PEOPLE'S UNIVERSITY, BHOPAL

(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **Diploma in Engineering** **Semester –V**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
DEC15011	Communication Network & Transmission Lines	3	1	-			Min: 40 (D Grade)			Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance – Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional – Nil Max Marks: Nil	Assignment/Quiz/Attendance – Max. Marks: Nil

Pre-Requisite	Basic Knowledge of Network Theory.
Course Outcome	1. Ability to understand various network parameters.
	2. Properties and applications of various types of filters.
	3. Ability to understand transmission line theory.

Unit	Contents (Theory)	Marks Weightage
I	**Network Parameters:** Open circuit impedance (Z) parameters - short circuit admittance (Y) parameters - transmission (ABCD) parameters and inverse transmission parameters - Hybrid (h) parameters and inverse hybrid parameters - Conversion between parameters - interconnection of two-port networks	**14**
II	**Time and Frequency Domain Analysis:** Network elements- Network function- driving point and transfer impedances and their properties- Poles and zeros of network function, Time domain response for pole-zero plot. Frequency response of RLC networks- frequency response from pole-zero plots.	**14**
III	**Network Filters:** Classification of filters - characteristic impedance in the pass band and stop band, constant K filters - m-derived filters – BPF and BSF. Insertion loss and reflection factor- Attenuators – Equalizer - T section and Pi section filters – Twin T networks, Bridged T and lattice networks.	**14**
IV	**Transmission Line Theory:** Transmission line equation – Primary and secondary constants. skin effect- wavelength- velocity of propagation- group velocity. Waveform distortion- distortion less transmission line telephone cable- inductance loading of telephone cables. Open and short circuit lines.	**14**
V	**Transmission Line at Radio Frequencies**: Line with any termination- Input impedance, input impedance of a lossless line, Reflection coefficient- Standing wave ratio. Ultra high frequency lines- Characteristics impedance, SWR, Smith chart- applications of smith chart. Stub matching- Single and double.	**14**

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Programme: **Diploma in Engineering** **Semester –V**

Text Book/References Books/ Websites :-

1. M.E. Van Valkenburg; "Network Analysis"; PHI, Third Edition, 2008.
2. John. D. Ryder; "Network lines and fields"; PHI Learning, Second Edition, 2005.
3. Umesh Sinha; "Transmission lines and Networks"; Satya Parkashan Publishers, 1997
4. Shyammohan and Sudhakar; "Circuits and Networks"; Tata McGraw Hill, 1994.
5. Frankline F.Kuo; "Network Analysis and Synthesis"; Wiley Eastern Edition, 1996.

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Programme: **Diploma in Engineering** **Semester –V**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total
DEC15012	Linear Integrated Circuits	3	1	-	External (70)	Internal (30)	Min: 40 (D Grade)	External (Nil)	Internal (Nil)	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance – Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional – Nil Max Marks: Nil	Assignment/Quiz/Attendance – Max. Marks: Nil

Pre-Requisite	Basic Knowledge of Electronic Components.
Course Outcome	1. Ability to understand fabrication process.
	2. Properties and applications of IC's.
	3. Properties and applications of Digital IC's.

Unit	Contents (Theory)	Marks Weightage
I	**Fabrication Of Integrated Circuits -** Crystal – growth – water preparation – epitoxy – vapour – phase, molecular – beam oxidation – oxide properties – induced defects – lithography – optical, reactive plasma etching and feature size control – models of diffusion in solids, in SiO_2	**14**
II	**Linear Integrated Circuits -** Introduction to Linear IC – operational amplifiers – characteristics – application of op amp – arithmetic circuits, amplifier, rectifiers, op amp circuits using diodes – I, II order filters, waveform generators, using op amps – square, triangular and sine wave generation.	**14**
III	**Digital Integrated Circuits -** Designing combinational logic gates in CMOS – very high performance – Design of sequential logic circuits – arithmetic building blocks – design of memory and array structures.	**14**
IV	**VLSI Integrated Circuits -**Fundamental consideration – NMOS, CMOS, Bipolar IC technology – IC fabrication - assembly technique and packaging of VLSI devices – reliability requirements for VLSI – failure mechanisms.	**14**
V	**Special Application Ic's -** Functional Block diagram of op-amp 741c IC. Functional Block diagram of ADC and DAC, Integrating ADC, Sigma Delta ADC, successive approximation ADC.	**14**

Text Book/References Books/ Websites:-

1. Ramakant A, Gayakwad; OP-Amps and Linear Integrated Circuits; Prentice Hall of India, New Delhi.
2. Roy Choudhury and Shail Jain; 'Linear Integrated Circuits'; New Age Publications.

Suggested List of Laboratory Experiments :- (Expandable): Ni

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Programme: **Diploma in Engineering** **Semester –V**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
DEC15013	Data Communication & Networks	3	1	-			Min: 40 (D Grade)			Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance – Max. Marks: 15
Practical Internal Max Marks: Nil	Lab work & Sessional – Nil Max Marks: Nil	Assignment/Quiz/Attendance – Max. Marks: Nil

Pre-Requisite	Basic Knowledge of Networking.
Course Outcome	1. Ability to understand basic properties of LAN, WAN, and MAN.
	2. Properties and applications of various types of Switching.
	3. Properties and applications of TCP/IP Protocol.

Unit	Contents (Theory)	Marks Weightage
I	**Basics Of Data Communication Introduction :** Concepts of data communication system, Signal and Data, Analog and Digital Signals, Transmission technology: Signal Transmission, Digital signaling, Analog Signaling, Transmission Modes: simplex, half duplex and full duplex, Asynchronous & synchronous Transmission, Parallel and Serial Transmission, Base band and Broadband transmission, Wired & Wireless transmission.	**14**
II	**Basics of Networks:** Definition, Need, Uses and Advantages. Types of Computer Networks- LAN ,MAN ,WAN Network Architectures- Peer to Peer , Client-Server, Hybrid, Intranet, Internet and Extranet. etc Networking Devices – NIC, Modem, Hub, Repeater, Switches, Bridge, Router, Gateway, Wi-Fi, VSAT.	**14**
III	**Guided Media:** Twisted Pair -UPT, STP, Coaxial Cable, Optical Fiber - Advantages and Disadvantages of optical fiber and uses. **Un-Guided Media:** Wireless Communication –Communication Band, Microwave Communication, Satellite Communication. **Switching:** Circuit Switching, Packet Switching and Message Switching. **Network Topology**-Ring, Star, Mesh, Tree, Bus etc.	**14**
IV	**Network Reference Model Protocol and Services:** OSI reference model, TCP/IP Reference Model -Function of each layer and Protocol, Comparison of the OSI and TCP/IP reference models.	**14**
V	**Network Security:** Network security issues, approaches to network security, hacking. Firewalls: types of firewall technology- network level and application level, IP packets filter screening routers, limitations of firewalls. Encryption and Decryption – Cryptography, Public/Private key encryption.	**14**

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Programme: **Diploma in Engineering** **Semester –V**

Text Book/References Books/ Websites

1. Behrouz A. Forouzan; "Data Communication and Networking"; Tata McGraw Hill, New Delhi.
2. Miller; "Data and Network Communications"; Cengage Learning, Singapore.
3. William A. Shay; "Understanding Data Communication networks"; Cengage Learning.
4. William Stallings; "Data and Computer Communication"; PHI Learning, New Delhi.

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Programme: **Diploma in Engineering** **Semester –V**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
DEC1502	Control System	3	1	-			Min: 40 (D Grade)			Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance – Max. Marks: 15
Practical Internal Max Marks: -Nil	Lab work & Sessional – Nil Max Marks: Nil	Assignment/Quiz/Attendance – Max. Marks: Nil

Pre-Requisite	Basic Knowledge of Various types of signals.
Course Outcome	1. Ability to understand properties of a control system.
	2. Ability to understand Time response analysis.
	3. Properties and applications of various plots.

Unit	Contents (Theory)	Marks Weightage
I	**Basic Control System** Terminology and Classification of control System, Examples of control System, Transfer Function of Linear Control System, Block Diagram Representation, Signal flow Graph Techniques.	**14**
II	**Time Response Analysis**- Standard Test Signals, Time Response of 1st Order System, Control System, Time Response of Prototype 2nd Order System, Performance Specification of 2nd Order System, Steady-State Errors and Error Constants	**14**
III	**Time Domain Stability Analysis**- Concept of Stability of Linear Systems, Effects of Location of Poles on Stability, Necessary Conditions for Stability, Routh-Hurwitz Stability Criteria, Relative Stability Analysis,	**14**
IV	**Polar Plot**-Root Locus Concept, Guidelines for Sketching Root-Locus,. Frequency Domain Stability Analysis- Performance Specification in Frequency Domain, Co-relation between	**14**
V	**Other plots**- Bode Plot, Minimum-Phase and Non-Minimum Phase System, Polar Plots, Inverse Polar Plot, Nyquist Stability Criterion. Numerical based on above plots.	**14**

Text Book/References Books/ Websites-

1. Nagrath and Gopal ; Control System Engineering; New Age International Publishers.
2. Samarjit Ghose; Control Systems Theory and Applications; Pearson Education.
3. B. S. Manke ; Linear Control System (with MATLAB Application); Khanna Publishers.
4. Ogata; Modern Control Engineering; PHI.

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Programme: **Diploma in Engineering** **Semester –V**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
DEC1503	Digital Communication	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance – Max. Marks: 15
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/Quiz/Attendance – Max. Marks: 05

Pre-Requisite	Basic Knowledge of signals.
Course Outcome	1. Ability to understand sampling process.
	2. Properties and applications of digital modulation techniques.
	3. Properties and applications of Multiplexing techniques.

Unit	Contents (Theory)	Marks Weightage
I	**Digital communication & digital modulation**: Introduction to digital communication, Sampling theorem , Types of sampling , Instantaneous, Natural and Flat Top, aperture effect, aliasing, pulse modulation, Pulse Amplitude Modulation (PAM), Pulse Position and pulse width modulation and their typical applications	**14**
II	**Pulse code modulation:** Quantization, Quantization Error, Basics of Pulse Code Modulation (PCM), Companding, Inter-symbol Interference, Differential PCM (DPCM), Delta Modulation (DM), Limitations of delta modulation and Adaptive Delta Modulation (ADM), asynchronous transmission, synchronous transmission	**14**
III	**Digital modulation techniques:** Analysis, Generation and Detection (Block Diagram), Amplitude shift keying (ASK), frequency shift keying (FSK), phase shift keying (PSK), Quadrature amplitude modulation (QAM).	**14**
IV	**Modem & Subscriber Lines :** Telephone modem, fax modem and data modem, cable modem, digital subscriber lines, ADSL.	**14**
V	**Multiplexing and multiple access techniques:** multiplexing and multiple access, FDM and TDM, FDMA, TDMA & CDMA.	**14**

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Programme: **Diploma in Engineering** **Semester –V**

Text Book/References Books/ Websites

1. B.P. Lathi ; Modern Analog and Digital Communication System; Wiley Eastern limited.
2. Taub and Schilling ; Principles of communication Systems; TMH.
3. Singh and Sapre ; Communication Systems; TMH.

Suggested List of Laboratory Experiments :- (Expandable):

1. To Perform Pulse Code Modulation.
2. To Perform Pulse Amplitude Modulation.
3. To Perform Pulse Width Modulation.
4. To Perform Pulse Position Modulation.
5. To Study Sampling Theorem.
6. To Perform Amplitude Shifting Key.
7. To Perform Phase Shifting Key.
8. To Perform Frequency Shifting Key.

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Programme: **Diploma in Engineering** **Semester –V**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
DEC1504	Antenna & Microwave Engineering	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance – Max. Marks: 15
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/Quiz/Attendance – Max. Marks: 05

Pre-Requisite	Basic Knowledge of Electromagnetic Theory.
Course Outcome	1. Ability to understand basics of antenna system.
	2. Properties and applications of Microwave waveguides.
	3. Properties and applications of Microstrips.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction of Antenna:** Properties of antenna and application of antenna, Definition and physical concepts of the terms used with antennas like point source, directivity, gain, aperture, effective area, radiation pattern, beam angle, beam width and radiation.	**14**
II	**Antenna array:** uniform array, broadside array and end-fire array. Types of antennas: characteristics and typical applications of half wave dipole, medium wave antenna, folded dipole, turns tile, loop antenna , yagi- uda antenna.	**14**
III	**Introduction to Microwaves:** applications, Classification on the basis of its frequency bands. Wave Guides, modes of wave guide, rectangular and circular wave guide.Propogation constant of a rectangular wave guide, cut off wavelength, guide wavelength and their relationship with free space wavelength.	**14**
IV	**Microwave Components:** Scattering matrix, Properties of scattering matrix of reciprocal, nonreciprocal, loss less, Passive networks, Examples of two, three and four port networks Constructional features, characteristics-plane tee, H- plane tee, Hybrid T, Magic tee and application. Directional couplers, Multi-hole directional coupler.	**14**
V	**Microwave Solid State Devices and Application:** PIN diodes, Properties and applications, Microwave detector diodes, Varactor diodes, parametric amplifier fundamentals, MASER, LASER. **Microwave Vacuum Tube Devices: Principles** of working of Reflex Klystrons, Principle of working of magnetrons. Principle of working of TWT amplifier.	**14**

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Programme: **Diploma in Engineering** **Semester –V**

Text Book/References Books/ Websites

1.G.S.N Raju; Antennas and Wave Propagation ; Pearson education.

2. K. D. Prasad; Antennas and Wave Propagation; Satya Parkashan.

3. J. D. Krauss; Antennas;for all applications; TMH.

4. Kulkarni; Microwave and Radar Engineering; Umesh Publication.

Suggested List of Laboratory Experiments :- (Expandable):

1. To Study the Radiation Pattern of antenna.
2. To Plot the Radiation Pattern of dipole antenna.
3. To Plot the Radiation Pattern of Folded dipole antenna.
4. To Plot the Radiation Pattern of Yagi-Uda antenna.
5. To Study the rectangular waveguide.
6. To Study of E-Plane Tee.
7. To Study of H-Plane Tee.
8. To Study of Magic Tee.

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Programme: **Diploma in Engineering** **Semester –V**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
DEC1505	Microprocessor	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 15	Assignment/Quiz/Attendance – Max. Marks: 15
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment/Quiz/Attendance – Max. Marks: 05

Pre-Requisite	Basic Knowledge of Digital Electronics.
Course Outcome	1. Ability to understand the basics of Microprocessor.
	2. Properties and applications of 8085 & 8086 Microprocessor.
	3. Properties and applications of various types of memories.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction to Microprocessor:** Evolution of Microprocessors, Elements of Microprocessor: ALU, Control Unit and Registers Array. System Bus: Data Bus, Address Bus, Control Bus. Interrupt definition. Introduction to Microcomputer and Microcontroller.	**14**
II	**Microprocessor 8085:** Elements of 8085 Microprocessor: ALU, Control Unit and Registers Array, System Bus of 8085: Data Bus, Control Bus, Address Bus. Architecture of 8085 Microprocessor. PIN diagram of 8085. Addressing Modes. Instruction set of 8085.	**14**
III	**Microprocessor 8086:** Elements of 8086 Microprocessor: ALU, Segment Registers, General Purpose and Special purpose registers. System Bus: Data Bus, Address Bus and Control Bus. Base Address and segment address, Effective address Calculation, PIN diagram of 8086 in Max mode and Minimum mode. Addressing Modes of 8086. Instruction set of 8086.	**14**
IV	**Memory and Programming:** Different types of Memory: Semiconductor Memory, Magnetic Tape Memory, Optical Disc, RAM, ROM, Volatile and Non-Volatile Memory. Program to add two 8 bit numbers, Subtract two 8 bit numbers, Multiplication of two 8 bit numbers.	**14**
V	**Difference between 8086 and 8085:** Difference between 8086 and 8085,difference between RISC and CISC, Difference between Microprocessor and Microcontroller, Assembly Language, Low level language, High level Language, Compiler, and Assembler.	**14**

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Programme: **Diploma in Engineering** **Semester –V**

Text Book/References Books/ Websites

1. Ramesh S Goonkar.; Microprocessor Architecture, Programming and Applications; Penram Publication.
2. Douglas V Hall; Microprocessors and Interfacing; TMH.
3. B Ram; Fundamentals of Microprocessors and Microcomputers; Dhanpat Rai Publication.

Suggested List of Laboratory Experiments :- (Expandable):

1. Program to add two 8-bit Numbers.
2. Program to Subtract two 8-bit numbers.
3. Program to multiply two 8-bit numbers.
4. Write a C language program to add two numbers.
5. Write program to divide an 8-bit number with 8-bit number.

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Programme: **Diploma in Engineering** **Semester –V**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (50)
DEC1506	Minor Project	-	-	1	External (Nil)	Internal (Nil)	Nil	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): - Nil

Theory Internal- Max Marks: -Nil	Best of Two Mid Semester Test – Max Marks: -NIL	Assignment/Quiz/Attendance Max. Marks: -
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/ Attendance Max. Marks: 05

Pre-Requisite	Student should have basic knowledge of engineering principles.
Course Outcome	The student will be able to-An ability to utilize technical resources:
	1. Identify, analyze & define the problem.
	2. Generate alternative solutions to the problem identified.
	3. Compare & select feasible solutions from alternatives generated.
	4. Compare machines/devices/apparatus for performance practices.
	5. Work effectively in a team.

Unit	Contents (Theory)	Marks Weightage
I	The student should prepare a working system or some design or understanding of a complex system (on minor level) that he/she has selected for his/her minor project work using system analysis tools and submit the same in the form of a write-up i.e. detail project report. The student should maintain proper documentation of different stages of project such as concept evaluation, requirement specification, objectives, work plan, analysis, design, implementation and test plan wherever applicable. Each student is required to prepare a project report based on the above points and present the same at the final examination with a demonstration of their project.	**50**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments :- (Expandable): Nil

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Programme: **Diploma in Engineering** **Semester –V**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (100)
DEC1507	Industrial Training-II	-	-	2	External (Nil	Internal (Nil)	Nil	External (70)	Internal (30)	Min: 40 (D Grade)

Duration of Theory (Externals): - Nil

Theory Internal- Max Marks: -Nil	Best of Two Mid Semester Test – Max Marks: -Nil	Assignment/Quiz/Attendance Max. Marks: -Nil
Practical Internal Max Marks: 30	Lab work & Sessional – Max Marks: 25	Assignment / Quiz/ Attendance Max. Marks: 05

Pre-Requisite	Basic principles and theory knowledge of concern discipline of engineering.
Course Outcome	1. To develop general confidence, ability to communicate and attitude, in addition to basic technological concepts through Industrial visits, seminars on technical topics and group discussion. Correlate theoretical knowledge with practical engineering work. 2. Ability to learn under actual working environment.

Unit	Contents (Theory)	Marks Weightage
I	As a part of the Diploma in Engineering curriculum, DPE 507, Industrial Training II is a Practical course, which the students should undergo in reputed Private / Public Sector / Government organization / companies as industrial training of minimum two weeks to be undergone by the student in the semester break after IV semester theory examinations. **Training period**: Minimum of two weeks or 15 (Fifteen) Days. **Companies / Areas covered**: Any field related to concern branch / discipline of Diploma in Engineering. **Grading**: As per Scheme. **Note:** Presentation will take place the following week after you complete your training. The presentation is evaluated by your class in-charge. Report must be submitted during power point presentation. A Viva voce comprising comprehensive questions based on training undergone. **Etiquette:** Dress properly, Behave well, Portray good image as a university student, Be punctual, Observe work ethics, Concern for safety, Be professional.	**100**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments :- (Expandable): Nil