GALGOTIAS UNIVERSITY

(Established under Galgotias University Uttar Pradesh Act No. 14 of 2011)

B.Tech- Electronics and Communication Engineering

Vision and Mission of the University

Vision

To be known globally for value-based education, research, creativity and innovation"

Mission

- Establish state-of-the-art facilities for world class education and research.
- Collaborate with industry and society to align the curriculum,
- Involve in societal outreach programs to identify concerns and provide sustainable ethical solutions.
- Encourage life-long learning and team-based problem solving through an enabling environment.

Vision and Mission of the Department

Vision

To be known globally as a premier department of Electronics and Communication Engineering for value-based education and interdisciplinary research for innovation.

Mission

M1: Create a strong foundation on Fundamentals of Electronics and Communication Engineering through Outcome Based Teaching Learning (OBTL) Process

M2: Establish state-of-the-art facilities for design and simulation.

M3: Provide opportunities to students to work on real world problems and develop sustainable ethical solutions.

M4: Involve the students in group activities, including those of professional bodies to develop leadership and communication skills.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

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consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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 modeling 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 environments.

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.

Program Educational Objectives

1. Graduates will demonstrate their knowledge in the field of electronics and communication engineering and allied engineering.
2. The graduates will contribute to interdisciplinary research with the use of modern tools & emerging technologies.
3. The graduates will become successful leaders through effective project management and contribute to the growth & development of the organization and society.
4. The graduates will be involved in promoting professional and societal activities.

Program Specific Outcomes

1. Electronic System Development
2. Digital System Design
3. IoT Development

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Sample Course Outcomes

Name of The Course	Basic Electrical & Electronics Engineering			
Course Code	EEE101			
Prerequisite	Basic Number System, Basic Electronics			
L	**T**	**P**	**C**	
3	0	0	3	

Course Objectives:

The course will provide the knowledge on basic electronics engineering. The design and analysis of half wave and full wave rectifiers, clipping circuits and zeener regulators, BJT characteristics and amplifiers will be discussed in the course. It will also explain the logic gates family, combinational circuits and sequential circuits. Their application as pulse generators, ripple counter and numerical display will be discussed to ensure the basic knowledge among students. The process of communication system with the modulation techniques will be taught in this course.

Course Outcomes

CO1	Analyze the concepts of electrical network theorems
CO2	Explain the fundamental concepts of electronic components
CO3	Design and operate digital circuits
CO4	Explain the basic concepts of communication techniques
CO5	Develop the concept to design the circuits for a given problem

Text Book :

1. A. P. Malvino, Electronic Principles, TMH, New Delhi, 1993
2. R. J. Tocci, Digital Systems, PHI, 6th Ed, 2001

Reference Books

1. B. P. Lathi and Z. Ding, Modern Digital and Analog Communication Systems, 4th Ed., Oxford University Press, 2010

Course Content:

Unit-1 Principle of communication networks 8 hours Components of networks: Resistance, inductance, capacitance and semiconductor devices. Kirchoff's voltage and current laws, approximations, voltage source, current source, Thevenin's theorem, Norton theorem, troubleshooting
Unit II: Diodes 8 hours
Diode Circuits: Half wave rectifiers, transformers, full wave rectifiers, power supply, clippers and limiters, clampers, voltage multipliers, Zener diode, voltage regulators.
Unit-III Transistors fundamentals 8 hours
Transistors fundamentals: Unbiased transistor, biased transistor, CE connections, load line, operating point, saturation current, led driver.
Unit IV : Basic Digital Electronics 8 hours
Basic Digital Electronics: logic gates, inverter, NAND, NOR, OR, CMOS and TTL logic. Combinational and sequential digital circuits.
Unit V: Basic Communication Engineering 8 hours
Basic Communication Engineering: Amplitude modulation, Frequency modulation, Phase modulation, detection, phase-locked-loop (PLL), Frequency division multiplexing (FDM)

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Department of Electrical, Electronics and Communication Engineering

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Vision and Mission of the Department

Vision

To be recognized globally as a premier department of Electrical, Electronics and Communication Engineering for value-based education, interdisciplinary research and innovation.

Mission

- To produce skilled professional in the field of Electrical and Electronics Engineering to meet the requirement of Industry 4.0.
- To setup Center-of-Excellence for design simulation and product development.
- To provide opportunities for students to work on real world problems and develop sustainable solutions.
- To collaborate with industry and professional bodies to design up-to-date curriculum as per the industry need.

PROGRAM OUTCOMES

Engineering Graduates will be able to:

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

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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.

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Program Educational Objectives

Graduate shall

PEO1: The graduates shall exhibit their professional knowledge in the field of Electronics and S/W areas.

PEO2: The graduates shall demonstrate their research skills in multidisciplinary environment and in higher studies.

PEO3: The graduates shall emerge as a potential entrepreneur and contribute to the development of the society.

Program Specific Outcome

PSO1: Electronic System Development: Develop real time applications using Printed Circuit Board and Integrated Circuits.

PSO2: Communication System Development: Develop Communication Systems and applications using IoT, Artificial Intelligence and Machine Learning algorithms.

Sample Course Outcomes

Name of The Course	Electronic Devices and Circuits			
Course Code	BECE2015			
	L	T	P	C
	3	0	0	3

Course Objectives

To acquaint the students with the construction, theory and operation of the basic electronic devices such as PN junction diode, Bipolar and Field effect Transistors, Power control devices, LED, LCD and other Opto-electronic devices

Course Outcomes

CO1	Realize the transistor biasing methods and Design analog electronic circuits using discrete components
CO2	Design common amplifier circuits and analyze the amplitude and frequency responses
CO3	Design various analog circuits to analyze their responses
CO4	Understand the principle of operation of different Oscillator circuits.
CO5	Understand the principle of operation of various amplifier circuits
CO6	Understand the recent trends and practical applicationsof electronic devices

Course Content:

Unit-1 Introduction	8 hours
BJT and BJT Biasing .Hybrid models of CE, CB, CC, configurations – Study of the effect of emitter by-	

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pass condenser at low frequencies - Hybrid – π common emitter transistor model – hybrid π conductance and capacitance – CE short circuit current gain – current gain with resistive load – gain bandwidth product – Study of the effect of un bypassed emitter resister on amplifier performance, Cascode amplifier. HF & LF compensation of RC coupled amplifier. Multistage Amplifiers.
Unit-2FET and FET Biasing8 hours
FET and FET Biasing. FET Amplifiers: Common source, Common gate and Common drain Amplifiers – problems. Small signal analysis of FET Amplifiers. High Frequency analysis of FET Amplifiers, VMOS & CMOS Concepts.
Unit-3Feedback amplifiers 8 hours
The feedback concept – Transfer gain with feedback – general characteristics and advantages of negative feedback– analysis of voltage series, Voltage shunt, current series and current shunt feedback amplifiers – Study of the effect of Negative feedback on Gain, Bandwidth, Noise, Distortion, Input and Output impedances with the help of Block Schematic and Mathematical Expressions
Unit-4Oscillators 8 hours
Sinusoidal oscillators –phase shift oscillator – Wien bridge oscillator – Hartley oscillator – Colpits oscillator – frequency stability, inclusive of design, Crystal oscillators.
Unit-5Tuned amplifiers 8 hours
Characteristics of Tuned amplifiers – Analysis of Single tuned, Doubled tuned and stagger tuned amplifiers, Gain – bandwidth product – High frequency effect – neutralization. Power Amplifiers: Classification of amplifiers – class A large signal amplifiers – second harmonic distortion – higher order harmonic generations – computation of Harmonic distortion – Transformer coupled audio power amplifier – efficiency – push - pull amplifier – class B amplifier – class AB operation – Push-Pull circuit with Transistors of Complimentary Symmetry.
Unit-6 Recent trends and Application 8 hours
Trend of Energy Saving in Electronic Devices, Application of oscillators- springs and damping, shock absorber in cars, Pendulum

Suggested Reading

1. 1.Jacob. Millman, Christos C.Halkias, 'Electronic Devices and Circuits', Tata McGraw Hill Publishing Limited, New Delhi, 2008, ISBN 0070634556, 9780070634558.
2. Jacob Millman and C. Halkias, 'Integrated Electronics – Analog and Digital Circuits and Systems', Tata Mc Graw Hill, 2001, ISBN 0074622455, 9780074622452
3. Electronic Devices & Circuits Theory – Robert Boylestad and Louis Nashelsky, 10th EditionPrentice Hall, 2009, ISBN 0135026490, 9780135026496

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