Department of Electrical and Electronics

New course introduced

SL. NO.	COURSE CODE	COURSE OFFERED
1	SEE1616	Embedded systems and IOT
2	SEEA1201	Circuit Theory

SEE1616	Embedded systems and IOT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand fundamentals of IoT and embedded system including essence, basic design strategy and process modeling.
- To develop comprehensive approach towards building small low cost embedded IoT system.
- To learn real world application scenarios of IoT along with its societal and economic impact using case studies

UNIT 1 INTRODUCTION TO EMBEDDED SYSTEM AND IOT **9 Hrs.**

Introduction to embedded systems, Application Areas ,Categories of embedded systems, Overview of embedded system architecture, Specialties of embedded systems, recent trends in embedded systems, Introduction to ARM processor and its architecture. Internet Of Things Promises–Definition– Scope–Sensors, IoT Applications–Structure of IoT– IoT Map Device ; IoT Sensors-Characteristics-types. IoT Issues and Challenges, Applications.

UNIT 2 EMBEDDED IoT PLATFORM DESIGN METHODOLOGY **9 Hrs.**

Purpose and requirement specification, Process specification, Domain model specification, information model specification, Service specifications, IoT level specification, Functional view specification, Operational view specification, Device and component integration, Application development.

UNIT 3 PILLARS OF EMBEDDED IoT AND PHYSICAL DEVICES **9 Hrs.**

The internet of devices, The internet of objects, The internet of transducer, o The internet of controllers, Device to Connect and Manage, talk, Connect. Network, Basic building blocks of and IoT device, Exemplary device: Raspberry Pi, Raspberry Pi interfaces, Programming Raspberry Pi with Python, ▪ Beagle board and other IoT Devices.

UNIT 4 WEB OF THINGS AND CLOUD OF THINGS **9 Hrs.**

Web of Things versus Internet of Things, Two Pillars of the Web, Architecture Standardization for WoT, Cloud of Things: Grid/SOA and Cloud Computing, Cloud Middleware, Cloud Standards – Cloud Providers and Systems, Mobile Cloud Computing, The Cloud of Things Architecture.

UNIT 5 IoT CLOUD OFFERINGS AND IoT CASE STUDIES **9 Hrs.**

Introduction to Cloud Storage Models, Communication API, Amazon Web Services for IoT, Skynet IoT Messaging Platform. Case Studies: Home Intrusion Detection, Weather Monitoring System, Air Pollution Monitoring, Smart Irrigation, Energy Harvesting.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 - Understand the basic concepts of embedded systems and IoT.
CO2 - Apply the design methodology for embedded IoT Platform.
CO3 - Develop programs using Python for Raspberry Pi.
CO4 - Comprehend web of things and cloud of things.
CO5 - Implement IoT Cloud Offerings for
CO6 - Solve the given societal challenge using IoT

TEXT / REFERENCE BOOKS

1.Adrian McEwen and Hakim Cassimally, ―Designing the Internet of Things‖, John Wiley and Sons Ltd, UK, 2014.
2.Vijay Madisetti, Arshdeep Bahga, ―Internet of Things (A Hands-on Approach), Universities Press, 2015.
3.Dieter Uckelmann, Mark Harrison, Florian Michahelles, ―Architecting the Internet of Things‖, Springer, New York, 2011.
4.John H. Davies, ―MSP430 Microcontroller Basics‖, First Edition, Newnes Publication. 2010.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks:100 **Exam Duration:3 Hrs.**

PART A: 10 Question of 2 marks each – No choice **20 Marks**
PART B: 2 Questions from each unit of internal choice; each carrying 16 marks **80 Marks**

SEEA1201	CIRCUIT THEORY	L	T	P	Credits	Total Marks
		3	*	0	3	100

COURSE OBJECTIVES

- To impart sound knowledge in the analysis of electrical circuits.
- To educate the phasor concepts in A.C circuits.
- To introduce the knowledge of resonance and transients.
- To impart knowledge of tuned circuits.

UNIT 1 D.C.CIRCUITS **9 Hrs.**

Electrical quantities, Ohm's Law, Resistors - Series and parallel combinations, Current Division rule, Voltage Division rule, Source transformation - Kirchhoff's laws, Nodal and Mesh Analysis, Star Delta Transformation.

UNIT 2 SINGLE PHASE AC CIRCUITS **9 Hrs.**

Sinusoidal Functions - RMS(effective) and Average Values - Phasor Representation - J operator – Sinusoidal Excitation Applied to Purely Resistive - Inductive and Capacitive Circuits - RL - RC and RLC Series and Parallel Circuits- Power and Power Factor.

UNIT 3 THREE PHASE AC CIRCUITS **9 Hrs.**

Analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced & unbalanced – phasor diagram of voltages and currents – power measurement in three phase circuits.

UNIT 4 TRANSIENT RESPONSE ANALYSIS **9 Hrs.**

Time Domain Analysis - Transient response of RL, RC & RLC Networks with DC Input and Sinusoidal AC input.

UNIT 5 RESONANCE AND COUPLED CIRCUITS **9 Hrs.**

Series and Parallel resonance - Quality factor and Bandwidth - Self and mutual inductance – Coefficient of coupling – Tuned circuits – Single tuned circuits.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 - Understand the basis and able to analyze D.C Circuits.
CO2 - Determine the Electrical Parameters in a single phase A.C Circuits.
CO3 - Solve three phase A.C Circuits.
CO4 - Analyze the Circuit performance in Steady State and Transient State.
CO5 - Determine the quality factor, series and parallel resonance condition for an A.C circuit.
CO6 - Analyze single tuned circuits.

TEXT / REFERENCE BOOKS

1. Mittle B.N., Aravind Mittle, "Basic Electrical Engineering", Tata McGraw Hill", 2nd Edition, July 2017.
2. Charles Alexander, Mathew Sadiku,"Fundamentals of Electric Circuits", Tata McGraw Hill, 6th Edition, 2017.
3. Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", PHI Learning Private Ltd, 2nd Edition, 2010.
4. Abhijit Chakrabarti, Sudiptanath & Chandan Kumar Chanda, "Basic Electrical Engineering", Tata McGraw Hill, 1st Edition, 2010.
5. Wadhwa C.L., "Basic Electrical Engineering", New Age International, 4th Edition, 2007, Reprint June 2010.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100 **Exam Duration: 3 Hrs.**

PART A: 10 Question of 2 marks each – No choice **20 Marks**
PART B: 2 Questions from each unit of internal choice; each carrying 16 marks **80 Marks**