PEOPLE'S UNIVERSITY, BHOPAL

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

Programme: Master of Technology **Specialization:** Digital Communication **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MT13101	Industrial Safety	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 – Max Marks: Nil	Assignment / Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	Functioning of Engineering equipments and industry work culture.
Course Outcome	1. Student should be able to apply standard safety procedures in an industrial environment.
	2. An ability to identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the safety.

Unit	Contents (Theory)	Marks Weightage
I	**Industrial Safety:** Accident; causes; types; results and control; mechanical and electrical hazards; types; causes and preventive steps/procedure; describe salient points of factories act 1948 for health and safety; wash rooms; drinking water layouts; light; cleanliness; fire; guarding; pressure vessels; etc; Safety color codes. Fire prevention and firefighting; equipment and methods.	**14**
II	**Fundamentals of Maintenance Engineering:** Definition and aim of maintenance engineering; Primary and secondary functions and responsibility of maintenance department; Types of maintenance; Types and applications of tools used for maintenance; Maintenance cost & its relation with replacement economy; Service life of equipment.	**14**
III	**Wear and Corrosion and their Prevention:** Wear- types; causes; effects; wear reduction methods; lubricants-types and applications; Lubrication methods; general sketch; working and applications of Screw down grease cup; Pressure grease gun; Splash lubrication; Gravity lubrication; Wick feed lubrication; Side feed lubrication; Ring lubrication; Definition; principle and factors affecting the corrosion; Types of corrosion; corrosion prevention methods.	**14**
IV	**Fault Tracing:** Fault tracing-concept and importance; decision tree concept; need and applications; sequence of fault finding activities; show as decision tree; draw decision tree for problems in machine tools; hydraulic; pneumatic; automotive; thermal and electrical equipment's like;. Any one machine tool; Pump ;Air compressor; Internal combustion engine; Boiler; Electrical motors; Types of faults in machine tools and their general causes.	**14**
V	**Periodic and Preventive Maintenance**: Periodic inspection-concept and need; degreasing; cleaning and repairing schemes; overhauling of mechanical components; overhauling of electrical motor; common troubles and remedies of electric motor; repair complexities and its use; definition; need; steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: Machine tools; Pumps; Air compressors; schedule of preventive maintenance of mechanical and electrical equipment; advantages of preventive maintenance. Repair cycle; concept and importance.	**14**

Text Book/References Books/ Websites:-

1. Maintenance Engineering Handbook; Higgins & Morrow; Da Information Services.
2. Maintenance Engineering; H. P. Garg; S. Chand and Company.
3. Pump-hydraulic Compressors; Audels; Mcgrew Hill Publication.
4. Foundation Engineering Handbook; Winterkorn; Hans; Chapman & Hall London

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

PEOPLE'S UNIVERSITY, BHOPAL

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

Programme: Master of Technology **Specialization:** Digital Communication **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MT13102	Waste to Energy	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 – Max Marks: Nil	Assignment / Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	Nil
Course Outcome	1. Student should be able to apply the knowledge about the operations of Waste to Energy Plants.
	2. Apply the knowledge in planning and operations of Waste to Energy plants.
	3. Able to analyze the various aspects of Waste to Energy Management Systems.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction to Energy from Waste:** Classification of waste – agro based, forest residues, domestic waste, industrial waste (hazardous and non-hazardous). Characterization of waste for energy utilization; Conversion devices – Incinerators, gasifiers, digestors ;Waste production in different sectors i.e. domestic, industrial, agriculture, postconsumer waste etc. Waste Selection criteria.	**14**
II	**Technologies for Waste to Energy Biochemical Conversion** – Energy production from organic waste through anaerobic digestion and fermentation. Thermo-chemical Conversion – Combustion, Incineration and heat recovery, Pyrolysis, Gasification; Plasma Arc Technology.	**14**
III	**Waste to Energy Options**: Landfill gas, collection and recovery. Refuse Derived Fuel (RDF) – fluff, briquettes, pellets. Alternate Fuel Resource (AFR) – production and use in Cement plants, Thermal power plants and Industrial boilers. Conversion of wastes to fuel resources for other useful energy applications. Energy from Plastic Wastes – Non-recyclable plastic wastes for energy recovery. Energy Recovery from wastes and optimization of its use, benchmarking and standardization.	**14**
IV	**Centralized and Decentralized Waste to Energy Plants**: collection, segregation, transportation and storage requirements. Location and Siting of 'Waste to Energy' plants. Industry Specific Applications – In-house use – sugar, distillery, pharmaceuticals, Pulp and paper, refinery and petrochemical industry and any other industry. Centralized and Decentralized Energy production, distribution and use. Comparison of Centralized and decentralized systems and its operations.	**14**
V	**Waste To Energy & Environmental Implications**: Environmental standards for Waste to Energy Plant operations and gas clean-up;Savings on non-renewable fuel resources;Carbon Credits: Carbon foot calculations and carbon credits transfer mechanisms;Energy Analysis; Global Best Practices in Waste to energy production and use. Indian Scenario on Waste to Energy production distribution and use in India. Role of the Government in promoting 'Waste to Energy'.	**14**

Text Book/References Books/ Websites:-

1. Industrial and Urban Waste Management in India; TERI Press.
2. Banwari Lal and Patwardhan; Wealth from Waste: Trends and Technologies; TERI Press.
3. S.N Mukhopadhyay; Fundamentals of waste and Environmental Engineering; TERI Press.
4. www.envfor.nic.in www.cpcb.nic.in
5. www.eai.in/ref/ae/wte/typ/clas/india_industrial_wastes.html
6. www.teriin.org/projects/green/pdf/National-Waste.pdf

Suggested List of Laboratory Experiments (Expandable): Nil

PEOPLE'S UNIVERSITY, BHOPAL

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

Programme: Master of Technology **Specialization:** Digital Communication **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
MT13103	Cost Management of Engineering Projects	3	1	-	(70)	(30)	Min: 40 (D Grade)	(Nil)	(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 – Max Marks: Nil	Assignment / Quiz/Attendance- Max. Marks: Nil

Pre-Requisite	Nil
Course Outcome	1.Students should be able to perform and evaluate present worth, future worth and annual worth & more economic alternatives.
	2.Able to carry out and evaluate benefit/cost, life cycle and Break-even analysis.

Unit	Contents (Theory)	Marks Weightage
I	Introduction and Overview of the Strategic Cost Management Process Cost concepts in decision-making; Relevant cost; Differential cost; Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.	14
II	Project: meaning; Different types; why to manage; cost overruns centers; various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and nontechnical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram	14
III	Project commissioning: mechanical and process Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis; Cost-Volume-Profit Analysis. Various decision-making problems. Standard Costing and Variance Analysis.	14
IV	Pricing strategies: Pareto Analysis. Target costing; Life Cycle Costing. Costing of service sector. Just-in-time approach; Material Requirement Planning; Enterprise Resource Planning; Total Quality Management and Theory of constraints. Activity-Based Cost Management; Bench Marking; Balanced Score Card and Value-Chain Analysis. Budgetary Control; Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing.	14
V	Quantitative techniques for cost management; Linear Programming; PERT/CPM; Transportation problems; Assignment problems; Simulation; Learning Curve Theory.	14

Text Book/References Books/ Websites:-

1. Cost Accounting A Managerial Emphasis; Prentice Hall of India; New Delhi.
2. Charles T. Horngren and George Foster; Advanced Management Accounting .
3. Robert S Kaplan Anthony A. Alkinson; Management & Cost Accounting.
4. Ashish K. Bhattacharya; Principles & Practices of Cost Accounting A. H. Wheeler publisher.
5. N.D. Vohra; Quantitative Techniques in Management; Tata McGraw Hill Book Co. Ltd.

Suggested List of Laboratory Experiments (Expandable): Nil

PEOPLE'S UNIVERSITY, BHOPAL

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

Programme: Master of Technology **Specialization:** Digital Communication **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
MTDC13201	Information Theory & Coding	3	1	-	(70)	(30)	Min: 40 (D Grade)	(Nil)	(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 – Max Marks: Nil	Assignment/ Quiz/Attendance – Max. Marks: Nil

Pre-Requisite	To understand the principles and applications of information theory.
Course Outcome	1. To be able to understand about information, entropy & coding.
	2. To understand layout different types of channels and channel capacity.
	3. To understand about cyclic codes & its properties.

Unit	Contents (Theory)	Marks Weightage
I	Introduction to uncertainty, information, entropy and its properties, entropy of binary memory less source and its extension to discrete memory less source, coding theorem, data compression, prefix coding, HUFFMAN coding, Lempel-Ziv Coding	**14**
II	Discrete memory less channels, Binary symmetric channel, mutual information & its properties, channel capacity, channel coding theorem, and its application to BSC, Shannon's theorem on channel capacity, capacity of channel of infinite bandwidth, Bandwidth signal to noise Trade off, Practical communication system in light of Shannon's theorem, Fading Channel.	**14**
III	Group and field of Binary system Galois field and its construction in GF (2m) and its basic properties, vector spaces and matrices in GF(2), Linear Block Codes, Systematic codes, and its encoding circuits, syndrome and error detection ,minimum distance, error detecting and correcting capabilities of block code, Decoding circuits, Probability of undetected error for linear block code in BSC, Hamming code and their applications.	**14**
IV	Cyclic codes and its basic properties, Generator & parity check matrix of cyclic codes, encoding & decoding circuits, syndrome computation & error detection, cyclic Hamming codes.	**14**
V	Introduction to BCH codes, its encoding & decoding, error location & correction. Introduction to convolution codes, its construction & viterbi algorithm for maximum likelihood decoding	**14**

Text Book/References Books/ Websites:-

1. T. M. Cover, J. A, Thomas; Elements of information theory; Wiely.
2. R. W. Hamming;Coding and information theory; Prentice Hall.
3. A.B. Carlson; Communication Systems; McGraw Hill Publishers.

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

PEOPLE'S UNIVERSITY, BHOPAL

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

Programme: Master of Technology **Specialization:** Digital Communication **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
MTDC13202	Embedded System Design	3	1	-	(70)	(30)	Min: 40 (D Grade)	(Nil)	(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 – Max Marks: Nil	Assignment/ Quiz/Attendance – Max. Marks: Nil

Pre-Requisite	Basic knowledge of embedded system hardware and firmware design will be explored.
Course Outcome	1. To understand the Embedded Micro controller Cores.
	2. To get to know about Embedded System Design Aspects.
	3. To understand the Serial Communication Interface.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction to Embedded System:** Introducing Embedded Systems, Philosophy, Embedded Systems, Embedded Design and Development Process.	**14**
II	**The Hardware Side:** An Introduction, The Core Level, Representing Information, Understanding Numbers, Addresses, Instructions, Registers-A First Look, Embedded Systems-An Instruction Set View, Embedded Systems-A Register View, Register View of a Microprocessor The Hardware Side: Storage Elements and Finite-State Machines The concepts of State and Time, The State Diagram, Finite State Machines- A Theoretical Model.	**14**
III	**Memories and the Memory Subsystem:** Classifying Memory, A General Memory Interface, ROM Overview, Static RAM Overview, Dynamic RAM Overview, Chip Organization, Terminology, A Memory Interface in Detail, SRAM Design, DRAM Design, DRAM Memory Interface, The Memory Map, Memory Subsystem Architecture, Basic Concepts of Caching, Designing a Cache System, Dynamic Memory Allocation.	**14**
IV	**Embedded Systems Design and Development:** System Design and Development, Life-cycle Models, Problem Solving-Five Steps to Design, The Design Process, Identifying the Requirements, Formulating the Requirements Specification, The System Design Specification, System Specifications versus System Requirements, Partitioning and Decomposing a System, Functional Design, Architectural Design, Functional Model versus Architectural Model, Prototyping, Other Considerations, Archiving the Project.	**14**
V	**Performance Analysis and Optimization:** Performance or Efficiency Measures, Complexity Analysis, The methodology, Analyzing code, Instructions in Detail, Time, etc. – A more detailed look, Response Time, Time Loading, Memory Loading, Evaluating Performance, Thoughts on Performance Optimization, Performance Optimization, Tricks of the Trade, Hardware Accelerators, Caches and Performance.	**14**

Text Book/References Books/ Websites:-

1. Raj Kamal; Embedded Systems Architecture Programming and Design; Tata MC Graw-Hill.
2. Tim Wilmshurst; Designing Embedded Systems with PIC Microcontrollers; Elsevier.
3. Steve Heath; Embedded Systems Design; Newnes publications.

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

PEOPLE'S UNIVERSITY, BHOPAL

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

Programme: Master of Technology **Specialization:** Digital Communication **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External (Nil)	Internal (Nil)	Total
MTDC13203	Digital Image Processing	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 – Max Marks: Nil	Assignment/ Quiz/Attendance – Max. Marks: Nil

Pre-Requisite	To learn and understand the fundamentals of digital image processing, and various image Transforms, Image Enhancement Techniques, Image restoration Techniques.
Course Outcome	1. To study the image fundamentals and mathematical transforms necessary for image processing.
	2. To study the image enhancement techniques.
	3. To study image restoration procedures.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction:** Image as a 2D data, Image representation – Gray scale and Color images, image sampling and quantization. Frequency domain processing – Two dimensional orthogonal transforms: DFT, FFT, WHT. Haar transform, KLT, DCT.	**14**
II	**Image Enhancement:** Filters in spatial and frequency domains, histogram-based processing, Homomorphic filtering.Edge detection – non parametric and model based approaches, LOG filers, localization problem.	**14**
III	**Image Restoration :** PSF, circulant and block circulant matrices, deconvolution, restoration using inverse filtering. Wiener filtering and maximum entropy- based methods.	**14**
IV	**Mathematical Morphology :** Binary morphology, dilation, erosion, opening and closing duality relations, gray scale morphology, Image communication – JPED, JPEG 2000, MPEGs and H.26x standards packet video, error concealment.	**14**
V	**Image Representation And Recognition:** Image texture analysis co-occurrence matrix, measures of textures, statistical models for textures, principal component analysis.Misc. topic such as – Hough Transform, boundary detection, chain coding, and segmentation, thresholding methods.	**14**

Text Book/References Books/ Websites:-

1. R. Gonzalez and E. Woods; Digital Image Processing; PHI.
2. A. K. Jain; Fundamentals of digital image processing; Prentice Hall of India.
3. W. K. Pratt; Digital image processing; Prentice Hall.

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

PEOPLE'S UNIVERSITY, BHOPAL

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

Programme: Master of Technology **Specialization:** Digital Communication **Semester –III**

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total	External	Internal	Total (300)
MTDC1303	Pre-Dissertation	-	-	6	(Nil)	(Nil)	Nil	(200)	(100)	Min: 120 (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: 100	Lab work & Sessional – Max Marks: 50	Assignment / Quiz/Attendance – Max. Marks: 50

Pre-Requisite	Knowledge of concerned discipline of Engineering.
Course Outcome	1. Identify literature and problem identification of research.
	2. Apply engineering principles through efficient handling of project.
	3. Identify appropriate techniques to analyze complex engineering problems.

Unit	Contents (Theory)	Marks Weightage
-	**Pre- Dissertation:** Students are required to select a topic of their interest in the third semester and prepare a dissertation on it. Mid semester presentation will include identification of the problem based on the literature review on the topic referring to latest literature available. End semester presentation should be done along with the report on identification of topic for the work and the methodology adopted involving scientific research, collection and analysis of data, determining solutions and must bring out individuals contribution. The student must submit a synopsis at the end of the semester for the approval from the Research Advisory Committee (RAC) in the specified format and submitted to the university for further Approval and give the power point presentation of the same for Evaluation/Approval.	**300**

Text Book/References Books/ Websites: - Nil

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