GOVERNMENT OF RAJASTHAN
BOARD OF TECHNICAL EDUCATION RAJASTHAN JODHPUR

SEMESTER SCHEME-2020-21

V SEMESTER
(SESSION 2021-2022 & ONWARDS)

EMBEDDED SYSTEMS

Course Code	EL 5001(Same as EF/ER 5001)
Course Title	Embedded Systems
Number of Credits	4 (L-4, T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT I –

1.1   Embedded C basics operators for Arduino
1.2   Familiarizing with the Arduino IDE
1.3   Sketch designing for Arduino Communication interfaces using serial port
1.4   Basic understanding of the code with Boolean operations, pointer access operations, bitwise operations, compounded operations.

UNIT II –

2.1   Embedded C control structure blocks
2.2   looping mechanism – for, do and while
2.3   The branching operations based on conditions expression

UNIT III

3.1   Introduction to Arduino Mega
3.2   Arduino Mega specifications including power ratings, digital and analog peripherals.
3.3   Difference between the C language and Embedded C language
3.4   Arduino Mega Ports, Pins, Digital and Analog Peripherals

UNIT IV

4.1   Communication with Arduino
4.2   Different communication modules available with their real-life application Communication interface

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Arduino Projects For Dummies (For Dummies Series) Kennedy George; Davis Bernard; Prasanna SRM Wiley (5 July 2013) ISBN: 978-1118551479

2. Make: Getting Started With Arduino : The Open Source Electronics Prototyping Platform Massimo Banzi and Michael Shiloh Shroff/Maker Media; Third edition (27 December 2014) ISBN : 978-9351109075

SUGGESTED SOFTWARE/LEARNING WEBSITES:

https://www.arduino.cc/reference/en/
https://learn.adafruit.com/category/learn-arduino

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MOBILE AND WIRELESS COMMUNICATION

Course Code	EL 5002(Same as EF 5002)
Course Title	Mobile and Wireless Communication
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PC

COURSE CONTENTS:

UNIT I –
- 1.1 Overview of Cellular Systems
- 1.2 Evolution 2g/3G/4G/5G
- 1.3 Cellular Concepts – Frequency reuse, Co channel and Adjacent channel Interference

UNIT II –
- 2.1 Wireless propagation
- 2.2 Link budget, Free-space path loss, Noise figure of receiver
- 2.3 Multipath fading, Shadowing, Fading margin, shadowing margin

UNIT III
- 3.1 Antenna diversity,
- 3.2 wireless channel capacity
- 3.3 MIMO

UNIT IV
Overview of
- 4.1 CDMA
- 4.2 OFDM
- 4.3 LTE

REFERENCES /SUGGESTED LEARNING RESOURCES:
1. Wireless Communications – Principles and Practice T. S. Rappaport, (2nd edition) Pearson ISBN 9788131731864
2. Modern Wireless Communications Haykin & Moher Pearson 2011 (Indian Edition) ISBN: 978-8131704431

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ECONOMIC POLICIES IN INDIA

Course Code	EL 51001(Common in all branches of Engg.)
Course Title	Economic Policies in India
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
CourseCategory	OE

COURSE LEARNING OBJECTIVES:

The objective of this course is to familiarize the students of different streams with the basic concepts, structure, problems and issues concerning Indian economy.

CO1	Understand Indian economics policy, planning strategies
CO2	It will enable to students to comprehend theoretical and empirical development across countries and region for policy purposes
CO3	Development Economics as a discipline encompasses different approach estotheproblemsofunemployment,poverty,incomegeneration,industrializationfromdifferentperspec-tives
CO4	Abletoidentifytheproblemsandcapabletodecidetheapplicationforfuturedevelopment
CO5	Analyzeeconomicissuesandfindsolutionstocomplexeconomicproblemsandtakecor-recteconomicjudgment

COURSE CONTENTS:

1. **BASIC FEATURES AND PROBLEMS OF INDIAN ECONOMY:**
    1.1.   Economic History of India;
    1.2.   Nature of Indian Economy
    1.3.   Demographic features and Human Development Index,
    1.4.   Problems of Poverty, Unemployment, Inflation, income inequality, Blackmoney in India.

2. **SECTORAL COMPOSITION OF INDIAN ECONOMY:**
    2.1.   Issues in Agriculture sector in India,
    2.2.   land reforms,
    2.3.   Green Revolution
    2.4.   agriculture policies of India,
    2.5.

3. **INDUSTRIAL DEVELOPMENT,**
    3.1.   Small scale and cottage industries,
    3.2.   Industrial Policy,
    3.3.   Public sector in India,
    3.4.   Service sector in India.

4. **ECONOMIC POLICIES:**
    4.1.   Economic Planning in India,
    4.2.   Planning commission v/s NITI Aayog,
    4.3.   Five Year Plans,
    4.4.   Monetary policy in India,
    4.5.   Fiscal Policy in India,
    4.6.   Centre state Finance Relations,
    4.7.   Finance commission in India
    4.8.   LPG policy in India

5. **EXTERNAL SECTOR IN INDIA**

     5.1.   India's foreign trade value composition and direction,
     5.2.   India Balance of payment since 1991,
     5.3.   FDI in India,
     5.4.   Impact of Globalization on Indian Economy,
     5.5.   WTO and India.

REFERENCE BOOKS:

1. Dutt Rudder and K.P.M Sunderam (2017). Indian Economy .S Chand & Co.Ltd. New Delhi.
2. Mishra S. K & V. K Puri (2017). Indian Economy and Its Development Experience. Himalaya Publishing House.
3. Singh, Ramesh, (2016): Indian Economy, Tata-McGraw Hill Publications, New Delhi.
4. Dhingra, I.C., (2017): March of the Indian Economy, Heed Publications Pvt. Ltd.
5. Karam Singh Gill, (1978): Evolution of the Indian Economy, NCERT, NewDelhi
6. Kaushik Basu (2007): The Oxford Companion to Economics of India ,Oxford University Press.

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ENGINEERING ECONOMICS & ACCOUNTANCY

Course Code	EL 51002(Common in all branches of Engg.)
Course Title	Engineering Economics & Accountancy
Number of Credits	3 (L:3,T:0,P:0)
Prerequisites	NIL
Course Category	OE

COURSE OBJECTIVES

•To acquire knowledge of basic economicst of a cilitate the process of economic decision making.
•To acquire knowledge on basic financial management aspects.
•To develop the basic skills to analyze financial statements.

COURSE OUTCOMES:

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

CO1	Understand the macro-economic environment of the business and its impact on enterprise
CO2	Understand cost elements of the product and its effect on decision making
CO3	Prepare accounting records and summarize and interpret the accounting data for managerial decisions
CO4	Understand accounting systems and analyze financial statements using ratio analysis
CO5	Understand the concepts of financial management and investment

COURSE CONTENTS

1. **INTRODUCTION:**
    1.1.   Managerial Economics;
    1.2.   Relationship with other disciplines;
    1.3.   Firms: Types, objectives and goals;
    1.4.   Managerial decisions;
    1.5.   Decision analysis;

2. **DEMAND & SUPPLY ANALYSIS:**
    2.1.   Demand;
        2.1.1.   Types of demand;
        2.1.2.   Determinants of demand;
        2.1.3.   Demand function;
        2.1.4.   Demand elasticity;
        2.1.5.   Demand forecasting;
    2.2.   Supply;
        2.2.1.   Determinants of supply;
        2.2.2.   Supply function;
        2.2.3.   Supply elasticity.

3. **PRODUCTION AND COST ANALYSIS:**
    3.1.   Production function;
    3.2.   Returns to scale;
    3.3.   Production optimization;
    3.4.   Least cost input; Iso quants;
    3.5.   Managerial uses of production function;
    3.6.   Cost Concepts;
        3.6.1.   Cost function;

        3.6.2.   Types of Cost;

        3.6.3.   Determinants of cost;

        3.6.4.   Short run and Long run cost curves;

        3.6.5.   Cost Output Decision;

        3.6.6.   Estimation of Cost.

4. PRICING:

        4.1.   Determinants of Price;

        4.2.   Pricing under different objectives and different market structures;

        4.3.   Price discrimination;

        4.4.   Pricing methods in practice;

        4.5.   Role of Government in pricing control.

5. FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT):

        5.1.   Balance sheet and related concepts;

        5.2.   Profit & Loss Statement and related concepts;

        5.3.   Financial Ratio Analysis;

        5.4.   Cash flow analysis;

        5.5.   Funds flow analysis;

        5.6.   Comparative financial statements;

        5.7.   Analysis & Interpretation of financial statements;

        5.8.   Investments;

        5.9.   Risks and return evaluation of investment decision;

        5.10.   Average rate of return;

        5.11.   Payback Period;

        5.12.   Net Present Value;

        5.13.   Internal rate of return,

REFERENCE BOOKS:

1.Mc Guigan, Moyer and Harris,' Managerial Economics; Applications, Strategy and Tactics', Thomson South Western, 10th Edition, 2005.

2.Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill Publishing Ltd., 4th edition,2005.

3.Samuelson. Paul A and Nordhaus W. D., 'Economics', Tata Mcgraw Hill Publishing Company Limited, New Delhi, 2004.

4.Paresh Shah, 'Basic Financial Accounting for Management', Oxford University Press, NewDelhi, 2007.

5.Salvatore Dominick, 'Managerial Economics in a global economy'. Thomson SouthWestern, 4th Edition, 2001.

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INDUSTRIAL AUTOMATION

Course Code	EL 50031(Same as EF/ER/RA 50031)
Course Title	Industrial Automation
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PE

COURSE CONTENTS:

UNIT I -
- 1.1   Industrial automation overview and data acquisition
- 1.2   Architecture of Industrial Automation Systems.
- 1.3   Measurement Systems Characteristics
- 1.4   Data Acquisition Systems

UNIT II -
- 2.1   Control Generation
- 2.2   Introduction to Automatic Control
- 2.3   P-I-D Control
- 2.4   Feed-forward Control Ratio Control
- 2.5   The branching operations based on conditions expression

UNIT III
- 3.1   Sequential control and PLC
- 3.2   Introduction to Sequence Control, PLC, RLL
- 3.3   PLC Hardware Environment

UNIT IV
- 4.1   Industrial control application
- 4.2   Hydraulic Control Systems
- 4.3   Pneumatic Control Systems
- 4.4   Energy Savings with Variable Speed Drives
- 4.5   Introduction to CNC Machines

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Industrial Instrumentation, Control and Automation S.Mukhopadhyay, S. Sen and A. K. Deb Jaico Publishing House, 2013 ISBN: 978-8184954098
2. Electric Motor Drives, Modelling, Analysis and Control R. Krishnan Prentice Hall India, 2002 ISBN: 978-0130910141

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CONTROL SYSTEM AND PLC

Course Code	EL 50032(Same as EF/ER/RA 50032)
Course Title	Control System And PLC
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PE

COURSE CONTENTS:

UNIT I BASICS OF CONTROL SYSTEM
  1.1   Basics of control system diagram and practical examples
  1.2   Classification of control systems:-
          Open loop and closed loop systems
          Linear and non-linear systems
  1.3   transfer function

UNIT II TIME DOMAIN STABILITY ANALYSIS
  2.1   Transient and steady state response
  2.2   standard test inputs: Step, Ramp, Parabolic, Impulse and their corresponding Laplace transform
  2.3   analysis of second order control system: analysis for unit step input, concept, definition, effect of damping.
  2.4   steady state analysis: type 0, 1, 2 systems, steady state error and error constants, numerical problems

UNIT III PROCESS CONTROLLERS
  3.1   Process control system: block diagram, functions of each block
  3.2   control actions: discontinuous mode, continuous mode
  3.3   composite controllers: PI, PD, PID controllers output equation, response

UNIT IV FUNDAMENTALS OF PLC
  4.1   PLC: block diagram, classification, needs and benefits of PLCs in automation
  4.2   descriptions of different parts of PLC: CPU function, scanning cycle, speed of execution, memory, i/o modules
  4.3   PLC installation

UNIT V PLC HARDWARE AND PROGRAMMING
  5.1   Discrete input modules: block diagram, specifications of AC input modules and DC input module. Sinking and Sourcing concept in DC input modules
  5.2   discrete output modules: block diagram, description, specifications of AC output module and DC output modules
  5.3   analog input and output modules: block diagram and specifications
  5.4   I/O addressing of PLC: addressing data files, format of logical address, different addressing types
  5.5   PLC programs using Ladder programming language.

REFERENCES /SUGGESTED LEARNING RESOURCES:
1. Modern control engineering Ogata K. PHI 5th edition New Delhi
2. Programmable Logic Controllers Petruzella F.D. TMH 3rd edition New Delhi

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MICROWAVE AND RADAR

Course Code	EL 50041(Same as EF 50041)
Course Title	Microwave And Radar
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PE

COURSE CONTENTS:

UNIT I –
  1.1   Introduction to Microwaves, History and applications of Microwaves
  1.2   Mathematical Model of Microwave Transmission-Microwave transmission modes, wave- guides and transmission lines, Impedance Matching
  1.3   Microwave Network Analysis

UNIT II –
  2.1   Passive and Active Microwave Devices
  2.2   Directional Coupler, Power Divider, Attenuator, Resonator.
  2.3   Microwave active components: Diodes, Transistors, Microwave Tubes

UNIT III –
  3.1   Microwave Design Principles
  3.2   Microwave Filter Design
  3.3   Microwave Amplifier Design
  3.4   Microwave Mixer Design
  3.5   Microwave Oscillator Design
  3.6   Microwave Antennas

UNIT IV –
  4.1   Microwave Measurements,
  4.2   Microwave Systems,
  4.3   Effect of Microwaves on human body

REFERENCES /SUGGESTED LEARNING RESOURCES:
1. Microwave Engineering D.M. Pozar Wiley; Fourth edition (2013) ISBN 978-8126541904
2. Foundation for Microwave Engineering R.E. Collins Wiley; Second edition (2007) ISBN : 978-8126515288

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OPTICAL COMMUNICATION AND NETWORKING

Course Code	EL 50042
Course Title	Optical Communication And Networking
Number of Credits	3 (L-3, T-0, P-0)
Prerequisites	NIL
Course Category	PE

UNIT I INTRODUCTION TO OPTICAL FIBERS
  1.1   Element of an Optical Fiber Transmission link—
  1.2   Total internal reflection-Acceptance angle –Numerical aperture
  1.3   Optical Fiber Modes and Configurations
  1.4   Single Mode Fibers-Graded Index fiber structure.

UNIT II SIGNAL DEGRADATION OPTICAL FIBERS
  2.1   Attenuation - Absorption losses, Scattering losses, Bending Losses, Core and Cladding losses,
  2.2   Signal Distortion in Optical Wave guides-Information Capacity determination -Group Delay-Material Dispersion, Wave guide Dispersion,
  2.3   Signal distortion in SM fibers-Polarization Mode dispersion, Intermodal dispersion, Pulse Broadening in GI fibers- Mode Coupling -Design Optimization of SM fibers-RI profile and cut-off wavelength.

UNIT III FIBER OPTICAL SOURCES AND COUPLING
  3.1   LED structures -Light source materials -Quantum efficiency and LED power, Modulation of a LED,
  3.2   lasers Diodes-Modes and Threshold condition -Rate equations -External Quantum efficiency -Resonant frequencies -Laser Diodes, Temperature effects,
  3.3   Fiber -to- Fiber joints, Fiber splicing-Signal to Noise ratio , Detector response time.

UNIT IV FIBER OPTIC RECEIVER AND MEASUREMENTS
  4.1   Fundamental receiver operation, Pre amplifiers, Error sources – Receiver Configuration– Probability of
.   Error– Quantum limit
  4.2   Fiber Attenuation measurements- Dispersion measurements – Fiber Refractive index profile
measurements

UNIT V OPTICAL NETWORKS AND SYSTEM TRANSMISSION
  5.1   Basic Networks – SONET / SDH – Broadcast – and –select WDM Networks –Wavelength Routed .
.   Networks
  5.2   Non linear effects on Network performance —
  5.3   Link Power budget -Rise time budget- Noise Effects on System Performance-Operational Principles of
.   WDM Performance of WDM + EDFA system – Solutions – Optical CDMA – Ultra High Capacity . . .
.   Networks

REFERENCES /SUGGESTED LEARNING RESOURCES:
1. Govind P. Agrawal, "Fiber Optic Communication Systems", John Wiley, 3rd Edition, 2004
2. Joseph C. Plais, "Fiber Optic Communication", Pearson Education, 4th Ed, 2004.

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EMBEDDED SYSTEMS LAB

Course Code	EL 5005(Same as EF/ER 5005)
Course Title	Embedded Systems Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PC

PRACTICALS:-

1. Built-in LED state control by push button sketch implementation
2. Built-in LED blinking sketch implementation
3. Built-in LED blinking by toggling states based on binary operation
4. Built-in LED state control by user interface through serial port
5. User interface for Boolean operation and bit wise operation through serial port
6. User interface for compounded operation through serial port
7. Looping mechanism to check the state of pin and if change print its status on serial port
8. Controlling multiple LEDs with a loop and an array
9. Use a potentiometer to control the blinking of an LED
10. Uses an analog output (PWM pin) to fade an LED.
11. Servo Motor Control using PWM
12. Temperature sensor interfacing and sending its reading over serial port
13. I2C light sensor interfacing and sending its reading over serial port

REFERENCES /SUGGESTED LEARNING RESOURCES:

1. Arduino Projects for Dummies (For Dummies Series) Kennedy George; Davis Bernard; Prasanna SRM Wiley (5 July 2013) ISBN: 978-1118551479

2. Make: Getting Started With Arduino - The Open Source Electronics Prototyping Platform Massimo Banzi and Michael Shiloh Shroff/Maker Media; Third edition (27 December 2014) ISBN : 978-9351109075

SUGGESTED SOFTWARE/LEARNING WEBSITES:

https://www.arduino.cc/reference/en/
https://learn.adafruit.com/category/learn-arduino

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MOBILE AND WIRELESS COMMUNICATION LAB

Course Code	EL 5006(Same as EF 5006)
Course Title	Mobile And Wireless Communication Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PC

SUGGESTED PRACTICALS/ EXERCISES

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-

1. To understand the cellular frequency reuse concept to find the co-channel cells for a particular cell.
2. To understand the path loss
3. Understand the path loss with shadowing
4. Understanding the Flat fading
5. Understanding the Frequency selective fading
6. Understanding the Multipath channel for the following objectives
    No Fading
    Flat Fading
    Dispersive Fading
7. To simulate a dipole antenna (λ, $\lambda/4$, $\lambda/2$, $3\lambda/2$) for a particular frequency using 4NEC2
8. Perform following experiments using CDMA trainer kit
    PSK modulation and demodulation experiment
    Bit synchronization extraction experiment
    Error correction encoding experiment

REFERENCES /SUGGESTED LEARNING RESOURCES:
1. Wireless Communications – Principles and Practice T. S. Rappaport, (2nd edition) Pearson ISBN 9788131731864
2. Modern Wireless Communications Haykin & Moher Pearson 2011 (Indian Edition) ISBN: 978-8131704431

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INDUSTRIAL AUTOMATION LAB

Course Code	EL 50071(Same as EF/ER/RA 50071)
Course Title	Industrial Automation Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PE

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-
1. Develop a data acquisition system using Arduino
2. Temperature control system using PID
3. Level control system based on error feedback
4. PLC programming using Relay ladder Logic for AND , OR XOR and NOR gate
5. PLC, RLL programming using CASCADE method
6. PLC timer, counter, registers and analog input/output functions
7. Variable Speed drive of an induction motor
8. PLC/ microcontroller based computer numerical control machine job completion

REFERENCES /SUGGESTED LEARNING RESOURCES:
1. Industrial Instrumentation, Control and Automation S.Mukhopadhyay,S, S. Sen and A. K. Deb Jaico Publishing House, 2013 ISBN: 978-8184954098
2. Electric Motor Drives, Modelling, Analysis and Control R. Krishnan Prentice Hall India, 2002 ISBN: 978-0130910141

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CONTROL SYSTEM AND PLC LAB

Course Code	EL 50072(Same as EF/ER/RA 50072)
Course Title	Control System And PLC Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PE

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-

1. Different Toolboxes in MATLAB, Introduction to Control Systems Toolbox or its equivalent open source freeware Software like Scilab using Spoken Tutorial MOOCs.
2. Determine the transfer function for given closed loop system in block diagram representation.
3. Plot unit step response of given transfer function and find delay time, rise time, peak time and peak overshoot
4. Using MATLAB/SCILAB
   a) Simulation of a typical second order system and determination of step response and evaluation of time domain specifications
   b) Evaluation of the effect of additional poles and zeroes on time response of second order system
   c) Evaluation of effect of pole location on stability d) Effect of loop gain of a negative feedback . . system on stability
5. To study the effect of P, PI, PD and PID controller on step response of a feedback control system (Using control engineering trainer/process control simulator).Verify the same by simulation
6. Components/sub-components of a PLC, Learning functions of different modules of a PLC system
7. Practical steps in programming a PLC (a) using a Hand held programmer (b) using computer interface
8. Introduction to step 5 programming language, ladder diagram concepts, instruction list syntax
9. Basic logic operations, AND, OR, NOT functions.
10. Logic control systems with time response as applied to clamping operation

REFERENCES /SUGGESTED LEARNING RESOURCES:
1. Modern control engineering Ogata K, PHI 5th edition New Delhi
2. Programmable Logic Controllers Petruzella F.D. TMH 3rd edition New Delhi

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MICROWAVE AND RADAR LAB

Course Code	EL 50081(Same as EF 50081)
Course Title	Microwave And Radar Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PE

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-
1. To study wave guide components.
2. To study the characteristics of Gunn oscillator Gun diode as modulated source.
3. Introduction to Smith chart and its application for the unknown impedance measurement.
4. Study the behaviour of impedance matching for passive networks using Smith chart.
5. To study loss and attenuation measurement of attenuator
6. Construct a cavity resonator in waveguide and study its characteristics using the network analyzer and a frequency Counter.
7. To determine the frequency and wavelength in a rectangular wave- guide working in TE10 mode

REFERENCES /SUGGESTED LEARNING RESOURCES:
1. Microwave Engineering D.M. Pozar Wiley; Fourth edition (2013) ISBN 978-8126541904
2. Foundation for Microwave Engineering R.E. Collins Wiley; Second edition (2007) ISBN : 978-8126515288

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OPTICAL COMMUNICATION AND NETWORKING LAB

Course Code	EL 50082
Course Title	Optical Communication And Networking Lab
Number of Credits	1 (L-0, T-0, P-2)
Prerequisites	NIL
Course Category	PE

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

PRACTICALS:-
1. To study the different types of optical fibres.
2. Study of optical sources: LED & LASER
3. measurement of the numerical aperture
4. dc characteristics of led and laser diodes
5. propagation loss and bending loss in single mode optical glass fiber
6. data communication system usinga fiber- optic system
7. mode characteristics of single mode fiber

REFERENCES /SUGGESTED LEARNING RESOURCES:
1. Govind P. Agrawal, "Fiber Optic Communication Systems", John Wiley, 3rd Edition, 2004
2. Joseph C. Plais, "Fiber Optic Communication", Pearson Education, 4th Ed, 2004.

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SEMESTER SCHEME-2020-21

VI SEMESTER
(SESSION 2021-2022 & ONWARDS)