations- environmental ethics: Issues and possible solutions – 12 Principles of green chemistry- Current Environmental issues at Country level – management of municipal sewage, municipal solid waste, Hazardous waste and Bio-medical waste – Global issues – Climatic change, Acid rain, greenhouse effect and Ozone layer depletion. Disaster management: floods, earthquake, cyclone and landslides.	9

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HUMAN POPULATION AND THE ENVIRONMENT

V | Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare –Environmental impact analysis (EIA)- GIS-remote sensing-role of information technology in environment and human health – Case studies. | 9

Total Instructional Hours **45**

Course Outcome

CO1: Understand the natural environment and its relationships with human activities.
CO2: Characterize and analyze human impacts on the environment
CO3: Apply systems concepts and methodologies to analyze and understand interactions between social and environmental processes
CO4: Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
CO5: Understand and implement scientific research strategies, including collection, management, evaluation, and interpretation of environmental data.

TEXT BOOKS:

T1- Anubha Kaushik and C. P. Kaushik, "Environmental Science and Engineering", Fourth edition, New Age International Publishers, New Delhi, 2014.
T2 – Deeksha Dave and S.S.Katewa, "Textbook of Environmental Studies", Second Edition, Cengage Learning, 2012.

REFERENCES:

R1 - Trivedi R.K. "Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards", Vol. I and II, Enviro Media.
R2 - G.Tyler Miller, Jr and Scott E. Spoolman"Environmental Science" Thirteenth Edition, Cengage Learning, 2010.
R3 - Gilbert M. Masters, "Introduction to Environmental Engineering and Science", 2nd edition, Pearson Education, 2004

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16HE2102R	ESSENTIAL ENGLISH FOR ENGINEERS – II	3	1	0	4

(COMMON TO ALL BRANCHES)

Course Objective

- ✓ The learner will be introduced to global corporate culture and professional communication.
- ✓ It helps the students to focus on organizing professional event and documentation.
- ✓ The student will be able to describe the events and process in an effective way.
- ✓ It trains the student to analyze the problems and to find solution to it.
- ✓ The learner will be familiar with business communication.

Unit	Description	Instructional Hours
I	Introduction- talking about teamwork- Making arrangements- Improving Communication in spoken language – Taking and leaving Voice mail messages (present Tense, Past Tense and Present Perfect) Talking about Business Hotel- (Speaking Activity) Talking about Corporate Hospitality- Formal and Informal Language – Making accepting and declining invitations (Auxiliary Verb, Countable or Uncountable Nouns) – Focus on Language – Definitions and Extended Definitions-**Reading comprehension.**	12
II	Talking about orders – Clarity Written Language – Phone and Letter Phrases – Talking about Company Finances – Conditional 1 and 2 – Managing Cash Flow (Intention and Arrangements Conditional 1 and 2) – Talking about Brands and Marketing – Ethical Banking- Talking about Public Relations – Organizing a PR Event – Describing Duties and Responsibilities – (Future Tense and Articles) – Reported Speech – Modal Verbs and Passive, Impersonal Passive Voice-**interpretation of posters or advertisements.**	12
III	Talking about relocation – Report Phrases – Talking about Similarity and difference- Giving Directions- Asking for Information and Making Suggestions – Talking about Location (Comparatives and Superlatives, Participles) – Talking about Company Performances- Describing Trends – Describing Cause and Effect – Talking about Environmental Impact – Discussing Green Issues – Language of Presentations (Adjectives and Adverbs, Determiners)- Homophones – Homonyms- Acronyms-Abbreviations- British and American words.	12
IV	Talking about Health and Safety – Expressing Obligation- Discussing Regulations- Talking about personnel Problems – Passives – Talking about Problem at Work (modal Verbs, Passives)- Talking about Expenses Claims- Talking about Air Travel (Relative Pronoun, Indirect Questions) – **E-mail Writing - Note completion-** Transcoding.	12
V	Talking about staff Benefits- Talking about Appraisal Systems (gerunds and Infinitives, Reported Speech) – Talking about Marketing Disasters – Expressing hypothetical Situations- Talking about entering Foreign Market (Conditional 3, Grammar review) – Letter for calling quotations, Replying for quotations – Placing an order and Complaint and **reply to a complaint**.	12
	Total Instructional Hours	**60**

Course Outcome

CO1: Introduced corporate culture and professional communication.
CO2: It focused on organizing a professional event and its documentation.
CO3: Improved the ability to describe the events and process in an effective way
CO4: Trained to analyze the problems and to find solution to it.
CO5: Practiced to make business communication.

TEXT BOOKS:

T1 - Norman Whitby, Cambridge English: Business BENCHMARK Pre-intermediate to Intermediate – 2nd Edition. 2014.

T2 - Ian Wood and Anne Willams. "Pass Cambridge BEC Preliminary", Cengage Learning press 2013.

REFERENCE BOOKS :

R1 - Communication Skills for Engineers, Sunitha Misra & C.Murali Krishna, Pearson Publishers

R2 - Technical Communication, Daniel G. Riordan, Cengage learning publishers.

R3 - Kamalesh Sadanan "A Foundation Course for the Speakers of Tamil-Part-I &II", Orient Blackswan,2010.

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PROGRAMME	COURSE CODE	NAME OF THE COURSE	L	T	P	C
B.E.	16GE2102	ENGINEERING GRAPHICS (COMMON TO CSE, ECE, EEE, E&I, and IT)	2	0	4	4

Course Objective
1. To provide drafting skills for communicating the Engineering concepts and ideas.
2. To expose to BIS and International standards related to engineering drawings.

UNIT	DESCRIPTION	TOTAL HOURS
I	**PLANE CURVES** Importance of engineering drawing, drafting instruments, drawing sheets – layout and folding, Lettering and dimensioning, BIS standards and scales. Geometrical constructions, Construction of ellipse, parabola and Hyperbola by eccentricity method, construction of cycloids and involutes of square and circle – Drawing of tangents and normal to the above curves.	15
II	**PROJECTIONS OF POINTS, LINES AND PLANE SURFACES** Introduction to Orthographic projections- Projection of points. Projection of straight lines inclined to both the planes, Determination of true lengths and true inclinations by rotating line method. Projection of planes (polygonal and circular surfaces) inclined to both the planes by rotating object method (First angle projections only).	15
III	**PROJECTIONS OF SOLIDS** Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is perpendicular and inclined to one plane and objects inclined to both the planes by rotating object method.	15
IV	**SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES** Sectioning of simple solids with their axis in vertical position when the cutting plane is inclined to one of the principal planes and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids, cylinder and cone. Development of lateral surfaces of truncated solids. Intersection of solids-cylinder vs cylinder.	15
V	**ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS** Isometric views and projections of simple and truncated solids such as - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions. Free hand sketching of multiple views from a pictorial drawing. Perspective projection of solids in simple position using visual ray method.	15
	TOTAL INSTRUCTIONAL HOURS	75

Course Outcome
At the end of the course the students will be able to:
CO1: Draw the orthographic and isometric views of regular solid objects including sectional views.
CO2: Recognize the International Standards in Engineering Drawing practices.

TEXT BOOKS:

T1- K.Venugopal, V.Prabu Raja, "Engineering Drawing, AutoCAD, Building Drawings", 5th Edition New Age International Publishers, New delhi 2016.
T2-K.V.Natarajan, "A textbook of Engineering Graphics", Dhanalaksmi Publishers, Chennai.

REFERENCE BOOKS:

R1- Basant Agrawal and C.M.Agrawal, "Engineering Drawing", Tata McGraw Hill Publishing Company Limited,New Delhi 2008.
R2- K. R. Gopalakrishnan, "Engineering Drawing" (Vol. I & II), Subhas Publications, Bangalore, 1998.
R3- M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, India, 2005.
R4-N.S. Parthasarathy, Vela Murali, "Engineering Drawing", Oxford University press, India 2015.

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16EC2201	CIRCUIT THEORY	3	1	0	4

Course Objective

1. To introduce the concept of electric circuits and its analysis.
2. To impart knowledge on solving circuits using network theorems
3. To introduce the phenomenon of resonance in coupled circuits.
4. To educate on concepts of obtaining the transient response of circuits.
5. To understand Phasor diagrams and analysis of three phase circuits

Unit	Description	Instructional Hours
I	**BASIC CIRCUITS ANALYSIS** Ohm's Law - Kirchoff's laws - DC and AC Circuits - Form Factor-Peak factor- Series and Parallel circuits –Voltage and Current division techniques– Phasor Diagram – Power and Power Factor- Mesh current and Node voltage method-Source transformation-Dependent and Independent sources .	12
II	**NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS** Star delta conversion. -Thevenin's and Norton's Theorem – Superposition Theorem – Maximum power transfer theorem –Reciprocity Theorem-Compensation Theorem-Duality.	12
III	**RESONANCE AND COUPLED CIRCUITS** Series and Parallel resonance – Frequency response – Quality factor and Bandwidth - Self and Mutual inductance – Coefficient of coupling – Dot rule for coupled circuits - Tuned circuits – Single tuned and double tuned circuits.	12
IV	**CIRCUIT TRANSIENTS AND TWO PORT NETWORK** Transient response of RL, RC and RLC Circuits using Laplace transform for DC and sinusoidal inputs- Time constants - Free and forced responses-Two port networks-Z, Y, ABCD and h parameters,T and π representations .	12
V	**THREE PHASE CIRCUITS** Three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4-wire circuits with star and delta connection, balanced & unbalanced loads – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits using two wattmeter method.	12
	Total Instructional Hours	**60**

Course Outcome

CO1: To analyse AC and DC Circuits
CO2:To apply network theorems for AC and DC Circuits .
CO3:To design resonance and single tuned circuits.
CO4:To analyse two port networks.
CO5:To understand and analyse single phase and 3 phase AC circuits.

TEXT BOOKS:

T1 - Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis",Tata McGraw Hill, (2007).
T2 - William H. Hayt Jr, Jack E. Kemmerly and Steven M. Durbin, "Engineering Circuits Analysis", Tata McGraw Hill publishers, 6th edition, New Delhi, 2003.

REFERENCE BOOKS :

R1 - Nagoor Kani,"Electric circuits",RBA publications,First Edition.
R2 - Paranjothi SR, "Electric Circuits Analysis," New Age International Ltd., New Delhi, (1996).
R3 - Joseph A. Edminister, Mahmood Nahri, "Electric circuits", Schaum's series,TMHl, NewDelhi, 2001.
R4 - Chakrabati A, "Circuits Theory (Analysis and synthesis), Dhanpath Rai & Sons, New Delhi, (1999).
R5 - Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", II Edition, TMH (2003).

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16GE2001	VALUE ADDED COURSE-II (COMMON TO ALL BRANCHES)	0	0	2	1

Topic No.	Description of the Experiments
1.	A HANDS ON INTRODUCTION TO ENG.SIMULATIONS
2.	INTRODUCTION TO STEEL
3.	ENTERPRENUER DEVELOPMENT
4.	DRINKING WATER TREATMENT
5.	MECHANICAL BEHAVIOUR OF MATERIALS (LINEAR ORELASTIC BEHAVIOUR)
6.	FASCINATING WORLD OF ROBOTS AND ROBOTICS

Total Marks 100

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16PS2001	PHYSICAL SCIENCE LABORATORY– II PHYSICS LAB II (COMMON TO ALL BRANCHES)	0	0	2	1

Course Objective

1. Evaluate the band gap of a semiconductor.
2. Apply the concept of interference and calculate the thickness of thin wire.
3. Acquire the practical skills in Young's modulus by uniform bending method.

Expt. No.	Description of the Experiments
1.	Determination of Young's modulus by uniform bending method
2.	Determination of band gap of a semiconductor
3.	Determination of Coefficient of viscosity of a liquid –Poiseuille's method
4.	Determination of Dispersive power of a prism - Spectrometer
5.	Determination of thickness of a thin wire – Air wedge method
6.	Determination of Rigidity modulus – Torsion pendulum
7.	Magnetic hysteresis experiment.
8.	Calibration of ammeter using potentiometer

Total Practical Hours 30

Course Outcome

CO: 1. Experiment involving the physical phenomena of the Rigidity modulus of wire.
CO: 2. Determine the band gap of a semiconductor and variation of Energy Gap (E_g)with temperature.
CO: 3 Assess the Young's modulus of a beam using non uniform bending method.
CO: 4. Explain the concept of interference and calculate the thickness of thin wire and other fine objects.
CO:5. Experiment provides a unique opportunity to validate Dispersive power of a prism using Spectrometer.

*** Student will prepare lab record during the course of the semester.

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16EC2001	ELECTRIC CIRCUITS AND ELECTRON DEVICES LAB	0	0	4	2

Course Objective

1. To learn the characteristics of PN junction diode.
2. To understand the characteristics of Zener diode.
3. To learn the characteristics of Transistors.
4. To learn the basic laws and network reduction theorems
5. To learn the concept of resonance in AC circuits.

S.No	Description Of The Experiments
1	PN Junction Diode Characteristics
2	Zener Diode Characteristics
3	Common Emitter Input-Output Characteristics
4	Common Base Input-Output Characteristics
5	FET Characteristics
6	Verification Of Thevenin's and Norton's Theorem
7	Verification of KVL & KCL
8	Verification of Super Position Theorem
9	Verification of Maximum Power Transfer
10	Determination of Resonance Frequency of Series & Parallel RLC Circuits
	Total Instructional Hours 45

Course Outcome

- To understand the characteristics of PN junction diode, Zener diode and transistors.
- Apply the concept of basic laws and network reduction theorems.
- To understand the concept of resonance in AC circuits.

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SYLLABUS

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16MA3106	NUMERICAL METHODS FOR ELECTRONICS ENGINEERS	3	1	0	4

Course Objective

1. Solve algebraic, transcendental and system of linear equations by using various techniques.
2. Understand the concepts of curve fitting, interpolation with equal and unequal intervals.
3. Be Familiar with the concepts of numerical differentiation and numerical integration of the unknown functions.
4. Understand the concept of solving ordinary differential equations by applying single and multi step methods.
5. Appraise the methods introduced in the solution of ordinary differential equations and partial differential equations.

Unit	Description	Instructional Hours
I	**SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS** Solution of equation – Fixed point iteration : X = g(x) method – Newton Raphson method – Solution of linear system by Gauss Elilmination and Gauss Jordan method – Iterative method : Gauss seidel method.	12
II	**CURVE FITTING AND INTERPOLATION** Curve fitting - Method of least squares – Interpolation - Newton's forward and backward difference formulae – Lagrangian interpolation for unequal intervals – Newton's divided difference formula for unequal intervals.	12
III	**NUMERICAL DIFFERENTIATION AND INTEGRATION** Differentiation using interpolation formula – Newton's forward and backward interpolation formulae for equal intervals –Newton's divided difference formula for unequal intervals - Numerical integration by Trapezoidal and Simpson's 1/3 rule – Romberg's method – Double integration using Trapezoidal and Simpson's rules	12
IV	**INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS** Single step methods: Taylor's series method – Euler and Modified Euler methods for first order equation – Fourth order Runge- kutta method for solving first order equations – Multi step method: Milne's predictor and corrector method.	12
V	**BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS** Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional Wave equation – Two dimensional Heat equations – Laplace and Poisson Equations.	12
	Total Instructional Hours	**60**

Course Outcome

CO1: Solve the system of linear algebraic equations representing steady state models and non linear equations arising in the field of engineering.
CO2: Fit the smooth curves for the given data and understand the application of interpolation with equal and unequal intervals..
CO3: Express the information from discrete data set through numerical differentiation and summary information through numerical integration.
CO4: Classify and solve ordinary differential equations by using single and multi step methods.
CO5: Acquire knowledge of finding the solution of ordinary and partial differential equations which are useful in attempting any engineering problems.

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TEXT BOOKS:

T1 - Sankara Rao K, "Numerical Methods for Scientists and Engineers", 3rd edition, Prentice Hall of India Private limited, New Delhi,2007..

T2 - M.K.Jain,S.R.K.Iyengar, R.K.Jain "Numerical methods for Scientific and Computation", Fifth Edition, New Age International publishers 2010.

REFERENCE BOOKS :

R1 - Kreyszig.E. "Advanced Engineering Mathematics", Eight Edition, John Wiley and sons (Asia) limited.

R2 - Grewal B.S. and Grewal J.S. " Numerical Methods in Engineering and Science ", 6th Edition , Khanna publishers, New Delhi 2004.

R3 - S.K.Gupta, Numerical Methods for Engineers" , New Age Internationalm Pvt.Ltd Publishers,2015.

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Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC3201	DIGITAL ELECTRONICS	3	0	0	3

Course Objective

1. Interpret the basic postulates of Boolean algebra and show the correlation between Boolean expressions and the methods for simplifying Boolean expressions.
2. Describe the formal procedures for the analysis and design of combinational circuits.
3. Examine the formal procedures for the analysis and design of sequential circuits.
4. Discuss the concept of memories and programmable logic devices.
5. Enumerate the concept of various integrated circuits technologies.

Unit	Description	Instructional Hours
I	**BOOLEAN ALGEBRA AND LOGIC SIMPLIFICATIONS** Boolean operation and expressions- Laws and rules of Boolean algebra -Simplification using Boolean algebra - Sum of Products (SOP) - Product of Sums (POS)- Karnaugh map Minimization- Quine - Mc Cluskey method of minimization- Logic Gates-Universal property of NAND-NOR Gates- NAND–NOR implementations.	9
II	**ANALYSIS AND DESIGN OF COMBINATIONAL LOGIC** Basic adders and subtractors-Parallel binary adder/Subtractor- Carry Look Ahead adder - Serial Adder/Subtractor - BCD adder -Comparator- Decoder - Encoder- Priority encoder - Code converters- Multiplexer / Demultiplexer- Parity checker and generators-ALU-Binary Multiplier - Binary Divider.	9
III	**ANALYSIS AND DESIGN OF SEQUENTIAL CIRCUITS** Latches- Flip-flops- SR, JK, D, T, and Master-Slave - Characteristic table and equation - Application table- Edge triggering - Level Triggering- Asynchronous or Ripple counter - Asynchronous Up/Down counter - Synchronous counters - Synchronous Up/Down counters- Design of Synchronous counters- Shift registers- Universal shift registers- Ring counter - Shift counters.	9
IV	**FSM AND MEMORIES** Finite State Machines-Moore and Mealy models, Semiconductor Memories- RAM-ROM - PROM - EPROM - Flash memories- Memory expansion-Special types of memories.	9
V	**INTEGRATED CIRCUIT TECHNOLOGIES** Basics of digital integrated circuits-Operational characteristics and parameters-RTL-CMOS circuit-TTL circuit-Comparison of CMOS and TTL-ECL-PMOS-NMOS-E2CMOS-Tristate Logic-Introduction to Verilog with Basic programs.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Analyze the different methods used for simplification of Boolean expressions and implementation using gates.
CO2 :Design and test the performance of various combinational circuits.
CO3: Formulate the design procedure of synchronous counters.
CO4: Relate different memory cells and programmable logic devices.
CO5: Generalize the performance of various integrated circuits technologies.

TEXT BOOKS:

T1- Thomas L. Floyd, "Digital Fundamentals", 10th Edition, Pearson Education Inc, 2011.
T2- M. Morris Mano, "Digital Design", 4th Edition, Prentice Hall of India Pvt. Ltd., 2008 / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.

REFERENCE BOOKS :

R1- A.Anand kumar, "Fundmentals of Digital Electronics", fourth edition ,PHI Learning Pvt. Ltd,2016.
R2- S.Salivahanan and S.Arivazhagan, "Digital Circuits and Design" ,Vikas publishing House Pvt. Ltd ,2013
R3- Donald P.Leach and Albert Paul Malvino, "Digital Principles and Applications", 6th Edition, TMH, 2006.

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Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC3202	SIGNALS AND SYSTEM	3	1	0	4

Course Objective

1. To understand the basic signals and their properties.
2. To learn the mathematical tool of Fourier series and transforms.
3. To understand the concept of system analysis using Laplace transform.
4. To understand the discrete signal analysis using transforms.
5. To know discrete system analysis using Z –transform.

Unit	Description	Instructional Hours
I	**SIGNALS AND SYSTEM REPRESENTATION & CLASSIFICATION** Standard signal representation –continous and discrete domain. Properties of impulse signal. Mathematical operation on signals, classification of signals and system -analog and discrete.	12
II	**ANALYSIS OF CONTINUOUS TIME SIGNALS** Fourier series analysis-spectrum of continuous time (CT) signals- Fourier and Laplace transforms in CT signal analysis - properties.	12
III	**LINEAR TIME INVARIANT- CONTINUOUS TIME SYSTEMS** Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in analysis of CT systems	12
IV	**ANALYSIS OF DISCRETE TIME SIGNALS** DTFT – properties of DTFT - z transform – properties of z transform, convolution sum.	12
V	**LINEAR TIME INVARIANT-DISCRETE TIME SYSTEMS** Block diagram representation - DTFT and Z transform analysis of systems.	12
	Total Instructional Hours	**60**

Course Outcome

CO1: Understand the signal classification and properties
CO2: Analyze the signal spectrum with Fourier series and transform.
CO3: Apply Fourier and Laplace transform in LTI system analysis.
CO4: Analyze Discrete signal using DTFT.
CO5: Apply Z-transform for discrete system analysis.

TEXT BOOKS:

T1 - Allan V.Oppenheim, S.Wilsky and S.H.Nawab, "Signals and Systems", Pearson, 2007.
T2 - P Ramakrishna Rao, "Signals and System", Tata McGraw-Hill Education.

REFERENCE BOOKS :

R1 - M.J.Roberts, "Signals & Systems Analysis using Transform Methods & MATLAB", McGraw Hill, 2007.
R2 - B. P. Lathi, "Principles of Linear Systems and Signals", Second Edition, Oxford, 2009.
R3 - Ramesh Babu.P and Anandanatarajan, "Signals and Systems",Fourth edition,Scitech publications.
R4 - A.Nagoor Kani, "Signals and Systems", McGrawHill Publication, 2010.

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Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC3203	ELECTRONIC CIRCUITS	3	0	0	3

Course Objective

1. To introduce methods of biasing transistors.
2. To introduce the Midband analysis of amplifier circuits using small - signal equivalent circuits.
3. To analysis and design of wave shaping circuits and multivibrators.
4. To design and analysis of feedback amplifiers.
5. To analysis and design of low and high frequency oscillators.

Unit	Description	Instructional Hours
I	**BIASING OF BJT AND FET** Need for biasing – Stability factor - Load line and quiescent point.-Variation of quiescent point - BJT biasing circuits – Bias compensation for BJT – FET Biasing circuits.	9
II	**SMALL SIGNAL AMPLIFIERS** h-parameter small-signal equivalent circuit - Midband analysis of single stage BJT amplifiers - Low frequency response of BJT amplifiers - High frequency π model -High frequency response of BJT amplifiers. Multistage amplifiers -Darlington Amplifier.	9
III	**LARGE SIGNAL AMPLIFIERS AND LINEAR WAVE SHAPING CIRCUITS** Classification of large signal amplifiers –Class A , Class B amplifier – Cross over Distortion -Push-Pull amplifier – complementary symmetry push-pull amplifier, Tuned amplifiers -Class C tuned amplifier -Integrator- Differentiator- Clippers- Clampers- Diode comparator - Clampers.	9
IV	**FEEDBACK AMPLIFIERS** Block diagram, Loop gain, Gain with feedback, Effects of negative feedback. Sensitivity and desensitivity of gain, Cut-off frequencies, distortion, noise, input impedance and output impedance with feedback. Four types of negative feedback connections - voltage series feedback, voltage shunt feedback, current series feedback and current shunt feedback.	9
V	**OSCILLATORS AND MULTIVIBRATORS** Classification of oscillator, Barkhausen Criterion - Mechanism for start of oscillation and stabilization of amplitude. General form of an Oscillator, Analysis of Hartley, Colpitt's, RC phase shift and Wien bridge Oscillator- Astable multivibrator - Monostable multivibrator, Pulse Shaping circuits.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Understand the Midband analysis of amplifier circuits using small - signal equivalent circuits.
CO2: To analyze of LC and RC oscillators.
CO3: To understand the basic concepts of biasing transistors.
CO4: To analyze wave shaping circuits and multivibrators.
CO5: To design and analyze feedback amplifiers

TEXT BOOKS:

T1- S.Salivahanan, N.Suresh Kumar and A.Vallavaraj, "Electronic Devices and Circuits", 2 nd Edition,2008, McGraw Hill.
T2- David A. Bell, "Electronic Devices and Circuits", fifth edition,Oxford Higher education .
T3- Donald A Neamen, "Electronic Circuit Analysis and Design", McGraw Hill, 3rd Edition, 2003.

REFERENCE BOOKS :

R1- Robert L.Boylestad, Louis Nasheisky, "Electronic Devices and Circuit Theory", 9th Edition, 2007.
R2- Jacob Millman,Christos C.Halkias,"Electronic Devices and Circuits" Mc Graw Hill , Edition 1991.
R3- D.Schilling and C.Belove, "Electronic Circuits", 3rd Edition, Mc Graw Hill, 1989.

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Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC3204	SEMICONDUCTOR FABRICATION TECHNOLOGY	3	0	0	3

Course Objective

1. To give an overview of key technological developments, basic fabrication steps and crystal growth.
2. To be familiar with the process of silicon oxidation and photolithography.
3. To learn the concepts of etching and diffusion.
4. To give an outline on ion implantation techniques and film deposition.
5. To illustrate the inter relationship between the major process steps used for IC.

Unit	Description	Instructional Hours
I	**INTRODUCTION** Semiconductor materials, Semiconductor Devices, Semiconductor Process Technology: Key Semiconductor Technology , Basic Fabrication Steps, Crystal Growth: Silicon Crystal Growth from Melt: Starting Material, The Czochralski Technique, Distribution of Dopant, Silicon Float Zone Process, GaAs Crystal Growth Techniques-Material Characterization	9
II	**SILICON OXIDATION AND PHOTOLITHOGRAPHY** Thermal Oxidation Process, Impurity redistribution during oxidation, Masking properties of silicon dioxide-Oxide Quality, Oxide thickness Characterization, Optical Lithography, Next Generation Lithographic Methods.	9
III	**ETCHING AND DIFFUSION** Wet Chemical Etching: Silicon Etching, Silicon Dioxide Etching, Silicon Nitride and Polysilicon Etching, Aliminium Etching, Gallium Arsenide Etching, Dry etching: Plasma Fundamentals, Etch Mechanism, Reactive Plasma Etching-Applications, Basic Diffusion Process: Diffusion Equation, Diffusion Profiles, Equation of Diffused Layers, Extrinsic Diffusion: Concentration-Dependent Diffusivity, Diffusion Profiles, Lateral Diffusion.	9
IV	**ION IMPLANTATION AND FILM DEPOSITION** Range of Implanted Ions, Implant Damage and Annealing, Implantation Related Processes , Epitaxial Growth Techniques, Dielectric Deposition, Poly silicon Deposition, Metallization	9
V	**PROCESS INTEGRATION** Passive components-Integrated Circuit resistor, Integrated Circuit Capacitor, Integrated Circuit Inductor, Bipolar Technology-Basic Fabrication Process, MOSFET Technology-Basic Fabrication Process, MEMS Technology, System-on-a-Chip	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Ability to understand the basic steps of fabrication and crystal growth.
CO2: Understand the concepts of silicon oxidation and photolithography.
CO3: Ability to explain the process of etching and diffusion.
CO4: Understand the basic process of ion implantation and film deposition.
CO5: Ability to understand the integrating process in fabrication of active and passive components in an IC.

TEXT BOOK:

T1- Gary S.May and Simon M.Sze, "Fundamental of Semiconductor Fabrication", Wiley, 2004.

REFERENCES BOOKS:

R1- Amar Mukherjee, "Introduction to NMOS and CMOS VLSI System design", Prentice Hall India.2000.
R2- Douglas A. Pucknell and Kamran Eshraghian, "Basic VLSI Design", Prentice Hall India 2003.
R3- S.M.Sze, "VLSI Technology",Second Edition, Tata McGraw Hill.
R4- Wiley, Sorab.K.Ghandhi "VLSI Fabrication Principles",Second Edition, McGraw Hill.

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Programme	Course code	Name of the Course	L	T	P	C
B.E.	16CS3231	DATA STRUCTURES AND ALGORITHMS	3	0	0	3

Course Objective

1. To understand the basics of Data Structures and Algorithms.
2. To understand the concepts of Linear Data Structures.
3. To understand the concepts of Non Linear Data Structures.
4. To comprehend the applications of Data structures.
5. To know the concepts of sorting and searching design the Programs using 'C' Language.

Unit	Description	Instructional Hours
I	**LINEAR DATA STRUCTURES- LIST** Introduction to data structures-algorithm analysis-Abstract Data Types-List ADT-Implementaion of List ADT-Array based Implementation-Linked List Implementation – Doubly Linked List-Circular Linked List-Applications of List.	9
II	**LINEAR DATA STRUCTURES- STACK AND QUEUE** Stack ADT-Implementation of Stack ADT(array,list)-Applications of Stack-Balancing Symbol--Expression Evaluation--Queue ADT- Implementation of Queue ADT(array,list)-Circular Queue Implementation-De-queue, Applications of Queue.	9
III	**NON LINEAR DATA STRUCTURES-TREE** Introduction to Trees-Tree Representation-Binary Tree-Applications of Tree-BST Implementation-Expression Tree -Tree Traversals-Height-Balanced Trees (Various operations on AVL Trees)	9
IV	**NON LINEAR DATA STRUCTURES-GRAPHS** Introduction to Graphs- Definitions – Breadth First Search -Depth First Search-Topological sort – Shortest-Path Algorithms(Dijikstra's algorithm) – minimum spanning tree – Prim's and Kruskal's algorithms – Floyd algorithm -Warshall's Algorithm - applications of graphs.	9
V	**SORTING, SEARCHING AND HASH TECHNIQUES** Sorting algorithms: Insertion sort -Selection sort -Shell sort -Bubble sort -Quick sort -Merge sort -Radix sort –Searching: Linear search –Binary Search .	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Explain the concepts of Data structures and algorithms
CO2: Discuss the different methods of organizing large amount of data.
CO3: Comprehend the applications of Data structures.
CO4: Apply the different data structures for implementing solutions to practical problems.
CO5: Apply the concepts of sorting and searching techniques to solve the problems.

TEXT BOOKS

T1- Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Third Edition, Addison-Wesley, 2007.
T2- A. V. Aho, J. E. Hopcroft, and J. D. Ullman, "Data Structures and Algorithms", Pearson Education, 1983.

REFERENCE BOOKS

R1- ISRD Group, "Data Structures using C", Tata McGraw-Hill Publishing Company Ltd., 2006.
R2- Robert L. Kruse, Clovis L. Tondo, Bruce P. Leung ,"Data structures and program design in C " ,2nd Edition, PHI.
R3- T. H. Cormen, C. E. Leiserson, R. L. Rivest, and C. Stein, "Introduction to algorithms", 2nd Edition, PHI, 2001.

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Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC3001	ELECTRONIC CIRCUITS LAB	0	0	4	2

Course Objective

1. To introduce methods of biasing transistors
2. To design and analysis of feedback amplifiers
3. To analyze and design wave shaping circuits and multivibrators
4. To analyze and design low and high frequency oscillators
5. To simulate various electronic circuits using multisim

Expt. No.	Description of the Experiments
1	Design, construct and test the following biasing circuits and find the transient analysis and frequency response of Single BJT and FET. a) Fixed bias b) Self bias
2	Darlington Amplifier
3	Current series ,Voltage shunt and voltage series feedback amplifiers
4	RC Phase shift oscillator.
5	Hartley Oscillator and Colpitts Oscillator.
6	Class C tuned Amplifier
7	Astable multivibrator and Monostable multivibrator
8	Integrator, Differentiator, Clipper and Clamper circuits
	Simulation experiments
9	Integrator ,Differentiator, Clipper and Clamper circuits.
10	Astable multivibrator and Monostable multivibrator .
	Total Practical Hours 45

Course Outcome

CO1: Analyze and design different types of oscillators.
CO2: To design different types of feedback amplifiers.
CO3: To find applications for power amplifier .
CO4: Design different types of Mutlivibrators.
CO5: Analyze the performance of electronic circuits using PSPICE.

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Programme	Course code	Name of the Course	L	T	P	C
B.E.	16CS3031	DATA STRUCTRURES AND ALOGRITHMS LAB	0	0	4	2

Course Objective

1. To teach efficient storage mechanisms of data for an easy access.
2. To design various basic and advanced data structures.
3. To implement various basic and advanced data structures.
4. To introduce various techniques for representation of the data in the real world.
5. To teach the concept of management of data.

Expt. No.	Description of the Experiments
1	Implementations of Linked Lists menu driven program
2	Implementations of stack menu driven program
3	Implementations of Infix to Postfix Transformation and its evaluation program
4	Implementations of circular queue menu driven program
5	Implementation of Priority queue program using array
6	Implementations of Binary Tree menu driven program
7	Implementation of construction of expression tree using postfix expression
8	Implementations of AVL Tree menu driven program
9	Implementations of Shell sort, Radix sort and Insertion sort menu driven program
10	Implementations of Graph menu driven program (DFS & BFS)
11	Implementations of Prim's and Kruskal's Algorithm
	Total Practical Hours **45**

Course Outcome

CO1: To design and analyze the time and space efficiency of the data structure.
CO2: To develop application using data structures.
CO3: To design and analyze the time and space efficiency of the data structure.
CO4: To implement various sorting algorithms.
CO5:To identity the appropriate data structure for given problem.

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Programme	Course Code	Name of the Course	L	T	P	C
B.E.	16MA4109	PROBABILITY AND RANDOM PROCESSES	3	1	0	4

Course Objectives

1. Construct a well defined knowledge of probability and random variables.
2. Understand the concept of standard distributions which can describe the real life phenomenon.
3. Know the concept of two dimensional random variables and determine covariance.
4. Understand the concept of stationary process and correlation functions.
5. Learn the power spectral density functions and recognize the concepts of linear system with random inputs.

Unit	Description	Instructional Hours
I	**PROBABILITY AND RANDOM VARIABLE** Definition - Axioms of Probability - Conditional Probability - Total Probability - Bayes Theorem (Proof excluded) - Random variable - Discrete and continuous random variables - Moment generating functions.	12
II	**STANDARD DISTRIBUTION** Discrete Distributions - Binomial, Poisson, Geometric distributions - Continuous Distributions - Uniform, Exponential and Normal distributions.	12
III	**TWO DIMENSIONAL RANDOM VARIABLES** Joint distributions – discrete and continuous random variables – marginal and conditional probability distributions – covariance – correlation.	12
IV	**RANDOM PROCESSES** Classification of Random Processes – Stationary process – Markov process - Poisson Process – Auto correlation functions – Cross correlation functions - Properties.	12
V	**SPECTRAL DENSITIES AND LINEAR SYSTEMS WITH RANDOM INPUTS** Power spectral density – Cross spectral density – Properties- Linear time invariant system – System transfer function – Linear systems with random inputs.	12
	Total Instructional Hours	**60**

Course Outcomes

CO1: Understand the concepts of probability and random variables.
CO2: Describe various discrete and continuous distribution functions.
CO3: Understand and characterize phenomenon of two dimensional random variables.
CO4: Obtain a fundamental knowledge of the Markov and Poisson processes and acquire skills in analyzing correlation functions.
CO5: Apply the concept of Fourier Transform for finding power and cross spectral density functions and analyze the response of random inputs to linear time invariant systems.

TEXT BOOKS:

T1 - Ibe. O.C., "Fundamentals of Applied Probability and Random Processes", Elsevier, 1st Indian Reprint, 2010
T2 - Veerarajan, T., "Probability, Statistics and Random Processes", Tata McGraw-Hill,2nd Edition, New Delhi, 2010.

REFERENCE BOOKS :

R1 – Peebles. P.Z., "Probability, Random Variables and Random Signal Principles", Tata Mc Graw Hill, 4th Edition, New Delhi, 2002.
R2 - Stark. H. and Woods. J.W., "Probability and Random Processes with Applications to Signal Processing", 3rd Edition, Pearson Education, Asia, 2008.
R3 - Miller. S.L. and Childers. D.G., "Probability and Random Processes with Applications to Signal Processing and Communications", Academic Press, 2nd Edition, 2014.
R4 - Cooper. G.R., Mc Gillem. C.D., "Probabilistic Methods of Signal and System Analysis", 3rd Indian Edition, Oxford University Press, New Delhi, 2007.

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Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC4201	ELECTRO MAGNETIC FIELDS	3	0	0	3

Course Objective

1. To analyze fields and potentials due to static changes
2. To evaluate static magnetic fields
3. To understand how materials affect electric and magnetic fields
4. To understand the relation between the fields under time varying situations
5. To understand principles of propagation of uniform plane waves.

Unit	Description	Instructional Hours
I	**STATIC ELECTRIC FIELD** Vector Algebra, Coordinate Systems, Vector differential operator, Gradient, Divergence, Curl, Divergence theorem, Stokes theorem, Coulombs law, Electric field intensity, Point, Line, Surface and Volume charge distributions, Electric flux density, Gauss law, Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations, Electric dipole, Electrostatic Energy and Energy density..	9
II	**STATIC MAGNETIC FIELD** The Biot-Savart Law in vector form – Magnetic Field intensity due to a finite and infinite wire carrying a current I – Magnetic field intensity on the axis of a circular and rectangular loop carrying a current I – Ampere's circuital law. Magnetic flux density – Force on a moving charge – Force on a differential current element – Torque on a closed circuit – Magnetic moment – Magnetic Potentials.	9
III	**ELECTRIC AND MAGNETIC FIELDS IN MATERIALS** Poisson's and Laplace's equation – Electric Polarization- Definition of Capacitance – Capacitance of various geometries using Laplace's equation – Electrostatic energy and energy density – Boundary conditions for electric fields –point form of ohm's law – continuity equation for current. Definition of Inductance – Inductance of loops and solenoids – Definition of mutual inductance. Energy density in magnetic fields –magnetic boundary conditions.	9
IV	**TIME VARYING ELECTRIC AND MAGNETIC FIELDS** Faraday's law – Displacement current – Maxwell's equations in point form and integral form. Poynting Vector and the flow of power – Instantaneous Average and Complex Poynting Vector.	9
V	**ELECTROMAGNETIC WAVES** Derivation of Wave Equation – Uniform Plane Waves – Wave propagation in free space, dielectrics and in good conductors – Skin effect. Wave polarization – Reflection of Plane Wave from a conductor – normal incidence – Reflection of Plane Waves by a perfect dielectric – normal and oblique incidence.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Capable of analyzing fields and potentials due to static changes.
CO2: Ability to evaluate static magnetic fields.
CO3: Capability to understand how materials affect electric and magnetic fields.
CO4: Understanding the relation between the fields under time varying situations.
CO5: Understanding principles of propagation of uniform plane waves.

TEXT BOOKS

T1 - W H.Hayt & J A Buck : "Engineering Electromagnetics" McGraw-Hill, 7th Edition 2007.
T2 - E.C. Jordan & K.G. Balmain "Electromagnetic Waves and Radiating Systems." Pearson Education/PHI, 4th Edition, 2006.

REFERENCE BOOKS

R1 - Matthew N.O.Sadiku: "Elements of Engineering Electromagnetics" Oxford University Press, 4th Ed,2007.
R2 - Narayana Rao, N : "Elements of Engineering Electromagnetics" 6th edition,Pearson Education, 2006.
R3 - Ramo, Whinnery and Van Duzer: "Fields and Waves in Communications Electronics" ,John Wiley & Sons, 3rd edition 2003.
R4 - David K.Cheng: "Field and Wave Electromagnetics - Second Edition-Pearson,2004.
R5 - G.S.N. Raju, Electromagnetic Field Theory & Transmission Lines, Pearson Education, 2006.

Chairman - BoS
ECE - HiCET

Chairman

Dean (Academics)
HiCET

Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC4202	CONTROL SYSTEMS	3	0	0	3

Course Objective

1. To know the concept of modeling of control systems.
2. To gain adequate knowledge in the time response analysis of first and second order systems.
3. To examine the various frequency response plots.
4. To enumerate the concept of different stability analysis techniques.
5. To describe the concept of state variable analysis.

Unit	Description	Instructional Hours
I	**MATHEMATICAL MODELING OF CONTROL SYSTEMS** Basic components of Control System – Open loop and Closed loop systems – Introduction to Differential equation -Transfer function- Modeling of Electrical and Mechanical systems- Block diagram reduction methods - Signal flow graph.	9
II	**TIME RESPONSE ANALYSIS** Time response - Order and Type of the Systems – Standard test signals-Unit step Response analysis of first and second order systems – Time domain specifications-Steady state errors – Introduction to P, PI, PD and PID controllers.	9
III	**FREQUENCY RESPONSE ANALYSIS** Frequency Response - Frequency Domain specifications -Bode Plot, Polar Plot - Constant M and N Circles – Nichols chart-Introduction to Lead, Lag, and Lead Lag Compensators.	9
IV	**STABILITY ANALYSIS** BIBO Stability, Routh-Hurwitz Criterion, Root Locus Technique, Construction of Root Locus, Application of Root Locus Diagram - Nyquist Stability Criterion.	9
V	**STATE VARIABLE ANALYSIS** State space representation of Continuous Time systems – State equations – Physical, Phase and Canonical variable forms-Transfer function from State Variable Representation – Properties of state transition matrix - Concepts of Controllability and Observability.	9
	Total Instructional Hours	**45**

Course Outcome

CO1: To analyze different control systems mathematically and graphically and understood the concept of Transfer Function.
CO2: To derive different time domain specifications and analyze the steady state error concept.
CO3: To design and analyze the polar, bode and Nichols frequency response plots.
CO4: To analyze the stability of closed loop system using different techniques.
CO5: To understand the concept of state space modeling of continuous time systems and controllability and observability.

TEXT BOOKS:

T1- J.Nagrath and M.Gopal, "Control System Engineering", New Age International Publishers, 5th Edition, 2007.
T2- Benjamin.C.Kuo, "Automatic control systems", Prentice Hall of India, 7th Edition,1995.

REFERENCES BOOKS:

R1- Katsushiko Ogata,"Modern control engineering",Pearson education,5th Edition, 2010.
R2- Schaum's Outline Series, "Feed back and Control Systems" ,Tata Mc Graw-Hill, 2007.
R3- A.Nagoor kani,"Control Systems Engineering",RBA publications, First edition,2010.
R4- John J.D Azzo & Constantine H.Houpis, "Linear Control System Analysis and Design", TMH ,1995.
R5- Richard C. Dorf and Robert H. Bishop, "Modern Control Systems", Addison – Wesley, 1999.

Chairman - BoS
ECE - HICET

Chairman

Dean (Academics)
HiCET

Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC4203	MEASUREMENT AND INSTRUMENTATION	3	0	0	3

Course Objective

1. To know the concept of measurements and learn the use of DC and AC bridges for measuring R, L and C.
2. To learn the use of different types of transducers.
3. To learn the use of different types of function generators and analyzers.
4. To learn the working principle of digital instruments.
5. To learn the principle of working and applications of digital data acquisition system and fiber optic measurements.

Unit	Description	Instructional Hours
I	**MEASUREMENT CONCEPTS & INDICATING EQUIPMENTS** Principles of operation and construction of PMMC - Static and dynamic characteristics - types of errors-error analysis -moving coil, moving iron meters -multi meters -True RMS Meters -Bridge measurements -Maxwell, Kelvin and Wien bridge-Q meters.	9
II	**TRANSDUCERS** Classification of transducers-selecting a transducer -strain gauges-temperature transducer-LVDT Advantages and disadvantages-capacitive transducers-Piezo electric transducers and optoelectronic transducers. Measurement of Pressure, Temperature and velocity.	9
III	**FUNCTION GENERATORS AND ANALYZERS** Function generators-RF signal generators -Sweep generators -Frequency synthesizer - wave analyzer -Harmonic distortion analyzer -spectrum analyzer-heterodyne wave analyzer-frequency counters-time interval measurement-measurement of voltage, current, phase and frequency using CRO, DSO.	9
IV	**DIGITAL INSTRUMENTS** Comparison of analog and digital techniques - digital voltmeter - multimeters - frequency counters - measurement of frequency and time interval - extension of frequency range , Automation in digital instruments, Automatic polarity indication, automatic ranging, automatic zeroing, fully automatic digital instruments.	9
V	**DATA ACQUISITION SYSTEMS AND FIBER OPTIC MEASUREMENT** Elements of a digital data acquisition system - interfacing of transducers - multiplexing - data loggers -computer controlled instrumentation - IEEE 488 bus - fiber optic measurements for power and system loss - optical time domains reflectometer.	9
	Total Instructional Hours	**45**

Course Outcome

CO1:To understand the measurements concept and usage of AC/DC bridges.
CO2: To identify various types of transducers and their working.
CO3: To explain the different types of function generators and CRO.
CO4: To explore knowledge on Digital instruments.
CO5: To learn the various process of computer controlled instrumentation.

TEXT BOOKS:

T1 - B.C.Nakara, K.K.Chaudhry, Instrumentation Measurement and Analysis , McGraw - Hill , 2004.
T2 - Albert D.Helfrick and William D.Cooper, Modern Electronic Instrumentation and Measurement Techniques, PHI, 2003.

REFERENCE BOOKS :

R1 - Joseph J.Carr, Elements of Electronics Instrumentation and Measurement , PHI, 2003.
R2 - Alan. S. Morris, Principles of Measurements and Instrumentation , PHI, 2003.
R3 - A.K.Sawhney, "A Course In Electricl And Electronic Measurement And Instrumentation",Dhanpat Rai and Sons,fourth edition.
R4 - J.B.Gupta, "A Course In Electronics And Electrical Measurements And Instrumentation", S.K.Kataria and sons,2013.

Chairman

Dean (Academics)

Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC4204	LINEAR INTEGRATED CIRCUITS	3	0	0	3

Course Objective

1. To introduce the basic concepts of OPAMP.
2. To impart knowledge on various applications of OPAMP.
3. To understand the working of comparators and waveform generators.
4. To learn the design concepts of ADC and DAC.
5. To understand the working of PLL and voltage regulators.

Unit	Description	Instructional Hours
I	**BASICS OF OPERATIONAL AMPLIFIERS** Basic information about op-amps – Ideal Operational Amplifier - General operational amplifier stages ,DC and AC performance characteristics, slew rate, Open and closed loop configurations.	9
II	**APPLICATIONS OF OPERATIONAL AMPLIFIERS** Sign Changer, Scale Changer, Phase Shift Circuits, Voltage Follower, V-to-I and I-to-V converters, adder, subtractor, Instrumentation amplifier, Integrator, Differentiator, Logarithmic amplifier, Antilogarithmic amplifier, Precision rectifier, peak detector, clipper and clamper, Low-pass, high-pass and band-pass Butterworth filters.	9
III	**COMPARATORS AND WAVEFORM GENERATORS** Comparators, Schmitt trigger, Sine-wave generators, Multivibrators , Triangular wave generator, Saw-tooth wave generator, Timer IC 555, Frequency to Voltage and Voltage to Frequency converters.	9
IV	**ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS** Analog and Digital Data Conversions, D/A converter – specifications - weighted resistor type, R-2R Ladder type, Voltage Mode and Current-Mode -R - 2R Ladder types - switches for D/A converters, high speed sample and hold circuits, A/D Converters – specifications - Flash type - Successive Approximation type - Single Slope type – Dual Slope type .	9
V	**PLL AND VOLTAGE REGULATORS** Operation of the basic PLL, Closed loop analysis, Voltage controlled oscillator, Monolithic PLL IC 565, application of PLL for AM detection, FM detection, FSK modulation and demodulation,Frequency synthesizing, IC Voltage regulators – Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - SMPS.	9
	Total Instructional Hours	**45**

Course Outcome

1. To analyse the characteristics of opamp.
2. To design various applications of opamp.
3. To design various wave generating and shaping circuits.
4. To select ADC and DAC for various applications.
5. To design PLL and voltage regulators.

TEXT BOOKS:

T1 - D.Roy Choudhry, Shail Jain, "Linear Integrated Circuits", 4th Edition ,New Age International Pvt. Ltd., 2010.
T2 - Ramakant A. Gayakwad, "OP-AMP and Linear ICs", 4th Edition, Pearson Education, 2015 .

REFERENCE BOOKS :

R1 - S.Salivahanan & V.S. Kanchana Bhaskaran, "Linear Integrated Circuits", 2nd edition McGraw Hill, 2014.
R2 - Sergio Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", 3rd Edition, Tata Mc Graw-Hill, 2007.
R3 - Robert F.Coughlin, Frederick F.Driscoll, "Operational Amplifiers and Linear Integrated Circuits", Sixth Edition, PHI, 2001.
R4 - B.S.Sonde, "System design using Integrated Circuits" , 2nd Edition, New Age Pub, 2001.
R5 - Gray and Meyer, "Analysis and Design of Analog Integrated Circuits", Wiley International, 2005.

Chairman - BoS
ECE - HICET

Chairman

Dean (Academics)
HICET

Programme	Course code	Name of the course	L	T	P	C
B.E.	16CS4232	OBJECT ORIENTED PROGRAMMING AND STRUCTURES	3	0	0	3

Course Objective

1. Introduce the basic concepts of OOP.
2. Describe the programming concepts in C++.
3. Discuss the basic concepts of JAVA.
4. Discuss about the programming in JAVA.
5. Discuss about the advanced concepts in JAVA.

Unit	Description	Instructional Hours
I	**INTRODUCTION TO OOP** Object-Oriented Programming Concepts- Introduction to C++: Data Flow-Operators-Expressions-Control Flow- Arrays-Strings-Pointers and Functions.	9
II	**PROGRAMMING IN C++** Classes and Objects – Constructors and Destructors – Overloading – Inheritance – Polymorphism –Exception Handling-Templates	9
III	**INTRODUCTION TO JAVA** An overview of Java – Data Types – Variables and Arrays – Operators – Control Statements – Classes – Objects – Methods – Command Line Arguments	9
IV	**PROGRAMMING IN JAVA** Inheritance -Packages – Abstract classes – Interfaces and Inner classes – Exception handling	9
V	**ADVANCED CONCEPTS OF JAVA** String Handling-Multithreaded Programming-Streams and I/O-Applets	9
	Total Instructional Hours	**45**

Course Outcome

CO1: Explain the benefits of object oriented design and understand when it is an appropriate methodology to use.
CO2 : Implement, test and debug solutions in C++.
CO3: Write,compile and execute Java programs.
CO4: use the Java programming language for various programming technologies
CO5: Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem

TEXT BOOKS:

T1- Deitel and Deitel, "C++ How to Program", Sixth Edition, Prentice Hall, 2007.
T2- Herbert Schildt, "Java The complete reference", Eighth Edition, McGraw Hill Professional, 2011

REFERENCE BOOKS :

R1- Balagurusamy E., "Object oriented programming with C++", Fifth Edition, Third Reprint, Tata McGraw–Hill Education 2011.
R2- Ira Pohl, "Object Oriented Programming using C++", Pearson Education, Second Edition, Reprint 2004.
R3- Lippman S. B., Josee Lajoie, Barbara E. Moo, " C++ Primer ", Fourth Edition, Pearson Education, 2005.
R4- ISRD Group, "Introduction to Object–oriented programming through Java", Tata McGraw–Hill Publishing Company Ltd., 2007.

Chairman - BoS
ECE - HiCET

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Dean (Academics)
HiCET

Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC4001	DIGITAL ELECTRONICS LAB	0	0	4	2

Course Objective

1. Demonstrate the formal procedures for the analysis and design of combinational circuits
2. Use appropriate design technique to design the different sequential circuits.
3. Apply the concepts of Hardware Description Language for designing digital circuits.

Expt.No	Description of the Experiments
1	Design and implement 4-bit binary Adder / Subtractor using IC 7483.
2	Design and implement BCD adder using IC 7483.
3	Design and implement Multiplexer and De-multiplexer using logic gates.
4	Design and implement Encoder and Decoder using logic gates.
5	Design and implement code converter
6	Design and construct a 4 – bit binary ripple counter.
7	Design and construct Modulo ripple counter.
8	Construct and test 3-bit synchronous up / down counter.
9	Construct and test 4 – bit shift register using Flip – flops.
10	Design and implement basic digital circuits programs using HDL.
	Total Instructional Hours **45**

Course Outcome

CO1: Analyze the performance of various combinational circuits.
CO2: Design and develop various synchronous counters.
CO3: Design and develop shift registers
CO4: Formulate the design procedure of combinational digital circuits using Hardware Description Language
CO5: Formulate the design procedure of sequential digital circuits using Hardware Description Language

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ECE - HiCET

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Dean (Academics)
HiCET

Programme	Course code	Name of the course	L	T	P	C
B.E.	16EC4002	LINEAR INTEGRATED CIRCUITS LAB	0	0	4	2

Course Objective

1. To understand characteristics of operational amplifier.
2. To apply operational amplifiers in linear applications.
3. To apply operational amplifiers in nonlinear applications
4. To gain knowledge on generation of various waves.
5. To use SPICE software for circuit design.

Expt.No	Description of the Experiments
1	Design and Testing of Voltage Follower, Inverting & Non inverting amplifiers using 741 op-amp.
2	Design and Testing of Active low-pass, High-pass and band-pass filters using 741 op-amp.
3	Design and Testing of Astable multivibrator , Monostable multivibrator and Schmitt Trigger using 741 op-amp.
4	Design and Testing of Phase shift and Wien bridge oscillators using 741 op-amp.
5	Design and Testing of Astable and Monostable multivibrators using NE555 Timer.
6	Design Function Generator using ICL8038.
7	Simulate Integrator and Differentiator using SPICE.
8	Simulate Astable & Monostable multivibrators with NE555 Timer using SPICE.
9	Simulate Phase shift and Wien bridge oscillators with op-amp using SPICE.
10	Simulate D/A and A/D converters using SPICE.

Total Instructional Hours **45**

Course Outcome

CO1: Design oscillators using operational amplifiers.
CO2: Design amplifiers using operational amplifiers.
CO3: Design filters using Op-amp and plot frequency response.
CO4: Analyse the performance of oscillators using SPICE.
CO5: Analyse the performance of multivibrators using SPICE

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ECE - HiCET

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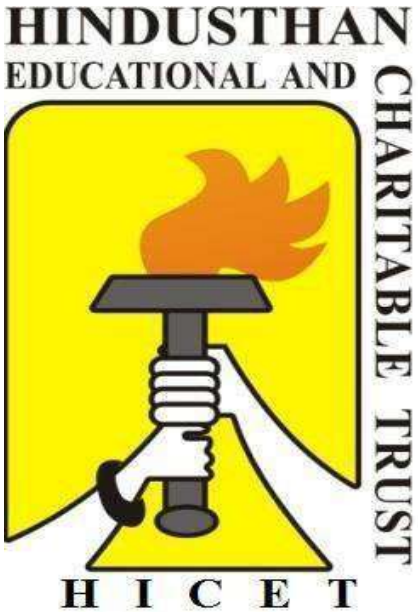
HiCET

HINDUSTHAN COLLEGE OF ENGINEERING AND TECHNOLOGY

(An Autonomous Institution Affiliated to Anna University, Chennai)

(Approved by AICTE, New Delhi, Accredited by NAAC with 'A' Grade)

COIMBATORE 641 032



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

2017-2018

Hindusthan College of Engineering and Technology

Approved by AICTE, New Delhi and Accredited with 'A' Grade by NAAC

(An Autonomous Institution, Affiliated to Anna University, Chennai)

Othakalmandapam Post, Coimbatore

VISION OF THE DEPARTMENT
To evolve as a centre of excellence in Electronics and Communication Engineering, to cater the global industrial needs.

MISSION OF THE DEPARTMENT
1. To expand frontiers of knowledge through the provision of inspiring learning environment. 2. To develop the intellectual skills towards employability by fostering innovation, and creativity in learning. 3. To provide a quality system for wholesome learning to achieve progress and prosperity in life along with moral values

Hindusthan College of Engineering and Technology

Approved by AICTE, New Delhi and Accredited with 'A' Grade by NAAC

(An Autonomous Institution, Affiliated to Anna University, Chennai)

Othakalmandapam Post, Coimbatore

PROGRAMME OUTCOMES

1. **ENGINEERING KNOWLEDGE** : Apply the knowledge of mathematics,science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **PROBLEM ANALYSIS** :Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

3. **DESIGN/ DEVELOPMENT OF SOLUTIONS** : Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate considerations for the public health and safety, and the cultural, societal and environmental consideration.

4. **CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS**: Use research-based knowledge and research methods including design of experiments,analysis and interpretation of data and synthesis of the information to provide valid conclusions.

5. **MODERN TOOL USAGE** : Create ,select and apply appropriate techniques,resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. **THE ENGINEER AND SOCIETY** : Apply reasoning informed by the contextual knowledge to assess societal, health, safety , legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **ENVIRONMENT AND SUSTAINABILITY**: understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of , and need for sustainable development.

8. **ETHICS**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **INDIVIDUAL AND TEAM WORK**: Function effectively as an individual, and as a member

or leader in diverse teams and in multidisciplinary settings.

10. **COMMUNICATION:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **PROJECT MANAGEMENT AND FINANCE**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work , as a member and leader in a team, to manage projects and in multidisciplinary environment.

12. **LIFE LONG LEARNING**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES

PSO 1: Graduates will be able to disseminate the knowledge in Communication Engineering towards Technical Incubation.

PSO 2: Graduates will have the perseverance to learn the modern design tools for

Electronic system design and analysis.

PROGRAMME EDUCATIONAL OBJECTIVES

PEO1: Exhibit their technical skills and knowledge in their working environment, higher studies and research.

PEO2: Succeed in multidisciplinary dimensions by excelling through life-long learning.

PEO3: Become leaders and innovators by devising engineering solutions for social issues and problems.

R – 2016

AY-2017--2018

B.E. ELECTRONICS AND COMMUNICATION ENGINEERING

CO'S, PO'S & PSO'S MAPPING

SEMESTER I

16MA1101Engineering Mathematics-I

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	1	2	1	2	2	3	-	3	1	-
CO2	2	1	1	1	1	2	2	2	2	3	-	2	-	1
CO3	2	2	1	1	1	2	2	2	2	3	1	3	1	-
CO4	2	2	1	1	2	2	2	2	3	3	1	3	1	1
CO5	1	1	1	1	1	2	2	1	2	3	1	3	1	1
Avg	1.6	1.6	1	1	1.2	2	1.8	1.8	2.2	3	1	2.8	1	1

16PH1101Engineering Physics

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	1	1	-	-	-	-	-	1	2	1
CO2	3	3	1	1	2	-	-	-	-	-	-	1	3	3
CO3	3	2	1	2	2	-	-	-	-	-	-	1	3	3
CO4	3	2	3	2	3	1	-	-	-	-	-	1	2	2
CO5	3	2	3	2	2	2	-	-	-	-	-	1	2	3
Avg	3	2.2	2	1.6	2	1.333333	-	-	-	-	-	1	2.4	2.4

16CY1101Engineering Chemistry

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	1	1	2	-	-	-	-	-	1	2	1
CO2	3	3	1	1	2	2	-	-	-	-	-	1	3	3
CO3	3	2	1	2	2	2	-	-	-	-	-	1	3	3
CO4	3	2	3	2	3	2	-	-	-	-	-	1	2	2
CO5	3	2	3	2	2	2	-	-	-	-	-	1	2	3
Avg	3	2.2	2	1.6	2	2	-	-	-	-	-	1	2.4	2.4

16HE1101English for Engineers - I

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	1	2	1	2	2	3	-	3	1	-
CO2	2	1	1	1	1	2	2	2	2	3	-	2	-	1
CO3	2	2	1	1	1	2	2	2	2	3	1	3	1	-
CO4	2	2	1	1	2	2	2	2	3	3	1	3	1	1
CO5	1	1	1	1	1	2	2	1	2	3	1	3	1	1
Avg	1.6	1.6	1	1	1.2	2	1.8	1.8	2.2	3	1	2.8	1	1

16GE1101Computer Programming

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2	-	-	-	-	-	-	2	2	2
CO2	3	3	3	2	2	-	-	-	-	-	-	2	2	2
CO3	3	3	3	3	3	-	-	-	-	-	-	2	2	2
CO4	3	3	3	2	2	-	-	-	-	-	-	2	2	2
CO5	3	3	3	3	3	-	-	-	-	-	-	2	2	2
Avg	3	3	3	2.4	2.4	-	-	-	-	-	-	2	2	2

16EC1201 Electron Devices

PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO2	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	2	-
AVG	3	2	2									1	2	-

16PS1001 Physical Sciences Lab – I

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	1	1	1	2	1	2	2	3	-	3	1	-
CO2	2	1	1	1	1	2	2	2	2	3	-	2	-	1
CO3	2	2	1	1	1	2	2	2	2	3	1	3	1	-
CO4	2	2	1	1	2	2	2	2	3	3	1	3	1	1
CO5	1	1	1	1	1	2	2	1	2	3	1	3	1	1
Avg	1.6	1.6	1	1	1.2	2	1.8	1.8	2.2	3	1	2.8	1	1

16GE1001 Computer Programming Lab

PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO2	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	2	-
AVG	3	2	2									1	2	-

16GE1002 Engineering Practices Lab

PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO2	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	2	-
AVG	3	2	2									1	2	-

SEMESTER II

16MA2102 Engineering Mathematics-II

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3	3	3	2	2	-	-	-	-	-	-	2	2	
CO2	3	3	3	2	2	-	-	-	-	-	-	2	2	
CO3	3	3	3	2	2	-	-	-	-	-	-	2	2	
CO4	3	3	3	2	2	-	-	-	-	-	-	2	2	
CO5	3	3	3	2	2	-	-	-	-	-	-	2	2	
Avg	3	3	3	2	2	-	-	-	-	-	-	2	2	

16PH2102Physics of Materials

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	1	1							1	1
CO2	3	3	1	1	2								2	1
CO3	3	2	1	2	2								3	2
CO4	3	3	1	2	2	1							1	1
CO5	3	2	2	3	2	1	2						2	2
Avg	3	2.4	1.2	1.8	1.8	1	2						1.8	1.4

16CY2102Environmental Sciences

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					2	3	3	2		2	2	2	1
CO2	2	1	1			2	3	3	2		2	2	2	1
CO3	2					2	3	3	2		2	2	2	1
CO4	2	1	2			2	3	3	2		2	2	2	2
CO5	2	1	2			2	3	3	2		2	2	2	2
Avg	2					2	3	3	2		2	2	2	1

16HE2102English for Engineers - II

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1									1	3			1	
CO2	2	2				2			3	3		2		1
CO3	2		2						2	3			1	
CO4		1		1					1	2		2	1	1
CO5	2	1	2		1				1	3			2	1
Avg	2	1.333333	2	1	1	2			1.6	2.8		2	1.25	1

16GE2102 Engineering Graphics

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					2	3	3	2		2	2	2	1
CO2	2	1	1			2	3	3	2		2	2	2	1
CO3	2					2	3	3	2		2	2	2	1
CO4	2	1	2			2	3	3	2		2	2	2	2
CO5	2	1	2			2	3	3	2		2	2	2	2
Avg	2					2	3	3	2		2	2	2	1

16EC2201Circuit Theory

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					2	3	3	2		2	2	2	1
CO2	2	1	1			2	3	3	2		2	2	2	1
CO3	2					2	3	3	2		2	2	2	1
CO4	2	1	2			2	3	3	2		2	2	2	2
CO5	2	1	2			2	3	3	2		2	2	2	2
Avg	2					2	3	3	2		2	2	2	1

16PD2102Essential Life Skills

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2					2	3	3	2		2	2	2	1
CO2	2	1	1			2	3	3	2		2	2	2	1
CO3	2					2	3	3	2		2	2	2	1
CO4	2	1	2			2	3	3	2		2	2	2	2
CO5	2	1	2			2	3	3	2		2	2	2	2
Avg	2					2	3	3	2		2	2	2	1

16PS2001Physical Sciences Lab - II

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	1	1	-	-	-	-	-		1	2	2
CO2	2	3	2	1	1	-	-	-	-	-		1	2	2
CO3	2	2	2	2	1	-	-	-	-	-		1	2	2
CO4	3	3	3	1	2	2	-	-	-	-	1	2	2	2
CO5	3	3	3	2	1	1	-	-	-	-	1	2	2	3
Avg	2.4	2.8	2.4	1.4	1.2	2	-	-	-	-	1	1.4	2	2.2

16EC2001Electric Circuits and Electron Devices Lab

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	1	1	-	-	-	-	-	1	2	2	2
CO2	2	3	2	1	1	-	-	-	-	-	1	2	2	2
CO3	2	2	2	2	1	-	-	-	-	-	1	2	2	2
CO4	2	2	3	1	2	-	-	-	-	-	2	2	3	3
CO5	2	3	3	2	2	-	-	-	-	-	3	2	3	3
Avg	2	2.6	2.4	1.4	1.4	-	-	-	-	-	1.6	2	2.4	2.4

SEMESTER III

16MA3106 Numerical Methods for Electronics Engineers

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	2	-	-	-	-	-	-	2	2	2
CO2	3	3	3	3	3	-	-	-	-	-	-	2	2	1
CO3	3	3	3	3	2	-	-	-	-	-	-	2	2	1
CO4	3	3	3	3	3	-	-	-	-	-	-	2	2	1
CO5	3	3	3	3	3	-	-	-	-	-	-	2	2	1
Avg	3	3	3	3	2.6	-	-	-	-	-	-	2	2	1.2

16EC3201Digital Electronics

PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO2	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO3	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO4	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO5	3	2	2	-	-	-	-	-	-	-	-	1	2	-
AVG	3	2	2									1	2	-

16EC3202 Signals and Systems

PO & PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 2	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 3	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 4	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 5	3	2	2	-	-	-	-	-	-	-	-	1	2	-
AV G	3	2	2									1	2	-

16EC3203 Electronic Circuits

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	**3**	3	3	3	-	3	-	3	-	-	**1**	**3**	**2**	**3**
CO2	**3**	3	3	3	-	3	-	3	-	-	**1**	**3**	**2**	**3**
CO3	**3**	3	3	3	-	3	-	3	-	-	**1**	**3**	**2**	**3**
CO4	**3**	3	3	3	-	3	-	3	-	-	**1**	**3**	**2**	**3**
CO5	**3**	3	3	3	-	3	-	3	-	-	**1**	**3**	**2**	**3**
AVG	**3**	**3**	**3**	**3**	-	**3**	-	**3**	-	-	**1**	**3**	**2**	**3**

16EC3204 Semiconductor Fabrication Technology

PO & PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 2	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 3	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 4	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 5	3	2	2	-	-	-	-	-	-	-	-	1	2	-
AVG	3	2	2									1	2	-

16CS3231 Data Structures and Algorithms

PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	-	3	-	-	-	-	-	-	1	2	1
CO2	3	2	2	-	3	-	-	-	-	-	-	1	2	1
CO3	3	2	2	-	3	-	-	-	-	-	-	1	2	1
CO4	3	2	2	-	3	-	-	-	-	-	-	1	2	1
CO5	3	2	2	-	3	-	-	-	-	-	-	1	2	1
AVG	3	2	2		3							1	2	1

16EC3001 Electronic Circuits Lab

PO & PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO 1	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 2	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 3	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 4	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 5	3	2	2	-	-	-	-	-	-	-	-	1	2	-
AV G	3	2	2									1	2	-

16CS3031 Data Structures and Algorithms Lab

PO & PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 2	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 3	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 4	3	2	2	-	-	-	-	-	-	-	-	1	2	-
CO 5	3	2	2	-	-	-	-	-	-	-	-	1	2	-
AVG	3	2	2									1	2	-

SEMESTER IV

16MA4109 Probability and Random Processes

PO& PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	2	1	1	-	-	-	-	-	1	2	2	2
CO2	2	3	2	1	1	-	-	-	-	-	1	2	2	2
CO3	2	2	2	2	1	-	-	-	-	-	1	2	2	2
CO4	2	2	3	1	2	-	-	-	-	-	2	2	3	3
CO5	2	3	3	2	2	-	-	-	-	-	3	2	3	3
Avg	2	2.6	2.4	1.4	1.4	-	-	-	-	-	1.6	2	2.4	2.4

16EC4201Electro Magnetic Fields

PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO1	PO8	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	-	-	2	-	-	-	-	3	3	1
CO2	3	3	3	3	-	-	2	-	-	-	-	3	3	1
CO3	3	2	2	3	-	-	1	-	-	-	-	3	3	1
CO4	3	3	3	2	-	-	2	-	-	-	-	3	3	1
CO5	3	2	2	2	-	-	1	-	-	-	-	3	3	1
AVG	3	2.4	2.4	2.5	-	-	1.6	-	-	-	-	3	3	1

16EC4202Control Systems

PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	2	2	-	-	-	-	-	2	**2**
CO2	3	3	3	2	2	2	2	-	-	-	-	-	2	2
CO3	3	3	3	2	2	2	2	-	-	-	-	-	2	2
CO4	3	3	3	2	2	2	2	-	-	-	-	-	2	2
CO5	3	3	3	2	2	2	2	-	-	-	-	-	2	2
AVG	3	3	3	2	2	2	2						2	2

16EC4203 Measurement and Instrumentation

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2	3	3	3	-	-	-	2	3	3
CO2	3	3	3	3	3	2	3	3	3	-	-	2	2	3
CO3	3	2	2	2	2	2	2	3	2	-	-	-	3	3
CO4	3	3	3	2	2	2	2	3	3	-	-	3	2	3
CO5	3	3	2	3	3	3	2	3	3	-	-	3	3	3
AVG	3	3	2	2	2	2	2	3	3	-	-	3	3	3

16EC4204 Linear Integrated Circuits

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**2**	3	**3**	2	**2**	-	-	-	-	-	-	**2**	**2**
CO2	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO3	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO4	3	3	2	3	2	2	-	-	-	-	-	-	2	2
CO5	3	3	2	3	2	2	-	-	-	-	-	-	2	2
AVG	3	3	2	3	2	2						-	2	2

16CS4232 Object Oriented Programming and Structures

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**2**	3	**3**	2	**2**	-	-	-	-	-	-	**2**	**2**
CO2	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO3	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO4	3	3	2	3	2	2	-	-	-	-	-	-	2	2
CO5	3	3	2	3	2	2	-	-	-	-	-	-	2	2
AVG	3	3	2	3	2	2						-	2	2

16EC4001 Digital Electronics Lab

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**2**	3	**3**	2	**2**	-	-	-	-	-	-	**2**	**2**
CO2	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO3	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO4	3	3	2	3	2	2	-	-	-	-	-	-	2	2
CO5	3	3	2	3	2	2	-	-	-	-	-	-	2	2
AVG	3	3	2	3	2	2						-	2	2

16EC4002 Linear Integrated Circuits Lab

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	**3**	**2**	3	**3**	2	**2**	-	-	-	-	-	-	**2**	**2**
CO2	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO3	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO4	3	3	2	3	2	2	-	-	-	-	-	-	2	2
CO5	3	3	2	3	2	2	-	-	-	-	-	-	2	2
AVG	3	3	2	3	2	2						-	2	2

SEMESTER V

16EC5201 Analog Communication

PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	2	2	2	-	-	3	-	3	2	**3**
CO2	3	2	3	3	2	2	2	-	-	3	-	3	2	3
CO3	3	2	3	3	2	2	2	-	-	3	-	3	2	-
CO4	3	2	3	3	2	2	2	-	-	3	-	3	2	3
CO5	3	2	3	3	2	2	2	-	-	3	-	3	2	-
AV	3	3	3	3	2	2	2			2		3	3	1.8

16EC5202 Digital Signal Processing

PO&PSO ⟶	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	3	3	1			2			2	2	3
CO2	3	3	3	3	3	1			2			2	2	3
CO3	3	3	3	3	3	1			2	3		2	2	3
CO4	3	3	3	2	3	1			2	3		2	2	3
CO5	3	3	3	3	3	1			2	3		2	2	3
AVG	3	3	3	3		1			2	1.4		2	1	3

16EC5203 Data Communication and Networks

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	-	3	-	3	3	3	2	3	3	2
CO2	3	3	3	3	3	3	-	3	-	3	-	3	3	3
CO3	3	3	3	3	3	-	3	-	-	-	-	3	3	3
CO4	3	3	3	3	-	-	2	3	3	-	2	-	3	3
CO5	3	3	3	3	3	3	2	-	3	3	2	3	3	2
AVG	**3**	3	3	3	1.8	1.8	1.4	1.8	1.8	1.8	2	2.4	3	3

16EC5204 Microprocessors and Microcontrollers:Concepts and Applications

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	2	3	3	-	-	-	-	-	2	3
CO2	3	3	3	3	2	3	2	-	-	-	-	-	3	3
CO3	3	3	2	3	3	3	3	-	-	-	-	-	3	3
CO4	3	3	3	3	3	3	2	-	-	-	-	-	3	3
CO5	3	3	3	3	3	3	3	-	-	-	-	-	2	3
AVG	**3**	3	2.6	3	2.6	3	2.6	-	-	-	-	-	2.6	3

16EC5205 Transmission Lines and Waveguides

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO11	PO12	PSO1	PSO2
CO1	3	**3**	3	**1**	2	**1**	**2**	**-**	**-**	**2**	**-**	**-**	**3**	**3**
CO2	2	2	2	1	3	1	2	**-**	**-**	**2**	**-**	**-**	**3**	**2**

CO3	3	3	2	1	2	2	2	**-**	**-**	**2**	**-**	**-**	**3**	**2**
CO4	3	3	2	1	3	2	2	-	-	2	-	-	2	2
CO5	3	3	1	1	1	2	2	-	-	2	-	-	2	1
AVG	2.8	2.8	2	1	2.2	1.6	2	-	-	2	-	-	2.6	2

16EC5001 Digital Signal Processing Lab

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO 9**	**PO 10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	3	3	2	3	2	3	3	-	-	-	-	-	2	3
CO2	3	3	3	3	2	3	2	-	-	-	-	-	3	3
CO3	3	3	2	3	3	3	3	-	-	-	-	-	3	3
CO4	3	3	3	3	3	3	2	-	-	-	-	-	3	3
CO5	3	3	3	3	3	3	3	-	-	-	-	-	2	3
AVG	**3**	3	2.6	3	2.6	3	2.6	-	-	-	-	-	2.6	3

16EC5002 Microprocessors and Microcontrollers Lab

PO&PSO ⟶	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	3	2	2	2		2				3			3	3
CO2	3	2	2	2		2				3			3	3
CO3	3	2	2	2		2				3			3	3
CO4	3	2	2	2		2				3		2	3	3
CO5	3	2	2	2		2				3		2	3	3
AVG	3	2	2	2		2				3		2	3	3

SEMESTER VI

16EC6201 VLSI Design

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO11	PO12	PSO 1	PSO 2
CO 1	3	3	2	3	2	2	3	1	2	3	1	2	3	2
CO 2	3	3	2	3	2	2	2	1	1	2	2	2	2	2
CO 3	3	2	3	3	2	2	2	1	-	2	-	2	3	2
CO 4	3	2	3	2	2	2	2	1	2	2	1	2	2	2
CO 5	3	2	3	3	2	2	2	1	-	2	1	2	2	3
AV G	**3**	3	3	3	1.8	1.8	1.4	1	1	1.8	1	2.4	3	3

16EC6202 Digital Communication

PO&PSO ⟶	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	3	2	2			2							3	3
CO2	3	2	2			2							3	3
CO3	3	2	2	2		2								3
CO4	3	2	2			2						2		3
CO5	3	2	2	3		2						2		3
AVG	3	2	2	2.5		2						1.5	1.5	3

16EC6203Digital Image Processing

PO&PSO ⟶	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2		2				3			3	3
CO2	3	2	2	2		2				3			3	3
CO3	3	2	2	2		2				3			3	3
CO4	3	2	2	2		2				3		2	3	3
CO5	3	2	2	2		2				3		2	3	3
AVG	3	2	2	2		2				3		2	3	3

16EC6204 Antenna and Wave Propagation

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PSO 2
CO 1	2	2	3	3	3	2	2	2	-	-	-	2	1	2
CO 2	2	2	3	3	3	2	2	2	-	-	-	2	1	2
CO 3	2	2	3	3	3	2	2	2	-	-	-	2	1	2
CO 4	2	3	3	3	3	2	3	2	-	-	-	2	1	2
CO 5	2	2	3	3	3	2	2	2	-	-	-	2	1	2
AV G	2	2	3	3	3	2	2	2				2	1	2

16EC6001 Analog and Digital Communication Lab

PO&PS O ⟶	PO 1	PO 2	PO 3	P O 4	P O 5	PO 6	P O 7	PO 8	PO 9	P O 1 0	PO 11	PO 12	PSO 1	PSO 2
CO1	3	2	2			2							3	3
CO2	3	2	2			2							3	3
CO3	3	2	2	2		2								3
CO4	3	2	2			2						2		3
CO5	3	2	2	3		2						2		3
AVG	3	2	2	2.		2						1.5	1.5	3

16EC6002 VLSI Design Lab

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO 10	PO1 1	PO1 2	PSO 1	PSO 2
CO 1	3	3	2	3	2	2	3	1	2	3	1	2	3	2
CO 2	3	3	2	3	2	2	2	1	1	2	2	2	2	2
CO 3	3	2	3	3	2	2	2	1	-	2	-	2	3	2
CO 4	3	2	3	2	2	2	2	1	2	2	1	2	2	2
CO 5	3	2	3	3	2	2	2	1	-	2	1	2	2	3
AV G	**3**	3	3	3	1.8	1.8	1.4	1	1	1.8	1	2.4	3	3

16EC6801 Mini Project

PO & PSO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	3	2	2	2	3	1	2	2	1	3	1
CO2	3	2	2	3	2	2	2	3	1	2	2	1	3	1
CO3	3	2	2	3	2	2	2	3	1	2	2	1	3	1
CO4	3	2	2	3	2	2	2	3	1	2	2	1	3	1
CO5	3	2	2	3	2	2	2	3	1	2	2	1	3	1
AVG	3	2	2	3	2	2	2	3	1	2	2	2	2	1

SEMESTER VII

16EC7201 Embedded and Real Time Systems

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	2	2	3	3	3	2	2	2	-	-	-	2	1	2
CO 2	2	2	3	3	3	2	2	2	-	-	-	2	1	2
CO 3	2	2	3	3	3	2	2	2	-	-	-	2	1	2
CO 4	2	3	3	3	3	2	3	2	-	-	-	2	1	2
CO 5	2	2	3	3	3	2	2	2	-	-	-	2	1	2
AVG	2	2	3	3	3	2	2	2				2	1	2

16EC7202 Wireless Communication

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	**3**	**3**	3	**3**	2	**2**	-	-	-	-	-	-	**3**	**2**
CO 2	3	3	3	3	2	2	-	-	-	-	-	-	3	2
CO 3	3	3	3	2	2	2	-	-	-	-	-	-	3	2
CO 4	3	3	3	3	2	3	-	1	-	-	-	-	3	2
CO 5	3	3	3	3	2	2	-	-	-	-	-	-	3	2
AV G	3	3	3	3	2	2							3	2

16EC7203Microwave Engineering

PO&PSO ⟶	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	3	3	3	3	3	1			2			2	2	3
CO2	3	3	3	3	3	1			2			2	2	3
CO3	3	3	3	3	3	1			2	3		2	2	3
CO4	3	3	3	2	3	1			2	3		2	2	3
CO5	3	3	3	3	3	1			2	3		2	2	3
AVG	3	3	3	3		1			2	1.4		2	1	3

16EC7001 Embedded Systems Lab

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	**3**	**2**	3	**3**	2	**2**	-	-	-	-	-	-	**2**	**2**
CO 2	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO 3	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO 4	3	3	2	3	2	2	-	-	-	-	-	-	2	2
CO 5	3	3	2	3	2	2	-	-	-	-	-	-	2	2
AV	3	3	2	3	2	2						-	2	2

16EC7002 Optical Communication and Microwave Lab

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	**3**	**2**	3	**3**	2	**2**	-	-	-	-	-	-	**2**	**2**
CO 2	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO 3	3	3	3	3	2	2	-	-	-	-	-	-	2	2
CO 4	3	3	2	3	2	2	-	-	-	-	-	-	2	2
CO 5	3	3	2	3	2	2	-	-	-	-	-	-	2	2
AVG	3	3	2	3	2	2						-	2	2

16EC8901 Project Work

PO & PSO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO 1	3	2	2	3	2	2	2	3	3	3	3	1	3	1
CO 2	3	2	2	3	2	2	2	3	3	3	3	1	3	1
CO 3	3	2	2	3	2	2	2	3	3	3	3	1	3	1
CO 4	3	2	2	3	2	2	2	3	3	3	3	1	3	1
CO 5	3	2	2	3	2	2	2	3	3	3	3	1	3	1
AVG	3	2	2	3	2	2	2	3	3	3	3	2	2	1

Mapping of Course Outcome and Programme Outcome:

YEAR	SEM	Course Code Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
I	I	16MA1101 Engineering Mathematics-I	**3**	**3**	**3**	**2**	**3**	**1**	**1**	**-**	**1**	**-**	**2**	**3**	**1**	**1**
			3	**3**	**2**	**2**	**1**	**1**	**1**	**-**	**1**	**-**	**2**	**2**	**1**	**1**
		16PH1101 Engineering Physics	**3**	**3**	**2**	**2**	**2**	**1**	**1**	**-**	**1**	**-**	**1**	**2**	**1**	**1**
		16CY1101 Engineering Chemistry	3	2.2	2	1.6	2	2	-	-	-	-	-	1	2.4	2.4
		16HE1101R Essential English for Engineers -I	1.6	1.6	1	1	1.2	2	1.8	1.8	2.2	3	1	2.8	1	1
		16GE1101 Computer Programming	3	3	3	2.4	2.4	-	-	-	-	-	-	2	2	2
		16EC1201 Electron Devices	3	2	2									1	2	-
		16PS1001 Physical Sciences Lab - I	1.6	1.6	1	1	1.2	2	1.8	1.8	2.2	3	1	2.8	1	1
		16GE1001 Computer Programming Lab	3	2	2									1	2	-

		16GE1002 Engineering Practices Lab	**3**	**2**	**2**									**1**	**2**	
I	II	16MA2102 Engineering Mathematics-II	**3**	**3**	**3**	**2**	**3**	**1**	**1**	**-**	**1**	**-**	**2**	**3**	**1**	**1**
		16PH2102Physics of Materials	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**-**	**1**	**-**	**2**	**2**	**1**	**1**
		16CY2102Environmental Sciences	**3**	**3**	**2**	**2**	**2**	**1**	**1**	**-**	**1**	**-**	**1**	**2**	**1**	**1**
		16HE2102REssential English for Engineers - II	2	1.33	2	1	1	2			1.6	2.8		2	1.2	1
		16GE2102 Engineering Graphics	2					2	3	3	2		2	2	2	1
		16EC2201Circuit Theory	2					2	3	3	2		2	2	2	1
		16PS2001 Physical Sciences Lab - II	2.4	2.8	2.4	1.4	1.2	2	-	-	-	-	1	1.4	2	2.2
		16EC2001 Electric Circuits and Electron Devices	2	2.6	2.4	1.4	1.4	-	-	-	-	-	1.6	2	2.4	2.4

SEMESTER III

II	III	16MA3106Numerical Methods for Electronics Engineers	**3**	**3**	**3**	**2**	**3**	**1**	**1**	**-**	**1**	**-**	**2**	**3**	**1**	**1**

		16EC3201Digital Electronics	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**-**	**1**	**-**	**2**	**2**	**1**	**1**
		16EC3202Signals and Systems	**3**	**3**	**2**	**2**	**2**	**1**	**1**	**-**	**1**	**-**	**1**	**2**	**1**	**1**
		16EC3203Electronic Circuits	**3**	**3**	**3**	**3**	**-**	**3**	**-**	**3**	**-**	**-**	**1**	**3**	**2**	**3**
		16EC3204Semiconductor Fabrication	3	2	2									1	2	-
		16CS3231Data Structures and Algorithms	3	2	2		3							1	2	1
		16EC3001Electronic Circuits Lab	3	2	2									1	2	-
		16CS3031Data Structures and Algorithms Lab	3	2	2									1	2	-
II		16MA4109 Probability and Random Processes	**3**	**3**	**3**	**2**	**3**	**1**	**1**	**-**	**1**	**-**	**2**	**3**	**1**	**1**
		16EC4201Electro Magnetic Fields	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**-**	**1**	**-**	**2**	**2**	**1**	**1**
	IV	16EC4202Control Systems	**3**	**3**	**2**	**2**	**2**	**1**	**1**	**-**	**1**	**-**	**1**	**2**	**1**	**1**
		16EC4203Measurement and Instrumentation	3	3	2	2	2	2	2	3	3	-	-	3	3	3
		16EC4204Linear Integrated Circuits	3	3	2	3	2	2						-	2	2

		16CS4232Object Oriented Programming and	3	3	2	3	2	2						-	2	2
		16EC4001Digital Electronics Lab	3	3	2	3	2	2						-	2	2
		16EC4002 Linear Integrated Circuits Lab	3	3	2	3	2	2						-	2	2
III	V	16EC5201 Analog Communication	**3**	**3**	**3**	**2**	**3**	**1**	**1**	**-**	**1**	**-**	**2**	**3**	**1**	**1**
		16EC5202Digital Signal Processing	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**-**	**1**	**-**	**2**	**2**	**1**	**1**
		16EC5203Data Communication and Networks	**3**	**3**	**2**	**2**	**2**	**1**	**1**	**-**	**1**	**-**	**1**	**2**	**1**	**1**
		16EC5204Microprocessors and Microcontrollers:Concepts and Applications	**3**	3	2.6	3	2.6	3	2.6	-	-	-	-	-	2.6	3
		16EC5205Transmission Lines and Waveguides	2.8	2.8	2	1	2.2	1.6	2	-	-	2	-	-	2.6	2
		16EC5001 Digital Signal Processing Lab	**3**	3	2.6	3	2.6	3	2.6	-	-	-	-	-	2.6	3
		16EC5002 Microprocessors and Microcontrollers Lab	3	2	2	2		2				3		2	3	3

III	VI	16EC6201 VLSI Design	**3**	**3**	**3**	**2**	**3**	**1**	**1**	**-**	**1**	**-**	**2**	**3**	**1**	**1**
		16EC6202 Digital Communication	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**-**	**1**	**-**	**2**	**2**	**1**	**1**
		16EC6203 Digital Image Processing	**3**	**3**	**2**	**2**	**2**	**1**	**1**	**-**	**1**	**-**	**1**	**2**	**1**	**1**
		16EC6204 Antenna and Wave Propagation	2	2	3	3	3	2	2	2				2	1	2
		16EC6001 Analog and Digital Communication Lab	3	2	2	2.5		2						1.5	1.5	3
		16EC6002 VLSI Design Lab	**3**	3	3	3	1.8	1.8	1.4	1	1	1.8	1	2.4	3	3
		16EC6801 Mini Project	3	2	2	3	2	2	2	3	1	2	2	2	2	1
IV	VII	16EC7201 Embedded and Real Time	2	2	3	3	3	2	2	2				2	1	2
		16EC7202 Wireless Communication	3	3	3	3	2	2							3	2
		16EC7203Microwave Engineering	3	3	3	3		1			2	1.4		2	1	3
		16EC7001 Embedded Systems Lab	3	3	2	3	2	2						-	2	2
		16EC7002 Optical Communication and Microwave	3	3	2	3	2	2						-	2	2

	VIII	16EC8901 Project Work	3	2	2	3	2	2	2	3	3	3	3	2	2	1

Chairman - BoS
ECE - HiCET

Chairman

Dean (Academics)
HiCET