

Faculty of Engineering & Technology

P.K.University

Shivpuri (MP)



Evaluation Scheme & Syllabus for
Department of Electronics & Communication Engg.
(V to VI Semester)

(Effective from session 2025-26)

EVALUATION SCHEME
DIPLOMA – ELECTRONICS & COMM. ENGG

Study And Evaluation Scheme For Diploma in Electronics & Comm. Engg.- 6 SEM												
SEMESTER-6												
SUBJECTCODE	SUBJECTSNAME	STUDY SCHEME Periods/Week			Credits	Marks In Evaluation Scheme						Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	T	P		Th	Pr	Tot	Th	Pr	Tot	
DENVIEC601	Environmental Education & Disaster Management	4	-	-	4	30	-	30	70	-	70	100
DMICREC602	Microprocessor And Application	4	1	-	5	30	-	30	70	-	70	100
DMODEEC603	Modern Communication System	4	-	-	4	30	-	30	70	-	70	100
DMICREC604	Microwave & Radar Engineering	4	-	-	4	30	-	30	70	-	70	100
DMICREC605	Microprocessor And Application Lab	-	-	2	1	-	25	25	-	25	25	50
DMODEEC606	Modern Communication System Lab	-	-	2	1	-	25	25	-	25	25	50
DPROJEC607	PROJECT	-	-	12	6	-	100	100	-	100	100	200
Total		16	1	16	25	120	150	270	280	150	430	700

Department of Electronics & Communication Engineering
(Faculty of Engineering & Technology)
P.K. University, Shivpuri (MP)
III Year VI Semester
DENVIEC601
ENVIRONMENTAL EDUCATION & DISASTER MANAGEMENT
(L-T-P-4-0-0)

DETAILED CONTENTS

1. INTRODUCTION:

- Basics of ecology, Ecosystem, Biodiversity Human activities and its effect on ecology and eco system, different development i.e. irrigation, urbanization, road Development and other engineering activities and their effects on Ecology and eco system, Mining and deforestation and their effects.
- Lowering of water level, Urbanization.
- Biodegradation and Biodegradability, composting, bio remediation, Microbes .
Use of biopesticides and biofungicides.
- Global warning concerns, Ozone layer depletion, Green house Effect, Acid Rain, etc.

2. POLLUTION:

Sources of pollution, natural and manmade, their effects on living environments
And related legislation.

2.1 WATER POLLUTION:

- Factors contributing water pollution and their effect.
- Domestic waste water and industrial waste water. Heavy metals, microbes and Leaching metal.
- Physical, Chemical and Biological Characteristics of waste water.
- Indian Standards for quality of drinking water.
- Indian Standards for quality of treated waste water.
- Treatment methods of effluent (domestic waste water and industrial/ Mining Wastewater), its reuse/safe disposal.

2.2 AIR POLLUTION:

Definition of Air pollution, types of air pollutants i.e. SPM, NOX, SOX, CO, CO₂, NH₃, F, CL, causes and its effects on the environment.

- Monitoring and control of air pollutants, Control measures techniques.
Introductory Idea of control equipment in industries i.e.
 - A. Settling chambers
 - B. Cyclones
 - C. Scrubbers (Dry and Wet)
 - D. Multi Clones
 - E. Electro Static Precipitations
 - F. Bog Fillers.
- Ambient air quality measurement and their standards.
- Process and domestic emission control
- Vehicular Pollution and Its control with special emphasis of Euro-I, Euro-II, Euro-III and Euro IV.

2.3 NOISE POLLUTION:

Sources of noise pollution, its effect and control.

2.4 RADIOACTIVE POLLUTION:

Sources and its effect on human, animal, plant and material, means to control and Preventive measures.

2.5 SOLID WASTE MANAGEMENT:

Municipal solid waste, biomedical waste, Industrial and Hazardous waste, Plastic Waste and its management.

3. LEGISLATION:

Preliminary knowledge of the following Acts and rules made there under-

- The Water (Prevention and Control of Pollution) Act - 1974.
- The Air (Prevention and Control of Pollution) Act - 1981.
- The Environmental Protection (Prevention and Control of Pollution) Act -1986.

Rules notified under EPAct - 1986 Viz.

- # The Manufacture, Storage and Import of Hazardous Chemical (Amendment)Rules, 2000
- # The Hazardous Wastes (Management and Handling) Amendment Rules, 2003
- # Bio-Medical Waste (Management and Handling) (Amendment) Rules, 2003.
- # The Noise Pollution (Regulation and Control) (Amendment) Rules, 2002.
- # Municipal Solid Wastes (Management and Handling) Rules, 2000.
- # The Recycled Plastics Manufacture and Usage (Amendment) rules, 2003.

4. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) :

- Basic concepts, objective and methodology of EIA.
- Objectives and requirement of Environmental Management System (ISO-14000) (An Introduction).

5. DISASTER MANAGEMENT:

Definition of disaster - Natural and Manmade, Type of disaster management, How disaster forms, Destructive power, Causes and Hazards, Case study of Tsunami Disaster, National policy- Its objective and main features, National Environment Policy, Need for central intervention, State Disaster Authority- Duties and powers, Case studies of various Disaster in the country, Meaning and Benefit of vulnerability reduction, Factor promoting vulnerability reduction and Mitigation, Emergency support function plan. Main feature and function of National Disaster Management Frame Work, Disaster mitigation and prevention, Legal Policy Frame Work, Early warning system, Human Resource Development and Function, Information dissemination and communication.

Department of Electronics & Communication Engineering
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P.K. University, Shivpuri (MP)
III Year VI Semester
DMICREC602
MICROPROCESSORS AND APPLICATIONS

(L-T-P-4-1-0)

1. OVERVIEW OF MICROCOMPUTERS SYSTEM:

1.1 Functional block.

- (a) CPU. (b) Memory.
- (c) Input/Out devices (Key board, Floppy drive, Harddisk drive, Tape drive, VDU, Printer, Plotter).

1.2 Concept of programme and data memory.

- (a) Registers (general purpose). (b) external memory for storing data and results.

1.3 Data transfer between registers.

1.4 Concept of tristate bus.

1.5 Control on registers.

2. INTRODUCTION OF 8085 MICROPROCESSOR:

Evolution of Microprocessor, Register Structure, ALU, BUS Organization, Timing and Control. Internal Architecture of 8085 microprocessor, Pin diagram and input output (in detail)

3. INTRODUCTION OF 8086 MICROPROCESSOR:

Internal organization of 8086, Bus Interface Unit, Execution Unit, Unit, register, Organization, Sequential Memory Organization, Bus Cycle.

4. ASSEMBLY LANGUAGE PROGRAMMING :

Addressing Modes, Data Transfer, Instructions, Arithmetic & Logic Instruction, Program Control Instructions (Jumps, Conditional Jumps, Subroutine Call) Loop and String Instructions, Assembler Directives.

5. BASIC I/O INTERFACING :

Programmed I/O, Interrupt Driven I/O, DMA, Parallel I/O (8255-PPI, Centronics Parallel Port), Serial I/O (8251/8250, RS-232 Standard), 8259-Programmable Interrupt Controller, 8237-DMA Controller, 8253/8254-Programmable Timer/Counter, A/D and D/A conversion.

6. MEMORY INTERFACING :

Types of Memory, RAM and ROM Interfacing with Timing Considerations, DRAM Interfacing. Memory organization, Extension of memory in word length and depth, Memory mapping, Bus contention and How to avoid it.

7. ADVANCE MICROPROCESSOR AND MICRO CONTROLLERS :

Brief idea of Microcontroller 8051, Pentium and Power PC

NOTE : Study of Popular ICs Read/Write Chips-8155/8156, 2114,2148,2164. ROM Chips- 8355,2716,2732,8755. Other support chips - 8279,8257,8275,8205.

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III Year VI Semester
DMODEEC603

MODERN COMMUNICATION SYSTEMS

(L-T-P-4-0-0)

1. INTRODUCTION TO COMMUNICATION SYSTEM :

Basic idea of telegraphy, telephonic, digital, microwave, fiber optics, satellite, mobile and data communication.

Features of Microwave communication system, Block diagram, Antenna types.

2. TELEGRAPHY AND TELEPHONY:

- A. Facsimile transmission- Elementary idea of Fax machine and its operation, Transmission and Receiving process
- B. Telephone component- Construction and working of transmitter and receiver components, parts, circuit and working of subscriber's push button telephone sets.
- C. Brief idea of Automatic Exchanges
- D. Brief Idea of Electronic Exchanges and PCO.

3. DIGITAL SWITCHING SYSTEM :

Salient feature, architecture and services of C-DOT 128, C-DOT 256, C-DOT 512, EWSD (Electronic Digital Switching Network, OCB-283.

4. DIGITAL COMMUNICATION:

- 4.1 Elements of Digital Communication and information theory : Model of a digital communication system, Logarithmic measure of information. Source coding fixed in and variable length code words. Hartely-Shannon law for channel.
- 4.2 Sampling Theory and Pulse Modulation : Sampling theorem, Signal reconstruction in time domain. Types of analog pulse modulation, Method of generation and detection of PWM, PNM and PPM.
- 4.3 Waveform Coding Technique : Quantization, Quantization noise, Encoding and Pulse code modulation, Differential pulse code modulation, Delta modulation, Comparison of PCM and DM.
- 4.4 Digital Multiplexing : Fundamentals of time division multiplexing electronic commutator.
- 4.5 Digital Modulation Techniques : Types of digital modulation, Wave forms for amplitude, Frequency and phase shift keying, Method of generation and detection of coherent and non-coherent binary ASK,FSK & PSK, Differential phase shift, Quadrature modulation techniques. (QPSK and MSK) Probability of error and comparison of various digital modulation techniques.
- 4.6 Error Control Coding : Error free communication over a noisy channel, Hamming sphere, Hamming distance and Hamming bound, Relation between minimum distance and error detecting and correcting capability.

5. SATELLITE COMMUNICATION:

- (i) Introduction, historical background and basic Concepts of satellite communication. Elements of satellite communication link.
- (ii) Geostationary orbits, Orbit mechanisms and launching of satellite
- (iii) Satellite space craft- Satellite sub system, Tracking and Command, Communication subsystem, Transponders, Space Craft antenna
- (iv) Satellite Channel and Link Design : Design of down links and uplinks.
- (v) Earth stations technology : Earth Station Design, Earth Station Tracking, Low noise amplifiers.
- (vi) Multiple access techniques : Frequency Division Multiple Access (FDMA), FDM/FM/FMFDMA, Time division, Multiple Access, Frame Structure and Synchronization, Code division, Multiple Access, random Access.
- (vii) Introduction to DTH system

6. MOBILE COMMUNICATION :

Evaluation of mobile communication, A simplified reference model for mobile communications. A brief introduction of frequency for radio transmission, signals, propagation, Multiplexing, Modulation, Spread spectrum, Cellular system. Medium Access Control : Introduction To MAC, Advance Mobile Phone. Introduction to GSM(Global System For Mobile Communication), GPRS, GPS, Enable Positioning System. System Architecture, Protocol Architecture, Physical Layer and MAC layer. Mobile Networks

7. DATA COMMUNICATION :

- 1. Data Transmission Basics : Review of digital data analog modulation and digital formats. Data rates, Baud Rates, Channel capacity, Mediums for communication, Synchronous and asynchronous data communication.
- 2. ISO-OSI model and TCP/IP model of network, Protocols and services. Connection oriented and connectionless services, their interpretation at different layers. Quality of services, Design issue for different layers.
- 3. Data Links Layer Design Issues : Services provided to network layer forming: Necessity and techniques. Error control feature and review of techniques.
- 4. IEEE 802 standards for computer networks.
- 5. Brief idea of network layer, transport layer.
- 6. Internet and ISDN services.
- 7. 3G Technology, Y Max Technology, LTE, FTTL, Antenna used in mobile communication, Mobile Handset, IME number, SIM, IPB-4 and IPB-6, Router, Switch, LAN, WAN

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III Year VI Semester

DMICREC604
MICROWAVE AND RADAR ENGINEERING

(L-T-P-4-0-0)

DETAILED CONTENTS

1. E.M. WAVE THEORY:

- 1.1 Boundary Condition and different forms of Maxwell Equation
- 1.2 Concept of polarization of EM waves.
- 1.3 Concept of the electromagnetic radiation and propagation.

2. ANTENNA :

A study of Microwave antenna

3. MICROWAVE:

- 3.1 Introduction to microwave and its applications, classification on the basis of its frequency band according to ITU standards.
- 3.2 Effects of inter electrode capacitance, lead inductance and transit time on the signal frequency performance of conventional operations.
- 3.3 Construction, Operating Principles, Performance characteristics and Applications of the following -
 - (a) Microwave Tubes- Multi-cavity Klystron, Multi-cavity Magnetron, Reflex Klystron, Travelling wave tube and BWO.
 - (b) Microwave Semiconductor Devices - PIN, Tunnel Diode, IMPATT and TRAPATT and Gun diode .
- 3.4 Different types of waveguides and their applications. Propagation constant of a rectangular waveguide, cut off wavelength, guide wavelength. (No Mathematical Derivation)
- 3.5 Microwave components-Tees, Bends, Matched termination, Detector mount, Slotted section, directional coupler, Circulator & duplexer-their constructional features characteristics and application.

- 3.6 Microwave antennas-horn and parabolic disk antennas-their characteristics and typical applications.
- 3.7 Block diagram and working principles of microwave systems.
- 3.8 Microwave power measurements thermal convertors.
- 3.9 Planning of microwave links-Line of sight, Fresnel zones reflecting surfaces and fade margin.
- 3.10 Tropo scatter links-Basic idea only

4. RADAR SYSTEMS:

- 4.1 Introduction to Radar, its various application. Radar range equation (No Derivation) and its application.
- 4.2 Block diagram and operating principle of basic pulse radar, concept of ambiguous range.
- 4.3 Block diagram, operating principle of CW (Doppler) and FMCW radars and their application.
- 4.4 Block diagram and operating principle of MTI radar.
- 4.5 Radar display-PPI

5. RADIO AIDS TO NAVIGATION:

- 5.1 Application of loop antenna in direction finding, Errors adock antenna.
- 5.2 Description of different navigational system-VHF omni range (VCR). Distance measuring equipment (DME), Long Rang Navigational (LORAN), Instrument Landing System (ILS) and Ground Control Approach.

6. SATELLITE COMMUNICATION:

- 6.1 Basic idea passive and active satellites.
- 6.2 Meaning of the terms Orbit, Apogee and Perigee.
- 6.3 Geo-stationary satellite and its need.
- 6.4 Block diagram and explanation of a satellite communication link.

7. FACSIMILE TRANSMISSION:

- 7.1 Basic concept.
- 7.2 Specifications of facsimile transmitter and receiver.
- 7.3 Block diagram & function of each block.

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III Year VI Semester

DMICREC605

MICROPROCESSORS AND APPLICATIONS-LAB

(L-T-P-0-0-2)

LIST OF PRACTICALS

1. Assembly language programming :- Programming of simple problems. Assembly Language Programming using addition, subtraction, multiplication, division, larger, largest, smaller, smallest, positive and negative, etc. 8 bit and 16 bit based programming
2. Simple programming problems using 8085 and 8086 microprocessor.
Trainer kit to gain competence in the use of
 - (a) 8085 and 8086 Instruction set.
 - (b) Support chips of 8085 and 8086.

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III Year VI Semester

DMICREC606

MODERN COMMUNICATION SYSTEMS-LAB

(L-T-P-0-0-2)

LIST OF PRACTICALS

1. Study of FAX machines and its working.
2. To study the parts of telephone hand set :
 - (a) Frequency response of telephone receiver.
 - (b) To observe the wave form of impulses by dialing a number.
3. Visit and study of Digital Switching System.
4. Visit and study of Satellite transmission system.
5. Demonstration of sampling, FSK and PSK by simple experiment.
6. Demonstration of optical fiber communication through simple kits.
7. Study of working of mobile phones and its services.
8. Study and use of ISDN and Internet services.
9. Testing and fault finding of mobile phone and its service.
10. Visit and study of cellular base station.
11. Study of DTH system

NOTE: Report of every visit has to be submitted by each student along with the practical record to be examined by the examiner.

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DPROJEC607: PROJECT

(L-T-P-0-0-12)

GENERAL OBJECTIVE:

Purpose of the project work is :

- (i) To develop abilities of diagnosing problems.
- (ii) To develop the abilities to :
 - (a) Make literature survey.
 - (b) Design/develop/fabricate/test simple circuits.
 - (c) Prepare documents for electronic work.
 - (d) Work as a team.

LIST OF PROJECTS (TO BE ASSESSED INTERNALLY):

The list of projects shown below is indicative of general nature and the complexity of work to be entrusted to students. (Teachers can modify this list to suit local needs and constraints keeping the level of complexity as suggested here).

1. To make simple circuit which will demonstrate the use of transistor as a switch. (The student should measure I_c and V_{ce} in this circuit when I_b is varied from zero to a maximum value and measures the value of I_b (sat), I_c (sat), V_{ce} (sat) and H_{fe} (min) for saturation at a given supply voltage and load.
2. To calculate the values and assemble and test simple transistor switching circuit to switch on a
 - (a) LED.
 - (b) Relay.
 - (c) 200/500 ma. lamp. (6v/12v).
3. Make a battery eliminator
4. Make a battery charger.
5. Fabricate (including making PCB) and testing of regulated power supply (series and shunt circuit using zener diode & IC type).
6. Assembly and testing of a two band transistor radio receiver.
7. Fabrication and testing of any ICs of consumer interest, For example.
 - (a) Fan regulator/Light dimmer.
 - (b) Timer using IC 555.
 - (c) Burglar's alarm.
 - (d) Digital clock.

The list is only suggestive, more items may be included

LIST OF PROJECTS

NOTE: The list of projects shown below is to be used as a guideline by the BTE(UP) for drawing up the project list for the diploma examination. Expert team formulating the final list may consult this list to ensure that the complexity level is consistent with the guideline set here.

1. AMPLIFIERS:

- 1.1 Simple transistor / FET / IC amplifier to meet the given specifications.
- 1.2 Audio frequency mono/stereo amplifier including usual control facilities (including power amplifier and power supply stages).

2. OSCILLATORS:

- 2.1 Sine wave oscillators of given specifications using transistors/FETs/ICs (tuned oscillators, phase shift, including Wein's Bridge oscillators).
- 2.2 Multivibrators of different types to produce square wave output signals of given specifications (Monostable, Bistable and Astable) using transistor FET or IC circuits.
- 2.3 Simple function generators.

3. POWER SUPPLIES:

- 3.1 Single dual and multiranged low voltage and low power fixed variable D.C. power supplies of different specifications using transistor and regulator ICs.

4. TIMERS AND OPERATIONAL AMPLIFIERS:

- 4.1 Timers of different types using 555/556 ICs.
- 4.2 Amplifiers, oscillators, active filters, differentiations, integrator, scale changer and other simple circuits using operational modules.

5. DIGITAL CIRCUITS:

- 5.1 Simple three digit counter.
- 5.2 24 hour and 12 hour digital clock.
- 5.3 Electronic multimeter.
- 5.4 A/D and D/A convertors.
- 5.5 Interface circuits using Microprocessors.

6. MISCELLANEOUS CIRCUITS:

- 6.1 Fan regulators, motor speed control, phase controlled rectifier and similar circuits using Thyristor/Triac/Diac/UJT and similar PNP devices.

7. RADIO RECEIVER:

- 7.1 Simple one or two band AM radio receiver.
- 7.2 Simple trans receiver.
- 8. Mobile Phone based devices and Microcontroller based devices.

NOTE:-

1. Depending upon the complexity of the work, the teacher may assign any number of project work to a group. The group size will also be similarly decided by the teacher, normally between 2 to 4 students per group.
2. The board may request all heads of Electronics Engineering Departments of U.P. Polytechnics to provide list of projects. An expert committee may be appointed to screen the project list.
3. The BTE (UP) may adopt the following format for the project report.

FORMAT

A project report (of about 100 typed computer pages) should submitted covering the following points.

1. Basic design procedure for the project circuit.
2. Full block diagram and/or circuits diagram showing the component values.
3. Component layout diagram, including component and copper side details of the PCB used.
4. List of components used showing types voltage/current ratings, tolerance values and other specifications.
5. Details of heat sink used IC and Transistor pin connections and types of packages.
6. Front panel layout and chassis details. (as relevant)
7. Test and measurement procedure.
8. Discussion on the deviation of the results from the given specifications.
9. Estimating and costing with discussion about selection of components from cost point of view.

NOTE: For specialization Digital Electronics and Microprocessors and Radio, Audio Video Engineering, Mobile Communication more project in these subjects should be given by the teachers.

9. AMPLIFIERS:

- 9.1 Simple transistor / FET / IC amplifier to meet the given specifications.
- 9.2 Audio frequency mono/stereo amplifier including usual control facilities (including power amplifier and power supply stages).

10. OSCILLATORS:

- 10.1 Sine wave oscillators of given specifications using transistors/FETs/ICs (tuned oscillators, phase shift, including Wein's Bridge oscillators).
- 10.2 Multivibrators of different types to produce square wave output signals of given specifications (Monostable, Bistable and Astable) using transistor FET or IC circuits.
- 10.3 Simple function generators.

11. POWER SUPPLIES:

- 11.1 Single dual and multiranged low voltage and low power fixed variable D.C. power supplies of different specifications using transistor and regulator ICs.

12. TIMERS AND OPERATIONAL AMPLIFIERS:

- 12.1 Timers of different types using 555/556 ICs.
- 12.2 Amplifiers, oscillators, active filters, differentiations, integrator, scale changer and other simple circuits using operational modules.

13. DIGITAL CIRCUITS:

- 13.1 Simple three digit counter.
- 13.2 24 hour and 12 hour digital clock.
- 13.3 Electronic multimeter.
- 13.4 A/D and D/A convertors.
- 13.5 Interface circuits using Microprocessors.

14. MISCELLANEOUS CIRCUITS:

- 14.1 Fan regulators, motor speed control, phase controlled rectifier and similar circuits using Thyristor/Triac/Diac/UJT and similar PNP devices.

15. RADIO RECEIVER:

- 15.1 Simple one or two band AM radio receiver.
- 15.2 Simple transreceiver.
- 16. Mobile Phone based devices and Microcontroller based devices.

NOTE:-

- 4. Depending upon the complexity of the work, the teacher may assign any number of project work to a group. The group size will also be similarly decided by the teacher, normally between 2 to 4 students per group.
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NOTE: For specialization Digital Electronics and Microprocessors and Radio, Audio Video Engineering, Mobile Communication more project in these subjects should be given by the teachers.