VI SEMESTER

Semester: VI		
WIRELESS & CELLULAR COMMUNICATION (Theory)		
Course Code:	MVJ21EC61	CIE Marks:100
Credits:	L:T:P: 2:2:0	SEE Marks: 100
Hours:	40L+26T	SEE Duration: 3 Hrs
Course Learning Objectives: The students will be able to		
1	Understand mobile radio communication principles and to study the recent trends adopted in cellular systems and wireless standards.	
2	Familiarize students to radio signal propagation mechanisms and to the characteristics of mobile radio channels, which both are needed in the designing of modern wireless communication systems and networks.	
3	Study the concepts of cellular communication system, architecture, functioning, various standards	
4	Learn the concepts of signal propagation in cellular environment	
5	Study the different multiple access techniques for Wireless Communication	

UNIT 1	
Introduction to Cellular Mobile Systems: The Cellular concept, System design, Capacity improvement in cellular systems, Co-channel interference reduction. Intelligent cell concept and applications, technical Challenges. **Laboratory Sessions/ Experimental learning:** 1. Understand how pulse shaping is realized using MATLAB® functions **Applications:** 1. Transmission of music, news, road conditions, weather reports, and other broadcast information are received via digital audio broadcasting (DAB) with 1.5Mbit/s. 2. A universal mobile telecommunications system (UMTS) phone might be available offering voice and data connectivity with 384kbit/s. **Video link / Additional online information:**	8Hrs.

1. https://www.coursera.org/lecture/wireless-communications/1-1-cellular-communication-KpitQ 2. https://nptel.ac.in/courses/117/102/117102062/	
UNIT 2	
Mobile radio propagation : Reflection, Diffraction, Fading, Multipath Propagation, Channel modelling, Diversity Schemes and Combining Techniques. The cellular fundamentals: cellular communication and frequency reuse, general architecture of a cellular system, channel assignment strategies, hand-off in a cellular system. Interference and cellular system capacity: co-channel interference and adjacent channel interference, power control. **Laboratory Sessions/ Experimental learning:** 1. Compute the power of the noise and the original signal. Find signal to noise ratio (SNR), compare it with the desired value and see if they are the same using MATLAB **Applications:** 1. International broadcasting, long distance aircraft and ship communication, citizen band (CB) radios. 2. Diffraction and reflection give rise to propagation beyond the horizon. Propagation at large distance propagates well within buildings. **Video link / Additional online information:** 1. https://freevideolectures.com/course/2329/wireless-communication/14 2. https://nptel.ac.in/courses/108/108/108108148/	8Hrs.
UNIT 3	
Signal propagation in mobile communication: Design parameters at the base station, Practical link budget design using path loss models. propagation path loss, outdoor propagation models (Okumura model & Hata model), indoor propagation models, power delay profile, channel parameters (delay spread, doppler spread, coherence bandwidth, coherence time, Smart antenna systems, Beam forming. MIMO Systems. RAKE receiver. **Laboratory Sessions/ Experimental learning:** 1. Performance of Baseband QAM/QPSK Under AWGN Channel	8Hrs.

Applications: 1. Antennas mounted on these structures pump out wireless communications signals to devices in the field via electromagnetic waves. 2. Wireless signal propagation is the movement of these radio waves (which move at the speed of light) to and from these sites and devices. **Video link / Additional online information:** 1. https://freevideolectures.com/course/2329/wireless-communication 2. https://web.stanford.edu/class/ee359/lectures.html 3. https://nptel.ac.in/courses/117/105/117105084/	
UNIT 4	
Multiuser Systems : CDMA- Principle, Network design, Link capacity, Power control, WCDMA-Network planning, MC-CDMA, OFDM, Cellular mobile communication beyond 3G. Wireless Personal Area Networks (Bluetooth, UWB and ZigBee), Wireless Local Area Networks (IEEE 802.11, network architecture, medium access methods, WLAN standards), Wireless Metropolitan Area Networks (WiMAX), Ad-hoc Wireless Networks. **Laboratory Sessions/ Experimental learning:** 1. Develop a detector and calculate BER with MATLAB Simulation **Applications:** Radio and TV Broad casting **Video link / Additional online information:** 1. https://nptel.ac.in/courses/108/104/108104157/ 2. https://nptel.ac.in/courses/106/105/106105173/ 3. https://nptel.ac.in/courses/111/102/111102130/	**8Hrs.**
UNIT 5	
5G Radio Access Technologies : Access Design Principles for Multi-user Communications – Multi-carrier with Filtering – Non orthogonal Schemes for Efficient Multiple Access – Radio Access for Dense Deployments – Radio Access for V2X Communication – Radio Access for Massive Machine-type Communication. **Laboratory Sessions/ Experimental learning:** 1. Implementation of channel estimation for multipath environment	**8Hrs.**

Applications: Television remote control, Wi-Fi, Cell phones, wireless power transfer, computer interface devices **Video link / Additional online information:** 1. https://www.technologyreview.com/collection/wireless-technology-innovations-lead-the-way-to-a-smartly-connected-future/ 2. https://in.mathworks.com/videos/5g-new-radio-fundamentals-understanding-the-next-generation-of-wireless-technology-1561301737915.html **3.** https://nptel.ac.in/courses/117/104/117104099/	

Course outcomes:	
CO1	Discuss the cellular system design and technical challenges.
CO2	Analyse the Mobile radio propagation, fading, diversity concepts and the channel modelling.
CO3	Evaluate design parameters involved in the base station.
CO4	Discriminate Multiuser Systems, CDMA, WCDMA network planning and OFDM Concepts.
CO5	Describe the concepts of 5G Radio Access Technologies

Text Books:	
1.	T.S Rapaport, "Wireless Communications" 2 nd edition, Pearson Education, Noida, India.
2.	A.F.Molisch, Wireless Communications, Wiley, 2005.
Reference Books:	
1.	A.Goldsmith, Wireless Communications, Cambridge University Press, 2005.
2.	Andrea Goldsmith, "Wireless Communications", Cambridge University Press, 2005.
3.	Jonathan Rodriquez, "Fundamentals of 5G Mobile Networks", Wiley, 2015

Continuous Internal Evaluation (CIE):

Theory for 50 Marks

CIE is executed by way of quizzes (Q), tests (T) and assignments. A minimum of three quizzes are conducted along with tests. Test portion is evaluated for 50 marks and quiz is evaluated for 10 marks. Faculty may adopt innovative methods for conducting quizzes effectively. The number of quizzes may be more than three (conduct

additional quizzes and take best three). The three tests are conducted for 50 marks each and the average of all the tests are calculated for 50. The marks for the assignments are 20 (2 assignments for 10 marks each). The marks obtained in test, quiz and assignment are added to get marks out of 100 and report CIE for 50 marks.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks is executed by means of an examination. The Question paper for each course contains two parts, Part – A and Part – B. Part – A consists of objective type questions for 20 marks covering the entire syllabus. Part – B Students have to answer five questions, one from each unit for 16 marks adding up to 80 marks. Each main question may have a maximum of three sub divisions. Each unit will have internal choice in which both questions cover entire unit having same complexity in terms of COs and Bloom's taxonomy level.

CO-PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	-	-	-	-	-	1
CO2	3	3	3	2	2	1	-	-	-	-	-	1
CO3	3	3	3	2	2	1	-	-	-	-	-	1
CO4	3	3	3	2	2	1	-	-	-	-	-	1
CO5	3	3	3	2	2	1	-	-	-	-	-	1

High-3, Medium-2, Low-1

Semester: VI		
MICROWAVE & ANTENNA (Theory and Practice)		
Course Code:	MVJ21EC63	CIE Marks:50+50
Credits:	L:T:P: 3:0:2	SEE Marks: 50 +50
Hours:	40 L+ 26 P	SEE Duration: 03+03 Hours
Course Learning Objectives: The students will be able to		
1	Describe the microwave properties and the transmission media.	
2	Describe microwave devices for several applications.	
3	Understand the concept behind microwave systems.	
4	Understand the basics of antenna theory.	
5	Different antennas for specific applications	

UNIT 1	
Prerequisites: *Electromagnetics, Wave propagation, Waveguides* **Introduction to Microwaves:** History of Microwaves, Microwave Frequency bands, General Applications of Microwaves, Advantages of Microwaves **Analysis of Microwave Transmission Lines** : Transmission line equations & solutions, Smith Chart Basics, problems on smith chart, impedance matching using stub line, Introduction to strip lines, Micro strip lines, parallel strip lines, coplanar strip lines, shielded strip lines, Rectangular and circular waveguides- theory and analysis. **Laboratory Sessions/ Experimental learning:** 1. Measurement of frequency, guide wavelength, power, VSWR and attenuation in microwave test bench. **Applications:** Power transmission line, Telephone lines, Traces on Printed Circuit Boards, Traces on Multi-Chip Modules, Traces on Integrated Circuit Packages. **Video link / Additional online information:** 1. https://lake.videoken.com/nptel/category/933/	8Hrs.

UNIT 2	
Microwave Passive components: Directional Coupler, Power Divider, Magic Tee, Wave-guide Corners, Bends, Twists, Attenuator, Circulator, Isolator and Resonator. **Microwave Active components:** Tunnel diode, Varactor diodes, Step recovery diodes, Schottky Barrier diodes, PIN diodes, Gunn Diodes, IMPATT and TRAPATT diodes, Parametric Amplifiers, Microwave Transistors, Microwave oscillators and Mixers. Microwave tubes: Klystron, TWT, Magnetron. **Laboratory Sessions/ Experimental learning:** 1. Study of the characteristics of Klystron tube and to determine its electronic tuning range. **Applications:** Oscillators and mixers, power sources. **Video link / Additional online information:** 1. https://lake.videoken.com/nptel/category/933/ **2.** https://www.daenotes.com/electronics/microwave-radar/microwave-tube-devices	8Hrs.
UNIT 3	
Microwave Systems: Wireless Communications system, Radar Systems, Radiometer Systems, Satellite Communication, Remote sensing, Microwave Propagation (Introduction and Block diagrams only) **Antenna Basics:** Introduction, Basic Antenna Parameters, Patterns, Beam Area, Radiation Intensity, Beam Efficiency, Directivity and Gain, Antenna Apertures, Effective Height, Bandwidth, Friis Transmission Equation, Antenna Field Zones & Polarization. **Laboratory Sessions/ Experimental learning:** 1. To perform PC to PC Communication using Microwave test bench **Applications:** Satellite communications, remote sensing, RADAR systems. **Video link / Additional online information:** 1. https://lake.videoken.com/nptel/category/933/ 2. https://lake.videoken.com/nptel/category/1052/	8Hrs.

UNIT 4	
Point Sources and Arrays: Introduction, Point Sources, Power Patterns, Power Theorem, Radiation Intensity, Field Patterns, Phase Patterns, Arrays of Two Isotropic Point Sources, Pattern Multiplication, Linear Arrays of n Isotropic Point Sources of equal Amplitude and Spacing, Phased Arrays. **Electric Dipoles:** Introduction, Short Electric Dipole, Fields of a Short Dipole (General and Far Field Analyses), Radiation Resistance of a Short Dipole, Thin Linear Antenna (Field Analyses), Radiation Resistances of Lambda/2 Antenna. **Laboratory Sessions/ Experimental learning:** 1. Simulation of antenna patterns using FEKO software. **Applications:** Two-way radio communications links, to broadcasting broadcast reception, general radio reception. **Video link / Additional online information:** 1. https://lake.videoken.com/nptel/category/1052/	**8Hrs.**
UNIT 5	
Antenna Types: Introduction to Loop Antenna, Small loop, Comparison of Far fields of Small Loop and Short Dipole, The Loop Antenna General Case, Far field Patterns of Circular Loop Antenna with Uniform Current, Radiation Resistance of Loops, Directivity of Circular Loop Antennas with Uniform Current, Microwave antennas, Horn antennas, Helical Antenna, Yagi-Uda array, Parabolic reflectors, Log periodic array, Plasma antenna, Antenna for GPR. **Laboratory Sessions/ Experimental learning:** 1. Measurement of directivity and gain of Helical, Loop, Horn and Yagi antennas 2. Case study on 3-element printed Yagi-Uda antenna **Applications:** wave propagation and communications **Video link / Additional online information:** 1. https://lake.videoken.com/nptel/category/1052/	**8Hrs.**
LABORATORY SESSIONS:	

PART A: Hardware Experiments	
Sl No	Experiment Name
1.	Measurement of directivity and gain of microstrip Yagi antennas.
2.	Determination of Coupling and isolation characteristics of microstrip directional coupler.
3.	Determination of Resonance characteristics of microstrip ring resonator and computation of dielectric constant of the substrate.
4.	Power division and isolation of microstrip power divider.
5.	Measurement of frequency, guide wavelength, power, VSWR, and attenuation of the microwave test bench.
6.	Study of Isolator. Extraction of S- parameters.
7.	Study of Circulator. Extraction of S- parameters.
8.	Study the I-V Characteristics of Gunn Diode.
9.	Modelling of different planar microstrip patch antennas (square patch, circular patch, triangular patch etc.). Investigation of parametric requirements for simulation.
10.	Simulation of planar microstrip square (or circular, or triangular etc.) patch (or monopole) antenna and plotting the return loss bandwidth.
11.	Simulation of planar microstrip square (or circular, or triangular, or complementary etc.) patch (or monopole) antenna and investigating the gain and radiation patterns.
12.	Design of planar microstrip square (or circular, or triangular etc.) patch (or monopole) antenna, incorporation of fractal design and plotting the return loss bandwidth, investigation of surface current patterns.

Course outcomes:	
CO1	Design and analyze microwave transmission lines.
CO2	Identify various passive microwave components for different applications.
CO3	Design and analyze microwave antennas
CO4	Examine various antenna parameters necessary for building an RF system.
CO5	Recommend various antenna configurations according to the applications.

Reference Books:

1.	Annapurna Das, Sisir K Das, "Microwave Engineering", TMH Publication, 2nd edition, 2010.
2.	Liao, "Microwave Devices and Circuits" , Pearson education, 3rd edition, 2003.
3.	John D. Krauss, Ronald J Marhefka and Ahmad S Khan, "Antennas and Wave Propagation", 4th Special Indian Edition , McGraw- Hill Education Pvt. Ltd., 2010.
4	David M Pozar, "Microwave Engineering", John Wiley & Sons, Inc., 4th edition, 2014

Continuous Internal Evaluation (CIE):

Theory for 50 Marks

CIE is executed by way of quizzes (Q), tests (T) and assignments. A minimum of three quizzes are conducted along with tests. Test portion is evaluated for 50 marks and quiz is evaluated for 10 marks. Faculty may adopt innovative methods for conducting quizzes effectively. The number of quizzes may be more than three (conduct additional quizzes and take best three). The three tests are conducted for 50 marks each and the average of all the tests are calculated for 50. The marks for the assignments are 20 (2 assignments for 10 marks each). The marks obtained in test, quiz and assignment are added to get marks out of 100 and report CIE for 50 marks.

Laboratory- 50 Marks

The laboratory session is held every week as per the time table and the performance of the student is evaluated in every session. The average of the marks over number of weeks is considered for 30 marks. At the end of the semester a test is conducted for 10 marks. The students are encouraged to implement additional innovative experiments in the lab and are awarded 10 marks. Total marks for the laboratory is 50.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks are executed by means of an examination.

The Question paper for each course contains two parts, Part – A and Part – B. Part – A consists of objective type questions for 20 marks covering the entire syllabus. Part – B Students have to answer five questions, one from each unit for 16 marks adding up to 80 marks. Each main question may have a maximum of three sub divisions. Each unit will have internal choice in which both questions cover entire unit having same complexity in terms of COs and Bloom's taxonomy level.

CO-PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	-	1	-	-	1	-	-	1
CO2	3	3	3	2	-	1	-	-	1	-	-	1
CO3	3	3	3	2	1	1	-	-	1	-	1	1
CO4	3	3	3	2	1	1	1	-	1	-	1	1
CO5	3	3	3	2	1	1	1	-	1	-	1	1

High-3, Medium-2, Low-1

Semester: VI		
COMPUTER NETWORKS (Theory and Practice)		
Course Code:	MVJ21EC64	CIE Marks:100
Credits:	L:T:P: 3:0:2	SEE Marks: 100
Hours:	40L+26T	SEE Duration: 3 Hrs
Course Learning Objectives: The students will be able to		
1	Understand the layering architecture of OSI reference model and TCP/IP protocol suite.	
2	Know about the protocols associated with each layer.	
3	Learn the different networking architectures and their representations.	
4	Acquire a knowledge of various routing techniques and the transport layer services.	
5	Learn the security features and functionality of application layer protocols.	

UNIT 1	
Prerequisites: Basic knowledge on computers & programming **Introduction:** Data Communications: Components, Representations, Data Flow, Networks: Network criteria, Physical Structures, Network Types: LAN, WAN, Switching, Internet. **Network Models:** Protocol Layering: Scenarios, Principles, Logical Connections, TCP/IP Protocol Suite: Layered Architecture, Layers in TCP/IP suite, Description of layers, Encapsulation and Decapsulation, Addressing, Multiplexing and Demultiplexing, The OSI Model: OSI Versus TCP/IP. **Laboratory Sessions/ Experimental learning** : 1. Study and draw the layout of LAN connection in Computer Networks Lab in NetSim. List out the type of cabling involved. **Applications:** Ethernet, Fibernet, Satellite Communication. **Video link / Additional online information:** 1. http://www.redbooks.ibm.com/abstracts/gg243376.html 2. https://nptel.ac.in/courses/106/106/106106091/ https://nptel.ac.in/courses/106/105/106105080/	8Hrs.
UNIT 2	

Data-Link Layer: Introduction: Nodes and Links, Services, Categories of link, Sublayers, Link Layer addressing: Types of addresses, ARP. Data Link Control (DLC) services: Framing, Flow and Error Control, Data Link Layer Protocols: Simple Protocol, Stop and Wait protocol, Piggybacking. **Media Access Control:** Random Access: ALOHA, CSMA, CSMA/CD, CSMA/CA. **Wired LANs: Ethernet:** Ethernet Protocol: IEEE802, Ethernet Evolution, Standard Ethernet: Characteristics, Addressing, Access Method, Efficiency, and Implementation. **Wireless LANs:** Introduction: Architectural Comparison, Characteristics, Access control **Laboratory Sessions/ Experimental learning** : 1. Study and analyze packet transfer using CSMA/CD and CSMA/CA using NetSim. **Applications:** Collision detection and avoidance in wired and wireless network. **Video link / Additional online information:** https://nptel.ac.in/courses/106/105/106105183/	**8Hrs.**
UNIT 3	
Wireless LANs: Introduction: Architectural Comparison, Characteristics, IEEE 802.11: Architecture, MAC Sublayer, Addressing Mechanism, Physical Layer, Bluetooth: Architecture, Layers. **Connecting Devices:** Hubs, Switches. **Virtual LANs:** Membership, Configuration, Communication between Switches and Routers, Advantages. **Network Layer:** Introduction, Network Layer services: Packetizing, Routing and Forwarding, Other services, Packet Switching: Datagram Approach, Virtual Circuit Approach, IPV4 Addresses, Address Space, Classful Addressing, Classless Addressing, DHCP. **Laboratory Sessions/ Experimental learning** : 1. Study of different types of connecting devices. **Applications:** Bluetooth, WiFi, WiMax **Video link / Additional online information:**	**8Hrs.**

https://nptel.ac.in/courses/117/102/117102062/	
UNIT 4	
Transport Layer: Introduction: Transport Layer Services, Connectionless and Connection oriented Protocols, Transport Layer Protocols: Simple protocol, Stop and wait protocol, Go-Back-N Protocol, Selective repeat protocol. **Transport-Layer Protocols on the Internet:** User Datagram Protocol: User Datagram, UDP Services, UDP Applications, Transmission Control Protocol: TCP Services, TCP Features, Segment, Connection, State Transition diagram, Windows in TCP, Flow control, Error control, TCP congestion control. **Laboratory Sessions/ Experimental learning** : 1. Study of IP addressing, subnet mask and subnetting. **Applications:** Routing and forwarding packets. **Video link / Additional online information:** 1. https://nptel.ac.in/content/storage2/courses/106105080/pdf/M6L2.pdf	**8Hrs.**
UNIT 5	
Application Layer: Introduction: providing services, Application- layer paradigms, Standard Client -Server Protocols: World wide web, Hyper Text Transfer Protocol, FTP: Two connections, Control Connection, Data Connection, Electronic Mail: Architecture, Wed Based Mail, Telnet: Local versus remote logging. Domain Name system: Name space, DNS in internet, Resolution, DNS Messages, Registrars, DDNS, security of DNS. **Laboratory Sessions/ Experimental learning** : 1. Transport analysis using TCP/UDP using NetSim. **Applications:** MS Teams, Zoom, Cisco webex **Video link / Additional online information:** 1. http://www.digimat.in/nptel/courses/video/106105183/L11.html http://www.digimat.in/nptel/courses/video/106105183/L06.html	**8Hrs.**
LABORATORY SESSIONS	
1. Implement a point to point network with four nodes and duplex links between them. Analyze the network performance by setting the queue size and varying the	

bandwidth.

2. Implement a four-node point to point network with links n0-n1, n1-n2 and n2-n3. Apply TCP agent between n1-n2 and UDP between n1-n3. Apply relevant applications over TCP and UDP agents changing the parameter and determine the number of packets sent by TCP/UDP.
3. Implement Ethernet LAN using n (6-10) nodes. Compare the throughput by changing the error rate and data rate.
4. Implement ESS with transmission nodes in Wireless LAN and obtain the performance parameters.
5. Implementation of Link state routing algorithm.

Implement the following in C/C++ in Linux platform

6. Write a program for a HLDC frame to perform the following.
   i) Bit stuffing ii) Character stuffing.
7. Write a program for distance vector algorithm to find suitable path for transmission. For the given data, use CRC-CCITT polynomial to obtain CRC code. Verify the program for the cases. a. Without error, b. With error
8. Implementation of Sliding Window Protocol.
9. Write a program for congestion control using leaky bucket algorithm.

Course Outcomes: After completing the course, the students will be able to	
CO1	Analyze the layering architecture of computer networks and distinguish between the OSI reference model and TCP/IP protocol suite.
CO2	Apply the protocols and services of Physical and Data link layer.
CO3	Describe functions associated with network layer and connecting devices.
CO4	Analyze and apply the protocols and services of Transport layer.
CO5	Analyze and apply the protocols and services of application layer.

Reference Books:	
1.	Behrouz A Forouzan," Data Communication and Networks", 3rd Ed. TMH.
2.	Andrew S Tanebaum, "Computer Networks", 4th Ed. PHI/ Pearson education.
3.	S. Keshav, "An Engineering approach to Computer Networks", 5th Ed. Pearson.

4.	W.A. Shay, "Understanding communication and Networks", Thomson.

Continuous Internal Evaluation (CIE):

Theory for 50 Marks

CIE is executed by way of quizzes (Q), tests (T) and assignments. A minimum of three quizzes are conducted along with tests. Test portion is evaluated for 50 marks and quiz is evaluated for 10 marks. Faculty may adopt innovative methods for conducting quizzes effectively. The number of quizzes may be more than three (conduct additional quizzes and take best three). The three tests are conducted for 50 marks each and the average of all the tests are calculated for 50. The marks for the assignments are 20 (2 assignments for 10 marks each). The marks obtained in test, quiz and assignment are added to get marks out of 100 and report CIE for 50 marks.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks is executed by means of an examination. The Question paper for each course contains two parts, Part – A and Part – B. Part – A consists of objective type questions for 20 marks covering the entire syllabus. Part – B Students have to answer five questions, one from each unit for 16 marks adding up to 80 marks. Each main question may have a maximum of three sub divisions. Each unit will have internal choice in which both questions cover entire unit having same complexity in terms of COs and Bloom's taxonomy level.

CO-PO Mapping												
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	2	1	-	-	1	-	-	1
CO2	3	3	3	2	2	1	-	-	1	-	-	1
CO3	3	3	3	3	2	1	-	2	1	-	-	1
CO4	3	3	3	3	2	1	-	-	1	-	-	1
CO5	3	3	3	2	2	1	-	2	1	-	-	1

High-3, Medium-2, Low-1

Semester: VI		
SUMMER INTERNSHIP-II		
Course Code:	MVJ21INT68I	CIE Marks:50
Credits:	2	SEE Marks: 50
Hours: -	Industrial Oriented	SEE Duration: 3 Hrs
Course Learning Objectives: The students will be able to		
1	To get the field exposure and experience	
2	To apply the theoretical concept in field application	
3	To prepare the comparison statement of difference activities	

Internship: This shall be carried out by students in industry set-up related to the construction/ materials testing laboratories/research organizations/project management consulting firms/QS and QA organizations/ planning and design offices/Professional organizations and other avenues related to the Electronics and Communication engineering domain in consultation and approval of internship guide/HOD /internship committees of the institutions.

Course outcomes: At the end of the course the student will be able to:

CO1	Develop skills to work in a team to achieve common goal. Develop skills of project management and finance.
CO2	Develop skills of self-learning, evaluate their learning and take appropriate actions to improve it.
CO3	Prepare them for life-long learning to face the challenges and support the technological changes to meet the societal needs.

Scheme of Evaluation :

Internal Marks: The Internal marks (50 marks) evaluation shall be based on midterm and final presentation of the activities undertaken during the internship, to a panel comprising internship guide, a senior faculty from the department and head of the department. Each student should submit the internship report at the end of semester with internship certificate.

Semester End Examination: Viva-Voce examination shall be conducted by a panel of examiners consisting of internship supervisor, a senior faculty from the department and head of the department.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	3	2	1	1	2	1	1	2
CO2	2	2	2	3	3	2	1	1	2	1	2	2
CO3	2	2	2	3	3	2	1	1	2	1	2	2

High-3, Medium-2, Low-1