ANNAMACHARYA UNIVERSITY

(ESTD UNDER AP PRIVATE UNIVERSITIES (ESTABLISHMENT AND REGULATION) ACT, 2016)

(UNIVERSITY LISTED IN UGC AS PER THE SECTION 2(f) OF THE UGC ACT, 1956)

RAJAMPET, Annamayya District, AP – 516126

Department of Electrical and Electronics Engineering

EEE Computer Lab



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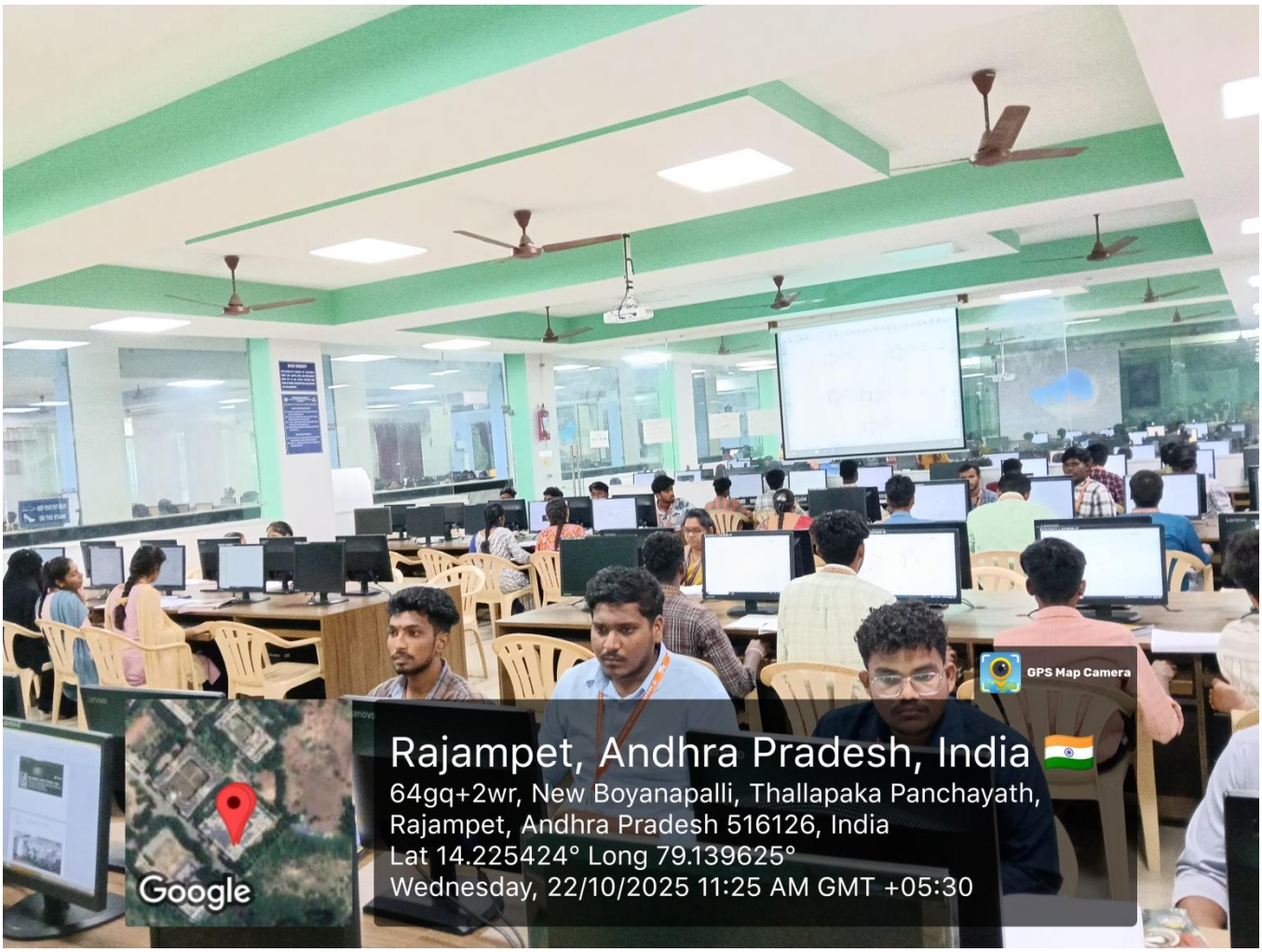

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EEE Computer Lab

Description of Lab

The **Electrical and Electronics Engineering (EEE) Computer Laboratory** is well-equipped with modern computer systems and software tools essential for simulation, analysis, and design in the field of electrical engineering. The lab provides students with hands-on experience in various areas such as electrical circuit simulation, power system analysis, Analog and Digital circuits Simulation, PCB simulation and MATLAB-based programming.

It is equipped with high-performance computers, internet connectivity, and licensed software like **MATLAB/Simulink, Ni-Multisim ,**which help students and researchers perform modeling and simulation of electrical networks and machines. The lab also facilitates project work, research, and training in emerging technologies related to electrical engineering.

Key Experiments Include:

Electrical and Electronics Simulation Lab:

1. Simulation of Thevenin's& Maximum Power Transfer Theorem.
2. Simulation of Compensation Theorem and Superposition Theorem.
3. Simulation of DC circuits:
   a). DC Transfer function
   b). DC Sweep Analysis
4. Magnetization characteristics of DC Shunt generator using Simulation.
5. Load Test on DC Series Motor using Simulation.
6. Load characteristics of DC Shunt Generator Using Simulation.
7. Simulation of Two port Network parameters.
8. Study of Series Resonance using Simulation.
9. Study of Logic gates AND, OR, NOT and Universal gates.
10. Determination of average value, RMS value, form factor and peak factor of sinusoidal and square waveforms using Simulation.
11. Measurement of ripple factor of Half Wave Rectifier and Full Wave Rectifier.
12. Simulation of Lowpass and High pass passive filter.
13. Generation and operation of continuous time signals.
14. Simulation of PN Junction and Zener Diode characteristics.
15. Simulation of input and output characteristics of transistor in CE configuration.
16. Simulation of Drain and Transfer characteristics of JFET.

PCB Lab:

1 .PCB design and fabrication
2. Design PCB layout for regulator circuit using 7805
3. Design PCB layout for inverting amplifier using op-amp
4. Design PCB layout for full-wave rectifier
5. Design PCB layout for a stable multivibrator using IC555
6. Design PCB layout for R-C phase shift oscillator using BJT
7. Design PCB layout for full adder circuit
8. Design PCB layout for R-S flip flop with logic Circuit
9. Design PCB layout for four-bit comparator
10 .Design PCB layout for flashing LED using 555 Timer IC
11. Design PCB layout for automatic street light controller using LDR & Transistor
12. Design PCB layout for two way traffic light controller using 555 timers

Analog & Digital Circuits Lab:

1. RC-Phase shift Oscillator
2. Hartley/ Colpitts Oscillator
3. CB & CE Characteristics
4. Design and realization of Comparator.
5. Non-Linear Wave Shaping-Clipper and Clampers
6. Design an Adder and Subtractor circuits
7. Op-Amp application- LPF, HPF (First order)
8. IC 555-Timer- Monostable / Astable operation circuit.
9. Generation of clock using NAND / NOR gates
10. Three-Bit DAC/ADC using Op-Amp
11. Design of Encoders
12. Design of Decoder
13. Design Multiplexer/Demultiplexer
14. Design of Flip-Flops

Tinkering lab:

1) Make your own parallel and series circuits using breadboard for any application of your choice.
2) Demonstrate a traffic light circuit using breadboard.
3) Build and demonstrate automatic Street Light using LDR.
4) Simulate the Arduino LED blinking activity in Tinkercad.
5) Build and demonstrate an Arduino LED blinking activity using Arduino IDE.
6) Interfacing IR Sensor and Servo Motor with Arduino.
7) Blink LED using ESP32.
8) LDR Interfacing with ESP32.
9) Control an LED using Mobile App.
10) Design and 3D print a Walking Robot
11) Design and 3D Print a Rocket.
12) Build a live soil moisture monitoring project, and monitor soil moisture levels of a remote plan in your computer dashboard.
13) Demonstrate all the steps in design thinking to redesign a motor bike.

Power System Simulation Lab:

1. Performance of Short/Medium Transmission Lines using Simulation
2. Computation of parameters and modeling of Long Transmission Lines using Simulation
3. Determination of GMD and GMR of a Transmission Line using Simulation
4. Formation of Admittance matrix using Direct Inspection method in Simulation
5. Formation of Impedance matrix using Zbus Building Algorithm in Simulation
6. Gauss Seidal method of Load Flow Analysis using Simulation
7. Newton Raphson method of Load Flow Analysis using Simulation
8. Decouple method of Load Flow Analysis using Simulation
9. Short Circuit Analysis for LG and LL faults using Simulation
10. Short Circuit Analysis for DLG and symmetrical faults using Simulation
11. Transient Stability Analysis of SMIB system using Equal Area Criteria in Simulation
12. Transient Stability Analysis of SMIB system using Swing equation in Simulation
13. Simulation of Power Quality Problems (Voltage Sag and Swell, Harmonics, Transients)
14. Simulation Program to find the optimum loading of generators neglecting transmission losses
15. Simulation Program to find the optimum loading of generators with penalty factor

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IOT using Arduino and Node MCU:

1. Design and run the experiment with single LED and Tri colour LED
2..Display the text message in 16x2 I2C LCD Display Using Arduino Uno
3. Write a program to increase count on LCD I2C when push button was pressed .
4. Display digits 0 to 9 in seven segment LCD display Arduino Uno.
5. Control the brightness of LED by varying the duty cycle using Arduino UNO.
6. Display the temperature and humidity using DHT11 sensor.
7. Study about ESP8266-01 Wi-Fi module pin diagram and Library installation.
8. Write a program to upload temperature and humidity values from the DHT11 sensor in Thing Speak platform.
9. Measure temperature and humidity using Node MCU and DHT11 sensor in Blynk Cloud
10. Measure temperature and humidity using Node MCU and DHT11 sensor in Arduino IoT Cloud.

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EEE Cmputer Lab
Total Lab Cost

Item No.	Name of the Equipment/Machine/Instrument	Total Cost (In Rupees)
1.	**Desk top Systems**	**21,86,480.00**
2.	**Printer**	**14649.99**
3.	**Projector**	**37120.00**
4.	**UPS**	**1,57,000.00**
5.	**Battery**	**68,320.00**
6.	**Air Conditioners**	**1,35,000.00**

Total Cost: 25,98,569.99 (Rupees Twenty Five Lakhs Ninety Eight Thousand Five Hundred and Sixty Nine)

EEE Cmputer Lab
List of Equipment with Cost and Quantity

Item No.	Name of the Equipment/Machine/Instrument	Power Rating	Unit Cost (in Rupees)	No.of Units
1	**Desk top Systems**	250W	21,86,480.00	68
2	**Printer**	70W	14649.99	1
3	**Projector**	300W	37120.00	1
4	**UPS**	20KVA	1,57,000.00	1
5	**Battery**	629W	68,320.00	20
6	**Air Conditioners**	1.5KW	1,35,000.00	3

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RAJAMPET, Annamayya District, AP – 516126

Electrical and Electronics Simulation Lab

Syllabus

Title of the Course	Electrical and Electronics Simulation Lab
Category	ESC
Course Code	20A233L
Year	II
Semester	I
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1. To demonstrate theorems of electrical circuits
2. To evaluate DC machine‘s performance
3. To describe operation of Logic gates
4. To sketch diode, transistor and JFET characteristics
5. To analyze the operation of passive filters
6. To analyze continuous time signals

List of Experiments

S.NO	Name of Experiments
1	Simulation of Thevenin‘s& Maximum Power Transfer Theorem.
2	2. Simulation of Compensation Theorem and Superposition Theorem.
3	3. Simulation of DC circuits: a). DC Transfer function b). DC Sweep Analysis
4	Magnetization characteristics of DC Shunt generator using Simulation.
5	Load Test on DC Series Motor using Simulation.
6	Load characteristics of DC Shunt Generator Using Simulation.
7	Simulation of Two port Network parameters.
8	Study of Series Resonance using Simulation.
9	Study of Logic gates AND, OR, NOT and Universal gates.

10	Determination of average value, RMS value, form factor and peak factor of sinusoidal and square waveforms using simulation
11	Measurement of ripple factor of Half Wave Rectifier and Full Wave Rectifier.
12	Simulation of Lowpass and High pass passive filter.
13	Generation and operation of continuous time signals.
14	Simulation of PN Junction and Zener Diode characteristics.
15	Generation and operation of continuous time signals.
16	Simulation of Drain and Transfer characteristics of JFET.

Course Outcomes:

At the end of the course, the student will be able to,

S.NO.	Name of Experiment	Blooms level of Learning
1.	Apply various theorems and verify practically using simulation software L4	L4
2.	Study of DC machines performance practically using simulation software L4	L4
3.	Experimentally analyze the two port network parameters using simulation software	L4
4.	Analyze the Phenomenon of Resonance using simulation software L4	L4
5.	Analyze the Diode, Transistor and JFET characteristics using simulation software L3	L3
6.	Study of various logic gates using simulation software L4	L4
7.	Analyze the passive filters and continuous time signals using simulation software	L3

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative team	Communication	Project management and finance	Life-long learning	PSO1	PSO2
CO1	3	3	3	-	3	-	-	-	-	-	3	-	3
CO2	3	3	3	-	3	-	-	-	-	-	3	-	3
CO3	3	3	3	-	3	-	-	-	-	-	3	-	3
CO4	3	3	3	-	3	-	-	-	-	-	3	-	3
CO5	3	3	3	-	3	-	-	-	-	-	3	-	3
CO6	3	3	3	-	3	-	-	-	-	-	3	-	3
CO7	3	3	3	-	3	-	-	-	-	-	3	-	3

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RAJAMPET, Annamayya District, AP – 516126

Analog & Digital Circuits Lab

Syllabus

Title of the Course	Analog & Digital Circuits Lab
Category	PCC
Course Code	23A0252L
Year	III
Semester	I
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

1.To analysis of transistor-based amplifiers

2. To generate different types of non-sinusoidal signals

3. To verify the applications of Op-Amp

4. To analysis of various combinational and sequential logic circuits

List of Experiments:

S.NO	Name of Experiments
1	RC-Phase shift Oscillator
2	Hartley/ Colpitts Oscillator
3	CB & CE Characteristics
4	Design and realization of Comparator.
5	Non-Linear Wave Shaping-Clipper and Clampers
6	Design an Adder and Subtractor circuits
7	Op-Amp application- LPF, HPF (First order)
8	IC 555-Timer- Monostable / Astable operation circuit.
9	Generation of clock using NAND / NOR gates
10	Three-Bit DAC/ADC using Op-Amp
11	Design of Encoders

12	Design of Decoder
13	Design Multiplexer/Demultiplexer
14	Design of Flip-Flops

Course Outcomes:

At the end of the course, the student will be able to Blooms Level of Learning

1.	Design of Amplifiers with its frequency response	L5
2.	Design of oscillators with its frequency response	L5
3.	Analysis of wave shaping circuits	L4
4.	Discuss the applications of Op-Amp and Timer	L3
5.	Analysis of various combinational and sequential logic circuits	L4

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative team	Communication	Project management and finance	Life-long learning	PSO1	PSO2
CO1	3	2	2	2	2	1	-	-	1	-	-	-	3
CO2	3	2	2	-	2	1	-	-	1	-	-	-	3
CO3	3	1	1	-	2	1	-	-	1	-	-	1	3
CO4	3	2	2	2	2	1	-	-	1	-	-	1	2
CO5	3	2	2	2	2	1	-	-	1	-	-	1	2

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PCB Design with EAGLE
Syllabus

Title of the Course	PCB Design with EAGLE
Category	SC
Course Code	20A235L
Year	II
Semester	I
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	2	2

Course Objectives:

1. To explain various numerical methods to solve algebraic and transcendental equation and interpolation
2. To introduce various numerical methods for evaluating definite integrals and numerical solution of ordinary differential equations
3. To describe the measures of central tendency.
4. To introduce the basic concepts of probability theory.
5. To elucidate probability distribution for solving problems in engineering**.**

List of Experiments:

S.NO	Name of Experiments
1	PCB design and fabrication
2	Design PCB layout for regulator circuit using 7805
3	Design PCB layout for inverting amplifier using op-amp
4	Design PCB layout for full-wave rectifier
5	Design PCB layout for a stable multivibrator using IC555
6	Design PCB layout for R-C phase shift oscillator using BJT
7	Design PCB layout for full adder circuit
8	Design PCB layout for R-S flip flop with logic circuit
9	Design PCB layout for four-bit comparator
10	Design PCB layout for flashing LED using 555 timer IC
11	Design PCB layout for automatic street light

Course Outcomes:

At the end of the course, the student will be able to Blooms Level of Learning

1.	Summarize the steps involved in schematic, layout, fabrication and assembly	L2
2.	Design a circuit and create a schematic Capture	L5
3.	Design (schematic and layout) and fabricate PCB for simple circuits.	L5
4.	Summarize the concept of developing copper clad PCB	L2
5.	Summarize the concept of copper clad PCB Etching process and soldering	L2

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative team	Communication	Project management and finance	Life-long learning	PSO1	PSO2
CO1	3	3	3	-	3	3	-	-	-	-	-	3	3
CO2	3	3	3	-	3	-	-	-	-	-	-	3	3
CO3	3	3	3	3	3	3	-	-	-	-	-	3	3
CO4	3	3	3	3	3	3	-	-	-	-	-	3	3
CO5	3	3	3	3	3	3	-	-	-	-	-	3	3

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Tinkering Lab
Syllabus

Title of the Course	**Tinkering Lab**
Category	PCC
Course Code	**25A0253L**
Year	III
Semester	I
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	2	1

Course Objectives:

Encourage Innovation and Creativity

- Provide Hands-on Learning and Impart Skill Development
- Foster Collaboration and Teamwork
- Enable Inter disciplinary Learning, Prepare for Industry and Entrepreneurship
- Impart Problem-Solving mind-set

List of Experiments

S.NO	Name of Experiments
1	Make your own parallel and series circuits using breadboard for any application of your choice.
2	Demonstrate a traffic light circuit using breadboard.
3	Build and demonstrate automatic Street Light using LDR.
4	Simulate the Arduino LED blinking activity in Tinkercad.
5	Build and demonstrate an Arduino LED blinking activity using Arduino IDE.
6	Interfacing IR Sensor and Servo Motor with Arduino.
7	Blink LED using ESP32.
8	LDR Interfacing with ESP32.
9	Control an LED using Mobile App.

10	Design and 3D print a Walking Robot
11	Design and 3D Print a Rocket.
12	Build a live soil moisture monitoring project, and monitor soil moisture levels of a remote plan in your computer dashboard
13	Demonstrate all the steps in design thinking to redesign a motor bike.

Course Outcomes:

The students will be able to experiment, innovate, and solve real-world challenges. These labs bridge the gap between academia and industry, providing students with the practical experience. Some students may also develop entrepreneurial skills, potentially leading to start-ups or innovation-driven careers. Tinkering labs aim to cultivate the next generation of engineers by giving them the tools, space, and mind-set to experiment, innovate, and solve real-world challenges.

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative team	Communication	Project management and finance	Life-long learning	PSO1	PSO2
CO1	3	3	3	2	3	2	1	-	-	1	2	3	2
CO2	3	3	3	2	1	2	1	-	-	1	2	2	2
CO3	3	3	3	2	1	2	1	-	-	1	2	2	2
CO4	2	3	3	3	3	2	1	-	-	1	2	2	2
CO5	2	3	3	3	3	2	1	-	-	1	2	2	2

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Power System Simulation Lab:
Syllabus

Title of the Course	Power System Simulation Lab
Category	PCC
Course Code	20A261L
Year	III
Semester	II
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
0	0	3	1.5

Course Objectives:

- To analyze the efficiency, regulation and stability of transmission system.
- To enable the students to know about different load flow techniques and fault analysis.
- To acquire the knowledge on formation of bus impedance and bus admittance matrices.
- To study the Ferranti effect and optimum loading of generators.

List of Experiments:

S.NO	Name of Experiments
1	Performance of Short/Medium Transmission Lines using Simulation
2	Computation of parameters and modeling of Long Transmission Lines using Simulation
3	Determination of GMD and GMR of a Transmission Line using Simulation
4	Formation of Admittance matrix using Direct Inspection method in Simulation
5	Formation of Impedance matrix using Zbus Building Algorithm in Simulation
6	Gauss Seidal method of Load Flow Analysis using Simulation
7	Newton Raphson method of Load Flow Analysis using Simulation
8	Decouple method of Load Flow Analysis using Simulation
9	Short Circuit Analysis for LG and LL faults using Simulation
10	Short Circuit Analysis for DLG and symmetrical faults using

	Simulation
11	Transient Stability Analysis of SMIB system using Equal Area Criteria in Simulation
12	Transient Stability Analysis of SMIB system using Swing equation in Simulation
13	Simulation of Power Quality Problems (Voltage Sag and Swell, Harmonics, Transients)
14	Simulation Program to find the optimum loading of generators neglecting transmission losses
15	Simulation Program to find the optimum loading of generators with penalty factor

Course Outcomes:

At the end of the course, the student will be able to Blooms Level of Learning

1.	Analyze the efficiency, regulation and stability of transmission system	L4
2.	Describe the formation of Admittance and Impedance matrices	L3
3.	Analyze Load Flow analysis of transmission systems	L4
4.	Evaluate Symmetrical and unsymmetrical faults	L6
5.	Estimate optimum loading of generators and study of Ferranti effect	L6

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative team	Communication	Project management and finance	Life-long learning	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	3	-	-	-	3
CO2	3	3	3	3	3	-	-	-	3	-	-	-	3
CO3	3	3	3	3	3	-	-	-	3	-	-	-	3
CO4	3	3	3	3	3	-	-	-	3	-	-	-	3
CO5	3	3	3	3	3	-	-	-	3	-	-	-	2

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IOT using Arduino and Node MCU

Syllabus

Title of the Course	IOT using Arduino and Node MCU
Category	SC
Course Code	20A271L
Year	IV
Semester	I
Branch	EEE

Lecture Hours	Tutorial Hours	Practice Hours	Credits
1	0	2	2

Course Objectives:

- To impart knowledge on Hardware Architecture of Arduino & Node MCU
- To impart knowledge on Programming Tools of Arduino
- To impart knowledge on Internet of Things

List of Experiments

S.NO	Name of Experiments
1	Design and run the experiment with single LED and Tri colour LED
2	Display the text message in 16x2 I2C LCD Display Using Arduino Uno
3	Write a program to increase count on LCD I2C when push button was pressed .
4	Display digits 0 to 9 in seven segment LCD display Arduino Uno.
5	Control the brightness of LED by varying the duty cycle using Arduino UNO.
6	Display the temperature and humidity using DHT11 sensor.
7	Study about ESP8266-01 Wi-Fi module pin diagram and Library installation.
8	Write a program to upload temperature and humidity values from the DHT11 sensor in Thing Speak platform.

9	Measure temperature and humidity using Node MCU and DHT11 sensor in Blynk Cloud
10	Measure temperature and humidity using Node MCU and DHT11 sensor in Arduino IoT Cloud.

Course Outcomes:

At the end of the course, the student will be able to,

S.NO.	Name of Experiment	Blooms level of Learning
1.	Design hardware and software for specific application using Arduino	L5
2.	Recognize various devices, sensors and applications L1	L1
3.	Summarize general concepts of Internet of Things (IoT) L2	L2
4.	Design hardware and software for specific application using Node MCU L5	L5
5.	Create IoT solutions using sensors, actuators and Devices	L5

CO-PO Mapping:

Course Outcomes	Engineering Knowledge	Problem Analysis	Design/Development of solutions	Conduct investigations of	Engineering tool usage	The engineer and the world	Ethics	Individual and collaborative team	Communication	Project management and finance	Life-long learning	PSO1	PSO2
CO1	3	3	3	-	3	3	-	-	-	-	-	3	3
CO2	3	3	3	-	3	-	-	-	-	-	-	3	3
CO3	3	3	3	-	3	3	-	-	-	-	-	3	3
CO4	3	3	3	3	3	3	-	-	-	-	-	3	3
CO5	3	3	3	3	-	-	-	-	-	-	-	3	3

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List of Experiments Beyond Syllabus

Electrical and Electronics Simulation Lab:

S.No.	Name of the Experiment
1	Simulation of Power Factor Improvement using Capacitor Bank.
2	Simulation of OC and SC tests on a single-phase transformer
3	Simulation of Drain and Transfer Characteristics of MOSFET
4	Speed control of DC motor by armature voltage and field flux control methods.
5	Simulation of Input and Output Characteristics of a Transistor in CB and CC configuration
6	Clipping and Clamping circuits using diodes**.**

PCB Lab:

S.No.	Name of the Experiment
1	Buck (step-down) DC-DC Converter (PWM + Inductor)
2	Boost Converter (LED driver / 12V → higher)
3	Adjustable Linear Regulator with Thermal Protection
4	Low-Noise Audio Preamplifier + Tone Control (Op-amps)
5	Microcontroller System on PCB: AVR/STM32 Development Board (Minimal)
6	Temperature Control (Sensor + PWM Fan)

Analog & Digital Circuits Laboratory:

S.No.	Name of the Experiment
1	Instrumentation Amplifier using Op-Amps .
2	Active Band-Pass and Band-Stop Filters using Op-Amps.
3	Schmitt Trigger using Op-Amp
4	Precision Rectifier (Super Diode) using Op-Amp
5	Amplitude Modulation and Demodulation using analog circuits.
6	Sample and Hold Circuit using Op-Amp.
7	Waveform Generator (Square, Triangular, Sawtooth) using Op-Amp or 555 timer

Tinkering Lab:

S.No.	Name of the Experiment
1	Smart Home Automation System
2	Gesture-Controlled Robot
3	Obstacle Avoiding Robot with ESP32
4	Smart Parking System
5	Automated Plant Watering System with IoT
6	Smart Energy Meter
7	Automated Pet Feede

Power System Simulation Lab:

S.No.	Name of the Experiment
1	Fast Decoupled Load Flow (FDLF) Method using simulation.
2	Comparison of Load Flow Methods (Gauss-Seidel, Newton-Raphson, Fast Decoupled).
3	Three-Phase Fault Analysis at different locations in a multi-bus system.
4	Unsymmetrical Fault Analysis using symmetrical components in MATLAB/Simulink or ETAP.
5	Contingency Analysis – Study of system performance under line outage conditions.
6	Voltage Stability Analysis using P–V and Q–V curves.
7	Reactive Power Compensation using Static VAR Compensator (SVC) model.
8	Economic Load Dispatch using Lambda-Iteration Method (with and without transmission losses).
9	Economic Dispatch using Newton-Raphson and Gradient Methods.
10	Unit Commitment Problem using Dynamic Programming technique.
11	Optimal Power Flow (OPF) analysis using MATLAB Power System Toolbox.
12	Simulation of Automatic Generation Control (AGC) in a two-area system

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IOT using Arduino and Node MCU:

S.No.	Name of the Experiment
1	Measure Air Quality using MQ135 Sensor and display CO2 and smoke levels on LCD and ThingSpeak.
2	Water Level Detection System using Ultrasonic Sensor and display on LCD & Blynk.
3	Soil Moisture Monitoring System using Soil Sensor and automate motor control.
4	Smart Dustbin System using Ultrasonic Sensor and Servo Motor.
5	Gas Leakage Detection and Alert System using MQ2 Sensor with Buzzer and SMS alert.
6	Motion Detection using PIR Sensor with LED indication and message on LCD.
7	Fire Detection and Alert System using Flame Sensor and GSM module.
8	Rain Detection System using Rain Sensor and display status on LCD.
9	Sound Level Meter using Microphone Sensor and LED bar graph.

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Out of Box Experiments

Electrical and Electronics Simulation Lab:

1. Smart Power Supply Design using Zener and Op-Amp Voltage Regulators.
2. Temperature-Dependent Automatic Fan Control Circuit (using Simulation).
3. Simulation of Light-Controlled Switch using LDR and Transistor.
4. Battery Charging and Cut-Off Circuit Simulation
5. Simulation of Fire or Smoke Detection Circuit
6. Automatic Room Light Controller using Logic Gates and Sensors
7. Digital Voltage Level Indicator using Comparator and Logic Gates
8. Simulation of an Electronic Voting Machine
9. Simulation of Traffic Light Control System using Digital Logic
10. Automatic Water Level Controller using Logic Gates and Op-Amp Comparator

Analog & Digital Circuits Lab:

1. RC Phase-Shift Oscillator
2. Hartley / Colpitts Oscillator
3. CB & CE Characteristics (Transistor characteristics)
4. Design an Adder and Subtractor Circuits
5. IC 555 Timer — Monostable / Astable
6. Generation of Clock using NAND / NOR gates.
7. Three-Bit DAC/ADC using Op-Amp

PCB Lab:

1. Design PCB Layout for IoT-Based Temperature and Humidity Monitor using ESP32 and DHT11
2. Design PCB Layout for Smart Home Automation System using Wi-Fi Module (ESP8266)
3. Design PCB Layout for Digital Dice Game Circuit using 555 Timer and 7-Segment Display
4. Design PCB Layout for Touch Sensor Controlled Light using NE555 and Touch Sensor Module
5. Design PCB Layout for Smart Door Lock System using RFID and Arduino Nano
6. Design PCB Layout for Soil Moisture-Based Automatic Irrigation System
7. Design PCB Layout for Burglar Alarm System using LDR and Buzzer
8. Design PCB Layout for Fire Detection and Alarm System using Temperature Sensor and Comparator
9. Design PCB Layout for Sound-Activated LED Flasher using Microphone Sensor and Transistor

10. Design PCB Layout for Bluetooth Controlled LED Board using HC-05 and Arduino
11. Design PCB Layout for Solar Battery Charger Circuit using LM317 Voltage Regulator
12. Design PCB Layout for Over Voltage and Under Voltage Protection Circuit

Tinkering Lab:

1. Smart Garbage Monitoring System
2. Solar-Powered Automatic Street Light with Weather Sensing
3. Gesture-Controlled Home Appliances**.**
4. Smart Mirror**.**
5. Voice-Controlled Wheelchair
6. Automated Pet Door
7. Fire and Smoke Detection Drone
8. IoT-Based Smart Aquarium
9. Energy Harvesting Circuit
10. Wearable Health Monitor

Power System Simulation Lab:

1. Simulation of Smart Grid Operation with Distributed Generation
2. Modeling and Analysis of a Microgrid under Variable Load Conditions
3. Dynamic Simulation of Renewable Energy Integration into Power Grid
4. Simulation of Solar PV System with MPPT Controller in MATLAB/Simulink
5. Wind Energy Conversion System Simulation using Doubly Fed Induction Generator (DFIG)
6. FACTS Device Implementation for Voltage Stability Enhancement (Using SSSC or UPFC)
7. Power Flow Analysis with Solar and Wind Hybrid System
8. Real-Time Simulation of Load Frequency Control using MATLAB
9. Voltage Stability Assessment using P–V and Q–V Curves
10. Simulation of Fault Ride-Through Capability of Grid-Connected Inverter
11. Harmonic Mitigation in Power Systems using Active Power Filters
12. Smart Load Management System using Demand Response Simulation
13. Automatic Generation Control in Two-Area Power System using PID Controller
15. Optimal Power Flow with Renewable Energy Sources using Genetic Algorithm
16. Simulation of Dynamic Reactive Power Compensation using STATCOM

IOT using Arduino and Node MCU:

1. Smart Mirror using NodeMCU
2. IoT-Based Smart Dustbin
3. Voice-Controlled Home Automation (Google Assistant + NodeMCU).
4. Smart Plant Monitoring System
5. Smart Traffic Light System
6. IoT-Based Fire and Gas Detection System
7. Smart Attendance System
8. Weather Forecast Station
9. Smart Parking System
10. IoT-Based Energy Monitoring

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EEE Computer Lab

Scope of research

The EEE Computer Laboratory offers extensive opportunities for research and innovation in various domains of Electrical and Electronics Engineering. Students and faculty can carry out simulation-based studies, modeling, and analysis to develop advanced electrical systems and technologies.

The major research scopes include:

- Power System Analysis and Optimization – Load flow studies, fault analysis, stability analysis, and smart grid modeling.
- Control Systems and Automation – Design and simulation of modern control strategies using MATLAB/Simulink.
- Renewable Energy Systems – Modeling and performance analysis of solar, wind, and hybrid energy systems.
- Electrical Machines and Drives – Simulation of electric drives, motor control, and performance evaluation.
- Power Electronics and Converters – Design and analysis of converters, inverters, and energy-efficient systems.
- Artificial Intelligence in Power Systems – Application of machine learning and optimization algorithms for system monitoring and fault prediction.