Faculty of Engineering & Technology
KAKATIYA UNIVERSITY, WARANGAL-506 009
Department of Electronics & Communication Engineering

B. Tech. (ECE) VII Semester

S. No.	Course Code	Course Title	Scheme of Instruction			Lecture Hrs/week	Scheme of Examination		Credits
			L	T	P		CIE	SEE	
1.	PC4101EC	Microwave Engineering	3	0	0	3	30	70	3
2.	PE-IV	Professional Elective-IV	3	0	0	3	30	70	3
3.	PE-V	Professional Elective-V	4	0	0	4	30	70	4
4.	OE-II	Open Elective-II	2	0	0	2	30	70	2
5.	PC4111EC	Microwave Engineering Lab	0	0	2	2	25	50	1
6.	PW4112EC	Project Stage-I	0	0	4	4	50	0	2
7.	SI4113EC	Summer Internship*	6 Weeks				50	0	0
Total			12	0	6	18	245	330	15

*Students have to undergo summer internship of 6 Weeks duration at the end of semester VI and Evaluation will be done in present semesters.

L Lecture
T Tutorial
P Practical
CIE Continuous Internal Evaluation
SEE Semester End Examination
PC Professional core

Professional Elective-IV

PEIV4102EC	Satellite Communications
PEIV4103EC	Wavelet Theory and Applications
PEIV4104EC	Fault Detection in Digital Systems

Professional Elective-V

PEV4105EC	Digital Image Processing
PEV4106EC	Internet of Things
PEV4107EC	Low Power VLSI Design

Open Elective-II

OEII4108HS	Disaster Management
OEII4109EE	Non-Conventional Energy sources
OEII4110HS	Startup Entrepreneurship

Faculty of Engineering & Technology
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B. Tech. (ECE) VII Semester

PC4101EC: MICROWAVE ENGINEERING

(Professional Core)

Credits: 3

Instruction: *3 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT – I

Microwave frequency bands, Advantages and Applications of Microwaves, TE & TM Waves in rectangular wave guides, Group and Phase velocity, Cutoff wavelength, Wave impedance, Attenuation and Q of Wave guides, Wave guide resonators, Power handling capability, Transmission line analogy, Waveguide Design

UNIT – II

Microwave circuit concepts, Normalized voltage and current, scattering parameters, properties of S-Matrix, Unitary property, S-Matrix for directional coupler, Magic tee, Construction, principle and applications of Attenuator, Phase Shifter, Circulator, Isolator, S-Matrix of Circulator

UNIT – III

High Frequency limitations of conventional tubes, Two cavity Klystron, Bunching by velocity modulation, Small signal theory of bunching, Effect of grid interception and de-bunching. Tran's admittance, Reflex Klystron, Mathematical theory of bunching, Admittance spiral and condition of oscillation, Principle of operation, construction and characteristics of TWT Amplifier, Backward wave oscillator (qualitative treatment only)

UNIT – IV

Principle of operation, construction and characteristics of multi-cavity magnetron, Microwave Solid-state devices: Introduction, Classification and Applications. TEDs —Introduction, Gunn Diode — Principle, RWH Theory, Characteristics, Basic modes of Operation, Oscillation modes, Avalanche transit time devices- IMPATT,TRAPATT

UNIT – V

Microwave Measurements: Blocks and features of microwave bench; frequency measurement, power measurement, attenuation measurement, impedance, phase shift and VSWR measurements.

Suggested Readings:

1. Samuel Y. Liao, "*Microwave Devices and Circuits*", 3rd Edition, PHI, 1994.
2. Pozar D.M., "*Microwave Engineering*", 3rd edition, John Wiley & Sons, 2005.
3. Skalnik, Krauss, Reich, "*Microwave principles*", East West Press, 1976.

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B. Tech. (ECE) VII Semester

Professional Elective-IV (a)
PEIV4102EC: SATELLITE COMMUNICATIONS

Credits: 3

Instruction: *3 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT–I

Origin of Satellite communications, a brief history of Satellite Communication, Basic principles and properties of satellite communication; Earth segment, Space segment, Interpretation of Kepler's Laws; Orbital Mechanics: The Equation of the Orbit, Describing the Orbit, Locating the Satellite in the Orbit, Orbital effects in communication system Performance

UNIT– II

Satellite Subsystems: Attitude and Orbit Control System, Telemetry, Tracking, Command and Monitoring, Power Systems, Communication Subsystems, Satellite Antennas, Equipment Reliability and Space Qualification

UNIT– III

Earth Stations: Earth Station Design for Low System Noise Temperature, Design of large antennasand small earth station antennas. Low noise amplifiers and High power Amplifiers for Satellite communication.

UNIT– IV

Satellite Link Design: Basic Transmission Theory, System Noise Temperature and G/T ratio: Noise Temperature, calculation of System Noise Temperature, Noise Figure and Noise Temperature, Design of Down Links, Up Link Design, Design Of Satellite Links For Specified C/N

UNIT– V

Satellite Navigation Applications: Global and Regional Satellite Navigation Systems- Operating Principles, Advantages, Limitations, Current Status and Applications; Multiple Access Techniques: FDMA, TDMA and CDMA.

Suggested Readings:

1. Wilbur L. Pitchand and Henri G. Suyderhoud, Robert A. Nelson, "*Satellite CommunicationSystems Engineering*", 2nd edn.3rd Impression, Pearson Education.2008.
2. Timothy Pratt and Charles Nestian. W, "*Satellite Communication*", John Wiley and Sons, 1988.
3. Tri T. Ha, "*Digital Satellite Communication*", Tata McGraw- Hill, Special Indian Edition 2009.

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B. Tech. (ECE) VII Semester

Professional Elective-IV (b)
PEIV4103EC: WAVELET THEORY AND APPLICATIONS

Credits: 3

Instruction: *3 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT-I

Introduction Stationary and non-stationary signals, Signal representation using basis function, Brief introduction to Fourier transform and Short time Fourier transform, Time frequency analysis, Bases of time frequency, Classes of mother wavelets: Haar, Daubechies, bi-orthogonal.

UNIT-II

Continuous wavelet transform (CWT), Time and frequency resolution of the CWT, Construction of continuous wavelets: Spline, orthonormal, bi-orthonormal, Inverse CWT, Redundancy of CWT, Zoom property of the CWT, Filtering in CWT domain.

UNIT-III

Discrete Wavelet Transform (DWT), Filter banks Orthogonal and biorthogonal two-channel filter banks, Design of two-channel filter banks, Tree-structured filter banks, and discrete wavelet transform, Non-linear approximation in the Wavelet domain

UNIT-IV

Multi resolution analysis, Construction and Computation of the DWT, the redundant DWT. Multi Resolution Analysis Multirate discrete time systems, Bi-orthogonal wavelet bases, 2-dimensional wavelet transforms

UNIT-V

Applications Signal and Image compression, Detection of signal changes, analysis and classification of audio signals using CWT, Wavelet based signal de-noising and energy compaction, Digital Communication and Multicarrier Modulation, Trans-multiplexers

Suggested Readings:

1. *A Wavelet Tour of Signal Processing*, 2nd edition, S. Mallat, Academic Press, 1999.
2. *Wavelets and Sub band Coding*, M. Vetterli and J. Kovacevic, Prentice Hall, 1995.
3. Wavelet transforms: Introduction, Theory and applications, Raghuveer rao and Ajit S.Bopardikar, Pearson Education Asia, 2000.
4. *Multirate Systems and Filter Banks*, P. P. Vaidyanathan, Pearson Education, 2004.

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B. Tech. (ECE) VII Semester

Professional Elective-IV (c)
PEIV4104EC: FAULT DETECTION IN DIGITAL SYSTEMS

Credits: 3

Instruction: *3 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT – I

Introduction: Modeling and testing digital circuits at different levels of abstraction, Types of testing, Errors and Faults, Fault classification and modeling, Hazards, Test generation and evaluation.

UNIT – II

Fault detection in Combinational Circuits: Detection of single stuck faults using Fault Table method, path sensitization and Boolean difference method, fault detection in two level and multilevel circuits, Bridging fault model, detection of non-feedback and feedback bridging faults, bridging fault simulation and test generation.

UNIT – III

Fault Detection in Sequential Circuits: State identification with homing and distinguishing experiments, Design of fault detection experiments for diagnosable machines.

UNIT – IV

Self-Checking Design: Basic concepts, application of Error-detecting and Error-correcting codes, multiple bit errors, checking circuits and self-checking, self-checking checkers, parity-check functions, totally self-checking m/n code checkers, totally self-checking equality checkers, self-checking Berger code checkers.

UNIT – V

Test Generation algorithms for SSFs: Combinational Circuits-Fault oriented ATG- algorithms and selection criteria, fault independent ATG, ATG for sequential circuits using iterative array model.

Suggested Readings:

1. Samuel C Lee, "*Digital Circuits and Logic Design*". PHI Pvt. Ltd. 2000
2. Zvi Kohavi, "Switching *and Finite Automata Theory*", TMH.2nd edition
3. M. Abramovici, M. Breuer, A. Friedman, "Digital *System Testing and testable design*", Jaico Publications

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B. Tech. (ECE) VII Semester

Professional Elective-V (a)
PEV4105EC: DIGITAL IMAGE PROCESSING

Credits: 4

Instruction: *4 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT-I

Introduction: Fundamental steps and components of digital image processing, image sensing and acquisition, sampling and quantization, representation of digital images, relationships between pixels neighborhood of a pixel, distance measures, arithmetic and logical operations on images, spatial transformations. Digital Image Transforms: Two dimensional DFT and its properties, DCT, unitary Transforms, Walsh transform, Hadamard Transform, slant transform and KL transform.

UNIT-II

Image Enhancement: Simple intensity transforms, Piecewise linear transforms and histogram processing. Spatial Domain Filtering: Correlation and convolution, linear and nonlinear filters-smoothing and sharpening filters, Frequency Domain Filtering: Image smoothing and sharpening - homomorphic filtering, selective filtering, Image Restoration and Degradation model, noise models, restoration in the presence of noise.

UNIT-III

Image Compression: Types of redundancy – coding redundancy, interpixel redundancy, psychovisual redundancy, fidelity criteria, image compression system model, lossless and lossy coding, huffman coding, LZW coding, arithmetic coding, run length coding, bit-plane coding, constant area coding, lossless and lossy predictive coding, JPEG 2000

UNIT-IV

Image Segmentation: Point, line and edge detection, image gradient and gradient operators, edge linking and boundary detection; thresholding- global, multiple, region based segmentation- region growing, region splitting and merging. Morphological Image Processing: Structuring element, erosion and dilation, opening and closing, hit-or miss transformation, basic morphological algorithms and grey-scale morphology, Active Contour Models.

UNIT-V

Color Fundamentals, Color Models, Pseudo color Image Processing, Color Transformations: Formulation, Color Components, Color Slicing; Color Image Smoothing and Sharpening; Segmentation in HSI Color space and RGB Vector Space; Noise in color images.

Suggested Readings

1. R.C. Gonzalez and R.E. Woods, *Digital Image processing*, 3rd ed., New Delhi: Pearson Education, 2009.
2. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins, *Digital image processing using MATLAB*, 1st ed., New Delhi: Pearson Education, 2004.
3. William K. Pratt, *Digital Image Processing*, 4th ed., New York: John Wiley and Sons, 2002

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B. Tech. (ECE) VII Semester

Professional Elective-V (b)
PEV4106EC: INTERNET OF THINGS

Credits: 4

Instruction: *4 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT- I

Basics of Networking & Network Security: Network Types, Layered Network Models, Addressing, Internet of Things TCP/IP Transport layer, Security, Network Confidentiality, Cryptography, Message Integrity and Authenticity, Digital signatures, Key Management, Internet Security& Firewall.

UNIT- II

Predecessors of IoT & Emergence of IoT–Introduction, Wireless Sensor Networks, Machine-to-Machine Communications, Cyber Physical Systems, Architectural components of CPS, IoT versus M2M, IoT versus CPS, IoT versus WoT, Enabling IoT and the Complex Interdependence of Technologies, IoT Networking Components, Addressing Strategies in IoT.

UNIT- III

IoT Architecture-State of the Art – Introduction, State of the art, Architecture Reference Model-Introduction, Reference Model, and architecture, IoT reference Model, IoT Reference Architecture-Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views.

UNIT- IV

IoT Sensing and Actuation & IoT Processing Topologies and Types: Introduction, Sensors, Sensor Characteristics, Sensorial Deviations, Sensing Types, Sensing Considerations, Actuators, Actuators Types, Actuator Types, Actuator Characteristics, Data Formats, Processing in IoT, Processing Topologies, IoT Device Design and Selection Considerations, Processing Offloading, Offload location, Offload decision making, Offloading considerations.

UNIT- V

IoT Case Studies: Agricultural IoT, Components of an agricultural IoT, Advantages of IoT in agriculture, Case Studies, Vehicular IoT, Components of vehicular IoT, Advantages of vehicular IoT, Healthcare IoT, Components of healthcare IoT, Advantages and risk of healthcare IoT, Case Studies, Evolution of New IoT Paradigms, Challenges Associated with IoT, Emerging Pillars of IoT.

Suggested Readings:

1. Sudip Mishra, Anandarup Mukherjee, Arijit Roy: *Introduction to IOT*, Cambridge University Press
2. Bassi, Alessandro, et al, "*Enabling things to talk*", Springer-Verlag Berlin -2016

3. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "*IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things*", CISCO Press, 2017
4. Neil Cameron: *Arduino Applied-Comprehensive Projects for Everyday Electronics*, Apress.
5. *Internet of Things*, Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram, John Wiley&Sons.
6. Massimo Banzi, Michael Shiloh Make: *Getting Started with the Arduino*, Shroff Publisher/Maker Media Publishers.

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B. Tech. (ECE) VII Semester

Professional Elective-V (c)
PEV4107EC: LOW POWER VLSI DESIGN

Credits: 4

Instruction: *4 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT-I

MOS transistor major evolutions-Bulk CMOS technologies, SOI technologies, MOS transistor saturation and sub threshold currents, tunnel currents, Leakage current components, scaling effects, Innovative transistor architectures

UNIT-II

Power Estimation Techniques: Circuit Level – Modeling of Signals, Signal Probability Calculations, Statistical techniques for combinational circuits, Power estimation at circuit level, High Level Power Estimation.

UNIT-III

Power Optimization Techniques – I: Dynamic Power Reduction – Dynamic Power Component, Circuit Parallelization, Voltage Scaling Based Circuit Techniques, Circuit Technology – Independent Power Reduction, Circuit Technology Dependent Power Reduction;

UNIT-IV

Power Optimization Techniques – II: Leakage Power Reduction – Leakage Components, Design Time Reduction Techniques, Run-time Stand-by Reduction Techniques, Run-time Active Reduction Techniques, techniques to reduce leakage in Cache Memories.

UNIT-V

Power Optimization Techniques – III: Low Power Very Fast Dynamic Logic Circuits, high throughput CMOS circuit techniques, Low Power Arithmetic Operators- addition and multiplication, Energy Recovery Circuit Design

Suggested Readings:

1. Kaushik Roy and Sharat Prasad, "*Low-Power CMOS VLSI Circuit Design*", Wiley Interscience Publications, 2000
2. Christian Piguet, "*Low Power CMOS Circuits Technology, Logic Design and CAD Tools*", 1st Indian Reprint, CRC Press, 2010
3. Jan M Rabaey, A Chandrakasan, Borvioje N "*Digital Integrated Circuits Design Perspective*" PHI-2nd edition, 2005

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B. Tech. (ECE) VII Semester

Open Elective-II (a)
OEII4108HS: DISASTER MANAGEMENT

Credits: 2

Instruction: *2 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT – I

Introduction & Principles of Disaster Management: Nature - development, hazards and disasters; natural disasters - earth quakes, floods, fire, landslides, cyclones, tsunamis, nuclear; chemical dimensions and typology of disasters - public health disasters, national policy on disaster management

UNIT –II

Prevention Preparedness and Mitigation Measures: Prevention, preparedness & mitigation measures for various disasters, post disaster reliefs and logistics management, emergency support functions and their coordination mechanism, resources and material management, management of relief camp

UNIT– III

Risk and Vulnerability: Building codes and land use planning, social vulnerability, environmental vulnerability, macroeconomic management and sustainable development, climate change, risk rendition, financial management of disaster and related losses

UNIT - IV

Role of Technology in Disaster Management: Disaster management for infrastructures, taxonomy of infrastructure, treatment plants and process facilities, electrical sub stations, roads and bridges, geo spatial information in agriculture, drought assessment, multimedia technology in disaster risk management and training

UNIT-V

Disaster management in India: Disaster Profile of India – Mega Disasters of India and Lessons Learnt Disaster Management Act 2005 – Institutional and Financial Mechanism National Policy on Disaster Management, National Guidelines and Plans on Disaster Management;

Suggested Readings:

1. Rajib shah and R.R Krishnamurthy, *Disaster management – Global Challenges and local solutions, Hyderabad*: Universities Press (India) Pvt. Ltd., 2009.
2. Satish Modh, *Introduction to Disaster management*, Bengaluru: Macmillan India Ltd., 2010

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B. Tech. (ECE) VII Semester

Open Elective-II (b)
OEII4108EE: NON-CONVENTIONAL ENERGY SOURCES

Credits: 2

Instruction: *2 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT-I

Review of Conventional and Non-Conventional energy sources - Need for non-conventional energy sources Types of Non- conventional energy sources - Fuel Cells - Principle of operation with special reference to H2O2 Cell - Classification and Block diagram of fuel cell systems - Ion exchange membrane cell - Molten carbonate cells - Solid oxide electrolyte cells - Regenerative system-Regenerative Fuel Cell - Advantages and disadvantages of Fuel Cells-Polarization - Conversion efficiency and Applications of Fuel Cells.

UNIT-II

Solar energy - Solar radiation and its measurements - Solar Energy collectors -Solar Energy storage systems - Solar Pond - Application of Solar Pond - Applications of solar energy.

UNIT-III

Wind energy- Principles of wind energy conversion systems - Nature of wind - Power in the Wind-Basic components of WECS -Classification of WECS -Site selection considerations -Advantages and disadvantages of WECS -Wind energy collectors -Wind electric generating and control systems - Applications of Wind energy -Environmental aspects.

UNIT- IV

Energy from the Oceans - Ocean Thermal Electric Conversion (OTEC) methods - Principles of tidal power generation -Advantages and limitations of tidal power generation -Ocean waves - Wave energy conversion devices -Advantages and disadvantages of wave energy - Geo-Thermal Energy - Types of Geo-Thermal Energy Systems - Applications of Geo-Thermal Energy.

UNIT-V

Energy from Biomass - Biomass conversion technologies / processes - Photosynthesis - Photosynthetic efficiency - Biogas generation - Selection of site for Biogas plant - Classification of Biogas plants - Details of commonly used Biogas plants in India - Advantages and disadvantages of Biogas generation -Thermal gasification of biomass -Biomass gasifiers.

Suggested Readings:

1. Rai G.D, *Non-Conventional Sources of Energy*, Khandala Publishers, New Delhi, 1999.
2. M.M. El-Wakil, *Power Plant Technology*. McGraw Hill, 1984.

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B. Tech. (ECE) VII Semester

Open Elective-II (c)
OEII4110HS: STARTUP ENTERPRENURSHIP

Credits: 2

Instruction: *2 hours per week* **Duration of SEE:** *3 hours*
CIE: *30 marks* **SEE:** *70 marks*

UNIT – I

Creativity & Discovery: Definition of Creativity, self-test creativity, discovery and delivery skills, The imagination threshold, Building creativity ladder, Collection of wild ideas, Bench marking the ideas, Innovative to borrow or adopt, choosing the best of many ideas, management of tradeoff between discovery and delivery

UNIT – II

From Idea to Startup: Introduction to think ahead backward, Validation of ideas using cost and strategy, visualizing the business through value profile, activity mapping, Risks as opportunities, building your own road map

UNIT – III

Innovation career lessons: Growing & Sharing Knowledge, The Role of Failure In Achieving Success, Creating vision, Strategy, Action & Resistance: Differentiated Market Transforming Strategy; Dare to Take Action; Fighting Resistance; All About the startup Ecosystem; Building a Team; Keeping it Simple and Working Hard.

UNIT – IV

Action driven business plan: Creating a completed non-business plan, including a list of the activities to be undertaken, with degrees of importance. A revision of the original product or service idea, in light of information gathered in the process, beginning to design the business or organization that will successfully implement your creative idea.

UNIT – V

Startup financing cycle: Preparing an initial cash flow statement, showing money flowing out and flowing in. Estimate your capital needs realistically. Prepare a bootstrapping option (self-financing). Prepare a risk map. Prepare a business plan.

Suggested Readings:

1. Vasant Desai, "*Dynamics of Entrepreneurial Development and Management*", Himalaya Publishing House, 1997.
2. Prasanna Chandra, "*Project – Planning, Analysis, Selection, Implementation and Review*", Tata McGraw-Hill Publishing Company Ltd., 1995.
3. B. Badhai, "*Entrepreneurship for Engineers*", Dhanpath Rai & Co., Delhi, 2001.
4. Stephen R. Covey and A. Roger Merrill, "*First Things First*", Simon and Schuster, 2002.
5. Robert D. Hisrich and Michael P.Peters, "*Entrepreneurship*", Tata McGraw Hill Edition, 2002.

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B. Tech. (ECE) VII Semester

PC4111EC: MICROWAVE ENGINEERING LAB

Credits: 1

Instruction: *2 hours per week* **Duration of SEE:** *3 hours*
CIE: *25 marks* **SEE:** *50 marks*

List of Experiments

A. Microwave Source Characteristics

1. Reflex Klystron Characteristics
2. Gunn diode Characteristics

B. Waveguide, Component Characteristics

1. Measurement of standing wave pattern, VSWR measurement, Low & High VSWR measurements.
2. Measurement of Frequency, wavelength, group and phase velocity.
3. Measurement of an unknown load characteristics of windows.
4. Directional Coupler Characteristics, Coupling, Directivity, and Isolation Measurements.
5. E plane, H plane and Magic Tee characteristics.
6. Characteristics of Circulator, Isolator, Measurements of S-parameters through insertion loss and isolation.

C. Antenna Characteristics

1. Measurement of principle plane radiation patterns for horn, Yagi Uda, folded dipole.
2. Measurement of gain & input impedance.
3. Linear array characteristics.
4. Measurement of return loss with Vector Network Analyzer.

D. Optical Communication

1. Optical Transmitter & Receiver Characteristics (Source' & Detector).
2. Optical Fiber Characteristics: Attenuation, Numerical aperture, splicing losses (step & graded index).
3. Modulation & Demodulation Techniques.
4. Analog/Digital Transmission link characteristics.

Suggested Readings:

1. Samuel Y. Liao, "*Microwave Devices and Circuits*", PHI, 3rd Edition, 1994.
2. Pozar D.M., "*Microwave Engineering*", John Wiley & Sons 3 rd edition, 2005.

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PW-I 4112EC PROJECT STAGE-1

Credits: 2

Instruction: *4 hours per week* **Duration of SEE***:*
CIE: *50 marks* **SEE:**

The department can initiate the project allotment procedure at the end of VI semester and finalize itin the first two weeks of VII semester.

The department will appoint a project coordinator who will coordinate the following:

Collection of project topics/ descriptions from faculty members (Problems can also be invited from the industries)
Grouping of students (max 3 in a group)Allotment of project guides

The aim of project work is to develop solutions to realistic problems applying the knowledge and skills obtained in different courses, new technologies and current industry practices. This requires students to understand current problems in their domain and methodologies to solve these problems. To get awareness on current problems and solution techniques, the first 4 weeks ofVII semester will be spent on special lectures by faculty members, research scholars, post graduate students of the department and invited lectures by engineers from industries and R&D institutions. After completion of these seminars each group has to formalize the project proposal based on theirown ideas or as suggested by the project guide

Seminar schedule will be prepared by the coordinator for all the students from the 5th week to thelast week of the semester which should be strictly adhered to.

Each group will be required to:

1. Submit a one page synopsis before the seminar for display on notice board.
2. Give a 30 minutes presentation followed by 10 minutes discussion.
3. Submit a technical write-up on the talk.

At least two teachers will be associated with the Project Seminar to evaluate students for the award of sessional marks which will be on the basis of performance in all the 3 items stated above.

The seminar presentation should include the following components of the project:

1. Problem definition and specification
2. Literature survey
3. Broad knowledge of available techniques to solve a particular problem.
4. Planning of the work, preparation of bar (activity) charts
5. Presentation- oral and written.

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SI-4113EC SUMMER INTERNSHIP

Credits:

Instruction: *6 weeks* *Duration of SEE: --*
CIE: *50 marks* *SEE: --*

Summer Internship is introduced as part of the curricula for encouraging students to work on problems of interest to industries. A batch of two or three students will be attached to a person from an Electronics Industry / R & D Organization / National Laboratory/Any other program approved by the department for a period of 8 weeks. This will be during the summer vacation following the completion of the VI semester course. One faculty member will act as an internal guide for each batch to monitor the progress and interacts with the industry guide.

After the completion of the project, students will submit a brief technical report on the project executed and present the work through a seminar talk to be organized by the department. Award of sessional are to be based on the performance of the student at the work place to be judged by industry guide and internal guide (25 Marks) followed by presentation before the committee constituted by the department (25 Marks). One faculty member will co- ordinate the overall activity of Summer Internship.

***Students have to undergo summer internship of 6 Weeks duration at the end of semester VI andcredits will be awarded after evaluation in VII semester**