

NAAC Criterion-I

Curricular Aspects

Key Indicator -1.1 Curriculum Design and Development

Sub-Criteria -1.1.2

Programmes with Syllabus Revision



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Gola ka Mandir, Gwalior - 474005, Madhya Pradesh, India

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Additional documents/evidence/proof

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MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005
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CIVIL ENGINEERING DEPARTMENT

SEMESTER	2019-2023 BATCH		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	100101	Engineering Chemistry	100011	Engineering Mathematics-I	27.69
	100102	Engineering Mathematics-I	100012	Engineering Chemistry	
	100103	Technical English	100014	Engineering Graphics	
	100104	Basic Electrical & Electronics Engineering	100015	Energy, Environment, Ecology & Society	
	100105	Engineering Graphics	100016	Technical Language	
	100106	Manufacturing Practices	100017	Language Lab	
			100018	Engineering Graphics Lab	
II	100201	Engineering Physics	100020	Basic Civil Engineering & Mechanics	
	100202	Energy, Environment, Ecology & Society	110211	Building Planning & Design	
	100203	Basic Computer Engineering	100021	Basic Mechanical Engineering	
	100204	Basic Mechanical Engineering	100022	Basic Electrical & Electronics Engineering	
	100205	Basic Civil Engineering & Mechanics	100023	Basic Computer Engineering	
	100206	Language Lab. & Seminars	100024	Manufacturing Practices	
			100026	Basic Civil Engineering Lab	
III	100001	Engineering Mathematics-II	100025	Engineering Mathematics-II	
	110302	Building Planning & Design	110311	Building Materials & Construction	
	110303	Building Materials & Construction	110312	Fluid Mechanics - I	
	110304	Surveying	110313	Surveying	
	110305	Strength of Materials	110314	Strength of Materials	
	110306	Software Lab	110315	Survey Practice Lab	
	110307	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	110316	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
	110308	Summer Internship Project-I	200XXX	Novel Engaging Course (Informal Learning)	
			110317	Summer Internship Project-I (Institute Level)	
		1000001	Indian Constitution & Traditional Knowledge		

IV	100003	Engineering Mathematics- III	100028	Engineering Mathematics- III
	110402	Geotechnical Engineering	110411	Geotechnical Engineering - I
	110403	Fluid Mechanics - I	110412	Theory of Structure - I
	110404	Structural Analysis	110413	Transportation Engineering
	110406	Water Resources Engineering	110414	Water Resources Engineering
	100004	Cyber Security	100009	Cyber Security
	110407	Survey Practice Lab	110415	Civil Drawing lab
	100002	Biology for Engineers	200XXX	Novel Engaging Course (Informal Learning)
			1000002	Biology for Engineers
V	110501	Estimating Costing & Contracting	110520	Data Science
	110502	Structural Design & Drawing (RCC)	110511	Water Supply Engineering
	110503	Fluid Mechanics - II	110512	Theory of Structure - II
	110509	Environmental Engineering	110513	Structural Design & Drawing (RCC)
	110505	Transportation Engineering	110514	Fluid Mechanics - II
	110506	Minor Project-I	110515	Minor Project-I
	110507	Summer Internship Project-II	110516	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)
	110508	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	200XXX	Novel Engaging Course (Informal Learning)
			110517	Summer Internship Project-II
			1000005	Project Management & Financing
			1000006	Disaster Management
VI	100005	Ethics, Economics, Entrepreneurship & Management	110620	Artificial Intelligence & Machine Learning
	110602	Structural Design & Drawing (Steel)	110621	Waste Water Engineering
	DE	110612 Solid Waste Management 110613 Construction Planning & Management 110614 Railway Airport & Tunnel Engineering	110622	Structural Design & Drawing (Steel)
	DE	110652 Geotechnical Engg - II (Foundation Engg) 110654 Concrete Technology 110655 Air Pollution & Control 110656 Disaster Recovery & Build Back Better	110623	Estimating Costing & Contracting

	OC	900120 Building Services & Maintenance 900121 Sustainable Materials & Green Buildings	DE	110661 Geotechnical Engg - II (Foundation Engg) 110662 Concrete Technology 110663 Air Pollution & Control
	100007	Disaster Management	OC	910111 Building Services & Maintenance 910110 Sustainable Materials & Green Buildings
	110607	Minor Project-II	110624	Minor Project-II
	100006	Indian Constitution & Traditional Knowledge	200XXX	Novel Engaging Course (Informal Learning)
			1000007	Intellectual Property Rights (IPR)
VII	DE	110713 Advanced Structural Design (RCC) 110714 Hydraulic Structure 110715 Advanced Structural Analysis	DE	110731 Advanced Structural Design (RCC) 110732 Hydraulic Structure 110733 Railway Airport & Tunnel Engineering
	DE	110754 Wastewater Treatment & Recycling 110757 Principles of Construction Management 110758 Advanced Geomatics Engineering	DE	110761 Wastewater Treatment & Recycling 110762 Principles of Construction Management 110763 Advanced Geomatics Engineering
	OC	900201 Integrated Waste Management for Smart City 900202 Project Planning & Control	OC	910201 Integrated Waste Management for Smart City 910202 Project Planning & Control
	OC	900213 Urban Planning & Transportation Systems 900226 Safety & Quality Management	OC	910213 Urban Planning & Transportation Systems 910226 Safety & Quality Management
	100008	Intellectual Property Rights (IPR)	110721	Problems
	110701	Problems	110722	Creative Problem Solving
	110702	Summer Internship Project-III	110723	Summer Internship Project-III
	110703	Creative Problem Solving	1000008	Universal Human Values & Professional Ethics
VIII	DE	110851 Safety in Construction 110856 Rock Engineering 110857 Strategies for Sustainable Design	DE	110861 Safety in Construction 110862 Rock Engineering 110863 Strategies for Sustainable Design
	OC	900614 Natural Hazards 900634 Safety in Construction 900635 Geographic Information Systems	OC	910614 Natural Hazards 910634 Safety in Construction 910635 Geographic Information Systems
	110801	Internship/Project	110811	Internship/Project
	110802	Professional Development	110812	Professional Development

Course Code: 110411
Course Name: Geotechnical Engineering - I

L	T	P	Credit
2	1	2	4

Course Objectives:

- 1) The students will get the basic knowledge about natural material like rocks and get acquainted with natural dynamic processes and their actions.
- 2) The students will know the significance of geological investigations for civil engineering projects and site selection.
- 3) To inculcate the basic knowledge of soil such as its identification and classification, determination of various engineering properties and its suitability as a foundation/subgrade material.
- 4) To develop an understanding of the relationships between physical characteristics and mechanical properties of soils by experimentally measuring them.
- 5) To explain role of water in soil behavior and how soil stresses, permeability and quantity of seepage including flow net are estimated.
- 6) To determine shear parameters and stress changes in soil due to foundation loads & estimate the magnitude and time-rate of settlement due to consolidation.
- 7) To apply the principles of soil mechanics in stability analysis of slopes and settlement calculations.

Syllabus:

Unit-I Engineering geology & soil properties

Introduction to geology, mineralogy, petrology – Three-fold classification of rocks and their characteristic features. Structural geology - Types and classification of structures (Joints, Unconformities, Folds and faults) and their effect on civil engineering projects.

Introduction – Types of soils, their formation & deposition, basic definitions and relationships - Three phase system. Index properties of soil and their determination. Relationship between volume weight, void ratio-moisture content, moisture content-specific gravity, and unit weight- air voids etc.

Plasticity Characteristics of soil & indices and their determination, use of consistency limits, Classification of soil based on particle size and consistency limits, unified soil classification systems, Indian standard soil classification system, general characteristics of soil in different groups.

Unit-II Soil Water and Consolidation:

Permeability of soil: Darcy law and its validity, Determination of permeability in laboratory and in field using various methods like constant head method, pumping tests etc. factors affecting permeability of soil, Seepage analysis – introduction, stream & potential functions, flow nets, uses of a flow net, Introduction to effective, neutral and total stresses, effect of water table, fluctuations of effective stress, effective stress in soils saturated by capillary action, seepage pressure, quick sand condition.

Consolidation – Introduction, Compressibility and consolidation, comparison between compaction and consolidation, initial, primary & secondary consolidation, spring analogy for primary consolidation, interpretation of consolidation test results, Terzaghi's Theory of consolidation, final settlement of soil deposits, Determination of consolidation settlement and secondary consolidation.

Unit-III Stress Distribution in Soils:

Stresses in soil – Introduction, stresses due to point load, line load, strip load, uniformly loaded circular area, rectangular loaded area, influence factors, isobars, Boussinesq's equation, westergaard's analysis, Newmark's influence chart. Contact pressure under rigid & flexible area, computation of displacements from elastic theory.

Unit – IV Shear Strength of Soils:

Mohr Circle and its characteristics, principal planes, relation between major and minor principal stresses. Mohr-

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Coulomb's theory, types of shear tests, direct shear test, merits of direct shear test, Triaxial compression test, test behaviour of UU, CU and CD tests, pore-pressure measurements, computation of effective shear strength parameters, unconfined compression test, vane shear test, critical void ratio, Liquefaction.

Unit – V Stability of Slopes:

Introduction, Types of slopes and their failure mechanisms, factor of safety, analysis of Infinite and finite slopes, wedge failure, Swedish circle method, friction circle method, stability numbers and charts. Effect of ground water. **Selection of shear strength parameters in slope stability analysis. Stability of Earth dams.**

Course Outcomes:

Upon completion of the course, the students will be able to:

- CO1: Evaluate different properties of rocks & soil and its classification.
- CO2: Examine the flow and shear parameters & their effects on various types of soil.
- CO3: Determine the stress distribution & shear failure by various methods.
- CO4: Evaluate the shear strength parameter of soil by various methods.
- CO5: Analyse the stability of slopes using various methods.

Text Books:

1. Soil Mech. & Found. Engg., Dr. K.R. Arora, Std. Publishers Delhi, 7th Edition, 2014
2. Soil Mech. & Foundation, Dr. B.C. Punmia, Laxmi Publications, Delhi, 16th Edition, 2017
3. Soil Mech. & Found Engg., S.K. Garg, Khanna Publishers, Delhi, 1st Edition, 2003
4. Basic & Applied Soil Mechanics, Gopal Ranjan, New Age International Publishers, 2016
5. Parbin Singh., "Engineering and General Geology", S. K. Kataria and Sons, 2009

Reference Books:

1. Modern Geotech Engg. Dr. Aram Singh, IBT Publishers, Delhi, 8th Edition, 2016
2. Geotech Engg., C. Venkatramiah, New Age International Publishers, 16th Edition, 2018
3. Soil Testing for Engg., T.W. Lambe, John Wiley & Sons, Inc. 1969
4. Bangar, K.M, Principles of Engineering Geology, Standard Publishers Distributors. 1995, New Delhi

List of Experiment's:

1. Moisture Content Determination. Oven Drying Method.
2. Grain Size Analysis – Mechanical Method.
3. Grain Size Analysis – Hydrometer Method.
4. Liquid Limit, Plastic Limit, Shrinkage Limit Tests.
5. In-Place Density tests – Core Cutter Method, Sand Replacement Method.
6. Specific Gravity Tests.
7. Permeability Tests, Variable Head Method.
8. Compaction Test.
9. Unconfined Compression Test.
10. Direct Shear Test.
11. Triaxial Shear Test (UU)
12. Vane Shear Test.
13. Plate Load Test (Demonstration)
14. Consolidation Test.

Upon completion of practical course, the students will be able to:

- CO 1: Check physical properties of soil.
- CO 2: Check strength properties of soil.
- CO 3: Differentiate the flow properties and stresses of soil.
- CO 4: Check shear strength of soil.

Civil Engineering Department, MITS Gwalior

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CIVIL ENGINEERING DEPARTMENT
M.E. in Construction Technology & Management

SEMESTER	2017-2019 BATCH		2020-2022 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	510101	Management Theory	510111	Computational Techniques	76.47
	510102	Materials & Equipments	510112	Construction Materials & Machines	
	510103	Quantitative Methods	510113	Contract Management	
	510104	Contract Management	DE	510114 Maintenance Management 510115 Infrastructure Development 510116 Formwork for Concrete Structure	
	510105	Functional Planning Building Services & Maintenance Management	OC	800108 Organizational Behaviour & Management 800109 Safety & Quality Management	
	510106	Computer Lab - I	510119	Construction Lab	
	510107	Construction Lab - I	510120	Self Learning / Presentation (SWAYAM/NPTEL)	
II	510201	Construction Techniques	510211	Project Economics & Financing	
	510202	Construction Economics & Finance	510212	Construction Cost Management	
	510203	Construction Cost Management	510213	Construction Project Management	
	510204	Project Management	DE	510214 Scheduling of Repetitive Construction Project 510215 Durability & Repair of Concrete Structure 510216 Project Procurement System 510217 Safety in Construction	
	510205	Project Planning Scheduling & Control	OC	800208 Sustainable Materials & Green Buildings	
	510206	Computer Lab - II	510219	Computational Laboratory for Construction Management	
	510207	Construction Lab - II	510220	Self Learning / Presentation (SWAYAM/NPTEL)	
III	510301	Infrastructure Project Management	510311	Dissertation Part - I	
	510302	Urban Hydrology & Waste Management	OC	800308 Urban Governance & Development Management	
	510303	Seminar			
	510304	Preliminary Dissertation			
IV	510401	Dissertation	510405	Dissertation Part II	

Course Code: 510112

Course Name: Construction Materials & Machines

L	T	P	C
3	-	-	3

Course Objectives:

1. To study the properties, design and production of various types of concrete i.e. cement
2. To understand the applications of polymeric materials, additives, admixtures.
3. To understand management of equipments used in construction industry.
4. To learn the design & methods of various foundations.
5. To study the design & manufacturing of various types of formwork and prefabricated components
6. To understand the concept of Modular coordination.

Syllabus:

Unit-I

Construction Materials & Concrete: Physical properties of construction materials and testing in field and laboratory as per IS code. Design and production of concrete its manufacture eg. Batching, Mixing, Transporting, Placing compacting and curing. Design and production of high strength Ready mix concrete.

Unit-II

New Construction Materials: Polymeric materials. Polymer concrete, Additives and admixtures in concrete, Light weight, Heavy and no fine concrete, Ferro cement and fiber reinforced concrete, high performance concrete and composite materials, roller compacted concrete.

Unit-III

Construction Equipments: Construction equipments and its characteristics, Operation and selection. Different types of construction equipments eg. Power shovels, drag lines, Scrapper, Bulldozer, Tractor, Rippers, Motor graders, aggregate processing and batching plants, Cycle time and capacity ratings, Sizing and matching, Hot Mix plant, RMC Plant.

Unit-IV

Foundations: Techniques of construction of piles, Cassions, Wells, Cofferdams and diaphragms, Drilling blasting, Underpinning, Shoring and shuttering of foundation.

Formwork: Design and construction of different types of formworks and temporary structures, Stationary and slip formwork techniques, Formwork of special structures eg. Shells, Bridges, Towers etc.

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Unit-V

Steel Construction, Prefabrication & Prestressing: Fabrication and erection (Shop and in situ construction techniques). Erection of steel structures like bridges, Chimneys and trusses.

Application of prefabrication in construction Modular coordination and standardization; Special equipments and plants for industrial production of prefabricated components.

Prestressing methods, Special equipments and plants for industrial production of prestressed components.

Course Outcomes:

Upon completion of the course, the students will be able to:

- CO 1: Explain** the advanced elements of buildings, engg. materials & construction.
- CO 2: Distinguish** the suitability of different foundations in Civil Engineering structure.
- CO 3: Evaluate** the properties of various types of concrete in construction industry accordingly.
- CO 4: Apply** various techniques for prefabrication & pre-engineered elements of building and modular coordination and standardization.
- CO 5: Design** different types of formwork as per their suitability.
- CO 6: Describe** various methods for design mix of concrete & equipment management.

Reference Books:

1. D. G. Gransberg, C. M. Popescu and R. C. Ryan, Construction equipment management for engineers, estimators, and owners, Taylor & Francis, New York, 2006.
2. R. L. Peurifoy, C. J. Schexnayder, A. Shapira and R. Schmitt, Construction planning, equipment, and methods, 8th ed., McGraw Hill, New York, 2010.
3. V. Shantha Kumar, Concrete, Oxford University press.
4. A.M. Neville, Properties of concrete, Pearson
5. M.L. Gambhir, Concrete Technology, Tata Mc Graw Hill Pub. Co.
6. Soil Mechanics by Gopal Ranjan , New Age Publishers.
7. Mahesh Verma, Construction Equipment, its planning & Application, Metropolitan Book Co.(P) Ltd.,
8. Foundation Design Manual by Narayan V. Nayak
9. Prestressed concrete by Rajagopalan
10. Prestressed concrete by T.Y. Lin
11. Highway Engg by Justo and Khanna.





Course Code: 510211

Course Name: Projects Economics & Financing

L	T	P	C
3	-	-	3

Course Objectives:

1. To understand managerial economics.
2. To understand demand analysis and forecasting in construction industry.
3. To understand Time value of money and Cost of Capital.
4. To understand budgeting of construction projects.
5. To understand selection and evaluation of construction projects.
6. To understand project financing and risk.
7. To understand the accounting processes in construction industry.

Syllabus:

Unit-I

Basic Economic Theories: Principles of managerial economics. Economic theories. Demand analysis and forecasting. Demand elasticity. Cost and production analysis. Production function. Pricing decisions. Policies & practice.

Unit-II

Money: Time value of money. Different methods & comparisons. Cash flow, discounted cash flow, cash flow forecasting. Financial ratios and statements. Cost of Capital.

Unit-III

Capital Budgeting: Working capital. Capital budgeting and performance budgeting. Break even analysis. Project selection. Project appraisals

Unit-IV

Project Financing: Means of Finance, Financial institutions in India, Policies of financial institutions, Financial assistance, Special schemes, Project risk

Unit-V

Financial Accounting: Book keeping processes of construction industry. Accountancy cycle. Journals. Forms and ledgers etc. for accounting and monitoring labour, equipment and material costs. PWD accounting procedure and types of financial statements in Government.



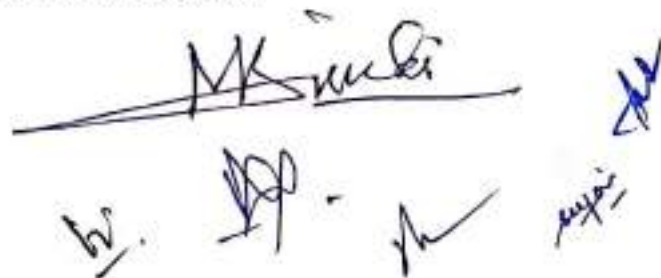
Course Outcomes:

Upon completion of the course, the students will be able to:

- CO1: Apply** principles of managerial economics.
- CO2: Perform** demand analysis in construction sector.
- CO3: Workout** time value of money and cost of capital.
- CO4: Analyze** break-even point and appraisal of projects.
- CO5: Determine** appropriate means of financing a project.
- CO6: Monitor** the various cost components of construction projects by using accounting procedures.

Reference Books:

1. Project Planning, Analysis, Selection, Financing, Implementation & Review by Prasanna Chandra, Publisher Tata McGraw-Hill Education.
2. Engineering Economics & Analysis, by Donald G Newnan, Publisher Oxford University Press.
3. Economic Theory and The Construction Industry by P. Hillebrandt, Publisher Palgrave Macmillan UK
4. Construction Economics: A New Approach by Danny Myers, Publisher Routledge
5. Construction and Project Management Theory And Practices by K.N. Jha, Publisher Pearson Education India
6. Construction Project Management: Planning, Scheduling and Controlling by K.K. Chitkara, Publisher Tata McGraw-Hill Education

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CIVIL ENGINEERING DEPARTMENT
M.Tech in Environmental Engineering

SEMESTER	2017-2019 BATCH		2020-2022 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	530101	Environmental Chemistry & Microbiology	530111	Environmental Chemistry & Microbiology	64.7
	530102	Materials & Equipments	530112	Solid & Hazardous Waste Management	
	530103	Quantitative Methods	530113	Advanced Treatment Process - I (Waste Water Engg)	
	530104	Solid Waste Management	DE	530114 Industrial Waste Management 530115 Environmental Auditing & Waste Management System 530116 Environmental Hydraulics	
	530105	Functional Planning Building Services & Maintenance Management	OC	800110 Sustainable Waste Management System	
	530106	Computer Lab - I	530118	Environmental Engineering Lab	
	530107	Env Lab - I	530119	Self Learning / Presentation (SWAYAM/NPTEL)	
II	530201	Air Pollution & Sound Pollution	530211	Air Pollution & Noise Pollution	
	530202	Advanced Treatment Process - I (Water Supply Engg)	530212	Advanced Treatment Process - II (Water Supply Engg)	
	530203	Advanced Treatment Process - II (Sanitary Engg)	530213	Environmental Impact Assessment & Ethics	
	530204	Project Management	DE	530214 Plastic Waste Management 530215 Electronic Waste Management	
	530205	Environmental Impact Assessment & Ethics	OC	800209 Global Climatic Changes & Disaster	
	530206	Computer Lab - II	530217	Advanced Environmental Engineering Lab	
	530207	Env Lab - II	530218	Self Learning / Presentation (SWAYAM/NPTEL)	
III	530301	Principles & Design of Biological Treatment Systems	530311	Dissertation Part - I	
	530302	Urban Hydrology & Waste Management	OC	800309 Trace & Ultra Trace Analysis of Metals using Atomic Absorption Spectrometry	
	530303	Seminar			

	530304	Preliminary Dissertation		
IV	530401	Dissertation	530405	Dissertation Part II

Course Code: 530112

Course Name: Solid and Hazardous Waste Management

L	T	P	Credit
3	0	0	3

Course Objectives:

- 1) To provide broad knowledge on various aspects of planning & implementation of waste management system in a smart city/town.
- 2) To understand the principles applied in waste management.
- 3) To understand various ways to collect, treat & disposal of waste.
- 4) To understand various methods of energy recovery from waste.
- 5) To understand various aspects of hazardous waste management, E-waste management, biomedical waste management etc.

Syllabus:

Unit I:

Introduction: Introduction to waste management, classification of solid waste, objective of solid waste management, Solid waste sources - Nature and characteristics (physical, chemical & biological) - Quantities and Qualities - Generation rates - Potential of disease - Nuisance and other problems.

Unit II:

Collection and Storage: Solid waste management - Functional elements of solid waste - on - site storage - Collection and separation - Containers and its location - Collection systems and its example - Vehicle routing - Route balance - Transfer station - Processing - Recovery and reuse.

Unit III:

Processing of Municipal Solid Waste: Conveying and compacting waste - Shredding - Types of shredders - Material separation - Types - Devices for material separation - Thermal processing of municipal solid waste - incineration, pyrolysis, gasification - Refuse Derived fuel - Biological process like composting, Vermicomposting and biomethanation.

Unit IV:

Disposal: Disposal methods - Sanitary land filling - Planning - Site selection - Design - Landfill Process - Monitoring Closure - Post closure monitoring - leachate management & control of gases in landfills, environmental monitoring of landfills. MSW rules. Introduction to swachh bharat mission and smart cities program - current status, challenges and future trend of waste management.

Unit V:

Hazardous Waste Management: Introduction to hazardous waste - Definition - Characterization and composition - TCLP test - Storage and transportation of hazardous waste - Labeling of hazardous waste - Physical, Chemical and Biological treatment of hazardous waste - Bioremediation of hazardous waste - Treatment of Bio medical - Nuclear waste and Radio - Active waste - Fly ash management and E-waste management.

Course Outcomes:

Upon completion of the course, the students will be able to:

CO 1: Explain the principles & concepts of waste management.

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CO 2: Apply various techniques of handling the waste.

CO 3: Apply various techniques of energy recovery from waste.

CO 4: Plan an effective & efficient waste management system.

Text Books:

1. Text Book of Solid Wastes Management, Iqbal H. Khan and Naved Ahsan, CBS Publishers, 1st edition 2012
2. Integrated Solid Waste Management, Hilary Theisen and Samuel A, Vigil, George Tchobanoglous, McGraw Hill Yew York, 1993

Reference Books:

1. Environmental Engineering, Rowe, Peavy & Tchobanoglous, Tata McGraw Hill Publications, 2017
2. CPHEEO, Manual on Municipal Solid Waste management, Central Public Health and Environmental Engineering organization, Government of India, New Delhi, 2016
3. Solid Waste Engineering, Vesilind P.A., Worrel H. W. and Reinhard, Thomson Learning Inc, 2003
4. Charles A. Wentz, Hazardous Waste Management, McGraw Hill, New York. 1995.
5. David Rimbers, Municipal Solid Waste Management: Pollution Technologies Review, Noyes Data Corporation, London, 1990.
6. Michael D. Lagrega, Philip L. Buckingham, Jeffrey C. Evans. Hazardous Waste Management McGraw Hill, New York. 1994.

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Course Code: 530211

Course Name: Air Pollution & Noise Pollution

L	T	P	Credit
3	0	0	3

Course Objectives:

- 1) To provide a broad knowledge on various sources & effects of air pollution.
- 2) To understand the techniques to control air pollution and apply them.
- 3) To provide knowledge on air quality standards, monitoring of air quality.
- 4) To provide a basic knowledge on sources, effects of noise pollution & also how to reduce the pollution.

Syllabus:

Unit I Introduction:

Definition of Air Pollution, Sources and classification of air pollutants – Man made – Natural sources
Type of air pollutants – Pollution due to automobiles, Units of measurements of pollutants, Air quality criteria - emission standards – National ambient air quality standards – Air pollution indices – Air quality management in India, Air pollution survey, Air pollution from major industrial operations, Air pollution in Indian cities, Major Air pollution episodes, Air Act.

Unit II Effects of Air Pollution:

Analysis of air pollutants – Chemical, Instrumental and biological methods, Air pollution and its effects on human beings, plants and animals – Economic effects of air pollution – Effect of air pollution on meteorological conditions – Changes on the Meso scale, Micro scale and Macro scale, Global Warming, Acid Rain, Ozone Layer Depletion, Indoor Air Pollution & Occupational Disease.

Unit III Sampling, Meteorology and Air Quality Modeling:

Sampling and measurement of particulate and gaseous pollutants – Ambient air sampling – Stack sampling, Environmental factors – Meteorology – temperature lapse rate and stability – Adiabatic lapse rate – Wind Rose – Inversion – Wind velocity and turbulence – Plume behavior – Dispersion of air pollutants- Air Quality Modeling.

Unit IV Air Pollution Control Measures:

Control – Source correction methods – Control equipments – Particulate control methods – Bag house filter – Settling chamber – cyclone separators – inertial devices – Electrostatic precipitator – scrubbers
– Control of gaseous emissions – Absorption – Absorption equipments – adsorption and combustion devices (Theory and working of equipments only), odour and its control, stack monitoring kit, auto exhaust analyser.

Unit V Noise Pollution & its Control

Characteristics of noise – Units and Measurements of Noise – Noise Standards, Noise rating system, Characterization of Noise from Construction, Mining, Transportation and Industrial Activities, Airport Noise – General Control Measures – Effects of noise pollution – auditory effects, non - auditory effects- Noise Menace- Prevention and Control of Noise Pollution – Control of noise at source,

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control of vibration, protection of exposed person – Control of other types of Noise Sound
Analytical Sound level meter.

Course Outcome

Upon completion of the course, the students will be able to:

- CO 1: Explain the concepts of air & noise pollution.
- CO 2: Illustrate the effects of air & noise pollution on environment.
- CO 3: Apply various techniques to measure air & noise pollution.
- CO 4: Solve air and noise pollution problems by devising solutions to the identified problems
- CO 5: Apply various techniques used in reducing the environmental pollution.

Text Books:

1. Air pollution & Control, M. N. Rao & H. V. N Rao, Tata McGraw Hill Publications., 2017
2. Air Pollution and Control Technologies, Dr. Y. Anjaneyulu, Allied publishers Pvt. Ltd., 2002.

Reference Books:

1. Sewage Disposal & Air Pollution Engineering, S.K. Garg, Khanna Publishers, 31st edition, 2008
2. Environmental Pollution Control Engineering, C. S. Rao, New Age Intl Pub., 3rd edition, 2018
3. Environmental Engineering, Rowe, Peavy & Tchobanogolous, Tata McGraw Hill Publication, 2017



B.Tech in Electronics Engineering(EC)
Department of Electronics Engineering

SEME STER	2019-2023 BATCH		2020-2024 BATCH		Percentage change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	100201	Engineering Physics	100013	Engineering Physics	30.64
	100202	Energy, Environment, Ecology & Society	100020	Basic Civil Engineering & Mechanics	
	100203	Basic Computer Engineering	100021	Basic Mechanical Engineering	
	100204	Basic Mechanical Engineering	100022	Basic Electrical & Electronics Engineering	
	100205	Basic Civil Engineering & Mechanics	100023	Basic Computer Engineering	
	100206	Language Lab. & Seminars	140111	Electronics Workshop	
II	100101	Engineering Chemistry	100011	Engineering Mathematics-I	
	100102	Mathematics - I	100015	Energy, Environment, Ecology & Society	
	100103	Technical English	100016	Technical Language	
	100104	Basic Electrical & Electronics Engineering	100017	Language Lab	
	100105	Engineering Graphics	140211	Electronics Devices	
	100106	Manufacturing Practices	140212	Engineering Materials	
III	100001	Mathematics-II	1000001	Indian Constitution and Traditional Knowledge	
	140301	Electronics - I	100025	Engineering Mathematics - II	
	140302	Digital Circuits and Systems	140311	Electronics Circuit Design	
	140303	Network Theory	140312	Network Theory	
	140304	Signals & Systems	140313	Signals & Systems	
	140305	Software Lab (Introduction to MATLA	140314	Electronics Measurement & Instrumentation	
	100002	Biology for Engineers	140315	Software Lab Introduction to MATLAB	
	140306	Self Learning/Presentation	140316	Self Learning/Presentation	
	140307	Summer Internship Project-I	140317	Summer Internship Project-I	
		200XXX	Novel Engaging Course		
IV	100003	Mathematics - III	1000002	Biology for Engineers	
	100004	Cyber Security	100009	Cyber Security	
	140401	Electronics - II	100003	Engineering Mathematics-III	
	140402	Analog Communication	140411	Digital Circuits & Systems	
	140403	Communication Networks	140412	Analog Integrated Circuits	

	140404	Electronics Measurement and Instrument	140413	Analog Communication
	140405	Hardware Lab	140414	Communication Networks
			140415	PCB Design Lab
			200XXX	Novel Engaging Course
V	100005	Ethics, Economics Entrepreneurship & Ma	1000005	Project Management & Financing
	140502	Electromagnetic Theory	1000006	Disaster Management
	140503	Data Communication	140511	Data Science
	140504	Linear Control Theory	140512	Microprocessor & Interfacing
	140505	Digital Communication	140513	Linear Control Theory
	140506	Minor Project - I	140514	Digital Communication
	140507	Summer Internship Project-II	140515	Electromagnetic Fields
	140508	Self Learning/Presentation	140516	Minor Project - I
	100006	Indian Constitution and Traditional Knowledge	140518	Summer Internship Project-II
			140517	Self Learning/Presentation
			200XXX	Novel Engaging Course
VI	100007	Disaster Management	140615	Digital Signal Processing
	140601	Microprocessor and Interfacing	140616	VLSI Design
	140602	Digital Signal Processing	140617	Learning
	140606	Minor Project - II	DE	140651 Spread Spectrum Communications and Jamming 140652 Digital IC Design 140653 Fuzzy Sets, Logic and Systems & Application
	DE	140611 Optical Communication 140612 Antennas and Wave Propagation 140613 Telecom Switching and Networks	OC	900116 Embedded System 900117 Intelligent Control

	DE	140651 Spread Spectrum Communications and Jamming 140652 Digital IC Design 140653 Fuzzy Sets, Logic and Systems & Application	140618	Minor Project - II
	OC	900104 Intelligent Control 900105 Embedded System	200XXX	Novel Engaging Course
			1000007	Intellectual Property Rights
VII	100008	Intellectual Property Rights	100008	Intellectual Property Rights
	140701	VLSI Lab	140701	VLSI Lab
	140704	Creative Problem Solving	140704	Creative Problem Solving
	DE	140711 Satellite and Radar Communication 140712 VLSI Design 140713 Microwave Engineering	DE	140711 Satellite and Radar Communication 140712 VLSI Design 140713 Microwave Engineering
	DE	140751 Digital Image Processing 140752 Introduction to Wireless Cellular Communication	DE	140751 Digital Image Processing 140752 Introduction to Wireless Cellular Communication
	OC	900206 Satellite System 900207 Consumer Electronics	OC	900206 Satellite System 900207 Consumer Electronics
	OC	900218 MEMS & Mechatronics 900219 Multimedia Communication	OC	900218 MEMS & Mechatronics 900219 Multimedia Communication
	140702	Summer Internship Project-III	140702	Summer Internship Project-III
VIII	DE	140853 Power Management Integrated Circuits 140854 Fundamental of Power Electronics 140855 Biomedical Signal Processing	DE	140853 Power Management Integrated Circuits 140854 Fundamental of Power Electronics 140855 Biomedical Signal Processing
	OC	900601 Linear Dynamical Systems 900602 Sensors and Actuators	OC	900601 Linear Dynamical Systems 900602 Sensors and Actuators
	140804	Internship/Project	140804	Internship/Project

B.Tech in Electronics & Telecommunication Engineering(ET)
Department of Electronics Engineering

SEMESTER	2019-2023 BATCH		2020-2024 BATCH		Percentage change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	100201	Engineering Physics	100013	Engineering Physics	30.64
	100202	Energy, Environment, Ecology & Society	100020	Basic Civil Engineering & Mechanics	
	100203	Basic Computer Engineering	100021	Basic Mechanical Engineering	
	100204	Basic Mechanical Engineering	100022	Basic Electrical & Electronics Engineering	
	100205	Basic Civil Engineering & Mechanics	100023	Basic Computer Engineering	
	100206	Language Lab. & Seminars	200111	Electronics Workshop	
II	100101	Engineering Chemistry	100011	Engineering Mathematics-I	
	100102	Mathematics - I	100015	Energy, Environment, Ecology & Society	
	100103	Technical English	100016	Technical Language	
	100104	Basic Electrical & Electronics Engineering	100017	Language Lab	
	100105	Engineering Graphics	200211	Electronics Devices	
	100106	Manufacturing Practices	200212	Engineering Materials	
III	100001	Mathematics-II	1000001	Indian Constitution and Traditional Knowledge	
	200301	Electronics - I	100025	Engineering Mathematics - II	
	200302	Digital Circuits and Systems	200311	Electronics Circuit Design	
	200303	Network Theory	200312	Network Theory	
	200304	Signals & Systems	200313	Signals & Systems	
	200305	Software Lab (Introduction to MATLA	200314	Electronics Measurement & Instrumentation	
	100002	Biology for Engineers	200315	Software Lab Introduction to MATLAB	
	200306	Self Learning/Presentation	200316	Self Learning/Presentation	
	200307	Summer Internship Project-I	200317	Summer Internship Project-I	
		200XXX	Novel Engaging Course		
IV	100003	Mathematics - III	1000002	Biology for Engineers	
	100004	Cyber Security	100009	Cyber Security	
	200401	Electronics - II	100003	Engineering Mathematics-III	
	200402	Analog Communication	200411	Digital Circuits & Systems	
	200403	Communication Networks	200412	Analog Integrated Circuits	

	200404	Stochastic Processes in Communication	200413	Analog Communication
	200405	Hardware Lab	200414	Communication Networks
			200415	PCB Design Lab
			200XXX	Novel Engaging Course
V	100005	Ethics, Economics Entrepreneurship & Ma	1000005	Project Management & Financing
	200502	Electromagnetic Theory	1000006	Disaster Management
	200503	Microprocessor & Interfacing	200511	Data Science
	200504	Linear Control Theory	200512	Microprocessor & Interfacing
	200505	Digital Communication	200513	Linear Control Theory
	200506	Minor Project - I	200514	Digital Communication
	200507	Summer Internship Project-II	200515	Electromagnetic Fields
	200508	Self Learning/Presentation	200516	Minor Project - I
	100006	Indian Constitution and Traditional Knowledge	200518	Summer Internship Project-II
			200517	Self Learning/Presentation
		200XXX	Novel Engaging Course	
VI	100007	Disaster Management	200615	Digital Signal Processing
	200601	Digital Signal Processing	200616	VLSI Design
	200602	Data Communication	200617	Artificial Intelligence and Machine Learning
	200606	Minor Project - II	DE	140651 Spread Spectrum Communications and Jamming 140652 Digital IC Design 140653 Fuzzy Sets, Logic and Systems & Application
	DE	140611 Optical Communication 140612 Antennas and Wave Propagation 140613 Telecom Switching and Networks	OC	900116 Embedded System 900117 Intelligent Control

	DE	140651 Spread Spectrum Communications and Jamming 140652 Digital IC Design 140653 Fuzzy Sets, Logic and Systems & Application	200618	Minor Project - II
	OC	900104 Intelligent Control 900105 Embedded System	200XXX	Novel Engaging Course
			1000007	Intellectual Property Rights
VII		100008 Intellectual Property Rights	100008	Intellectual Property Rights
		200701 VLSI Lab	200701	VLSI Lab
		200704 Creative Problem Solving	200704	Creative Problem Solving
		DE 140711 Satellite and Radar Communication 140712 VLSI Design 140713 Microwave Engineering	DE	140711 Satellite and Radar Communication 140712 VLSI Design 140713 Microwave Engineering
		DE 140751 Digital Image Processing 140752 Introduction to Wireless Cellular Communication	DE	140751 Digital Image Processing 140752 Introduction to Wireless Cellular Communication
		OC 900206 Satellite System 900207 Consumer Electronics	OC	900206 Satellite System 900207 Consumer Electronics
		OC 900218 MEMS & Mechatronics 900219 Multimedia Communication	OC	900218 MEMS & Mechatronics 900219 Multimedia Communication
		200702 Summer Internship Project-III	200702	Summer Internship Project-III
VIII	DE	140853 Power Management Integrated Circuits 140854 Fundamental of Power Electronics 140855 Biomedical Signal Processing	DE	140853 Power Management Integrated Circuits 140854 Fundamental of Power Electronics 140855 Biomedical Signal Processing

		900601 Linear Dynamical Systems		900601 Linear Dynamical Systems
	OC	900602 Sensors and Actuators	OC	900602 Sensors and Actuators
	200804	Internship/Project	200804	Internship/Project
	200805	Professional Development	200805	Professional Development

M.E in Communication,Control & Networking
Department of Electronics Engineering

SEMESTER	2019-2021 BATCH		2020-2022 BATCH		Percentage change in syllabus	
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME		
I	600101	Mathematics	600111	Computational Techniques	84.21	
	600102	Computer Networks	600112	Computer Communication Networks		
	600103	RF Circuits	600113	Communcation System Design & Applica		
	600104	Digital Communication	Elective	600114		Communication Protocols
				600115		Radar Signal Processing
				600116		Adaptive Control System
	600105	Modern Control Theory	OC	800102		Soft Computing Techniques in RF Engineering
600106	Matlab Programming Lab	600120	800103	5G Networks		
			800104	Image and Video Signal Processing		
	600107	C++ Programming Lab	600121	Self Learning/Presentation		
II	600201	Advanced Microprocessor and Embedded Systems	600211	Information Coding Theory		
	600202	Digital Control Systems	600212	Computer Aided Control System		
	600203	Information and Design Coding Th	600213	Digital Filter Design & Algorithm		
	Elective	600204 Microwave Circuit Design 600205 Internet and Network Security 600206 Wireless & Adhoc Network	Elective	600214		
				600215		
		600207 Computer Graphics		600216		
	600208	Digital Signal Processing	OC	600217		
				800201		
600209	Hardware Lab	600222	800203			
			Project Lab-II			
	600210	Simulation Lab	600223	Self Learning/Presentation		

III		600301 Advance Communication System		
	Elective	600302 Telecommunication Networks	600311	Dissertation Part-I
	Elective	600303 Radar Systems 600304 Advance Computer Architecture	MOOC Course	MOOC Course
		600305 Seminar		
		600306 Dissertation Part-I		
IV	600401	Dissertation Evaluation and Defense	600405	Dissertation Part-II

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MECHANICAL ENGINEERING DEPARTMENT B.Tech. Mechanical Engineering

SEM.	2019-2023 BATCH		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	100101	Engineering Chemistry	100011	Engineering Mathematics-I	25.42
	100102	Engineering Mathematics-I	100012	Engineering Chemistry	
	100103	Technical English	100014	Engineering Graphics	
	100104	Basic Electrical & Electronics Engineering	100015	Energy, Environment, Ecology & Society	
	100105	Engineering Graphics	100016	Technical Language	
	100106	Manufacturing Practices	100017	Language Lab	
			100018	Engineering Graphics Lab	
II	100201	Engineering Physics	120211	Material Science	
	100202	Energy, Environment, Ecology & Society	100020	Basic Civil Engineering & Mechanics	
	100203	Basic Computer Engineering	100021	Basic Mechanical Engineering	
	100204	Basic Mechanical Engineering	100022	Basic Electrical and Electronics Engineering	
	100205	Basic Civil Engineering & Mechanics	100023	Basic Computer Engineering	
	100206	Language Lab. & Seminars	100024	Manufacturing Practices	
			120026	Basic Mechanical Engineering Lab	
III	100001	Engineering Mathematics-II	100025	Engineering Mathematics-II	
	120301	Material Science	120311	Manufacturing Processes	
	120302	Mechanics of Materials	120312	Mechanics of Materials	
	120303	Theory of Machines –I	120313	Theory of Machines –I	
	120304	Fluid Mechanics and Hydraulic Machines	120314	Fluid Mechanics and Hydraulic Machines	
	120305	Software Lab	120315	Software Lab	
	120306	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	120316	Self-learning/Presentation	
	120307	Summer Internship Project–I (Institute Level) (Evaluation)	200XXX	Novel Engaging Course	
		120318	Summer Internship Project–I		
		1000001	Indian Constitution and Traditional Knowledge		
IV	100003	Mathematics- III	100003	Mathematics- III	
	120401	Theory of Machines –II	120411	Theory of Machines –II	
	120402	Design of Machine Elements	120412	Design of Machine Elements	
	120403	Manufacturing Processes	120413	Metal Cutting and Machine Tools	
	120404	Engineering Thermodynamics	120414	Engineering Thermodynamics	
	100004	Cyber Security	100004	Cyber Security	
	120405	Production Lab	120415	Production Lab	
100002	Biology for Engineers	200XXX	Novel Engaging Course (Informal Learning)		
		1000002	Biology for Engineers		
	120501	Industrial Engineering	120519	Data Science	

V	120502	Metal Cutting and Machine Tools	120511	Industrial Engineering
	120503	Heat and Mass Transfer	120513	Heat and Mass Transfer
	120504	Thermal Engineering	120514	Thermal Engineering
	120505	Machine Design	120515	Machine Design
	120506	Minor Project-I	120516	Minor Project-I
	120507	Summer Internship Project-II (Evaluation)	120517	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)
	120508	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	200XXX	Novel Engaging Course (Informal Learning)
			120518	Summer Internship Project-II (Evaluation)
			1000006	Disaster Management
		1000005	Project Management & Financing	
VI	100005	Ethics, Economics, Entrepreneurship & Management	120615	Mechanical Vibrations
	120601	Advance Production Technology	120616	Refrigeration and Air-Conditioning
	DE	120611 Vibration and Noise Engineering 120612 Statistical Quality Control 120613 Work Study and Ergonomics 120614 Turbo Machinery	120617	Artificial Intelligence & Machine Learning
	DE	120652 Fundamental of Welding Science and Technology 120654 Viscous Fluid Flow 120655 Properties of Materials (Nature and Properties of Material: III) 120656 Nature and Properties of Materials	DE	120661 Fundamental of Welding Science and Technology 120662 Viscous Fluid Flow 120663 Properties of Materials (Nature and Properties of Material: III)
	OC	900101 Robotics 900102 Product Design	OC	910108 Product Design 910109 Robotics
	100007	Disaster Management	120618	Minor Project-II
	120605	Minor Project-II	200XXX	Novel Engaging Course (Informal Learning)
	100006	Indian Constitution & Traditional Knowledge (Audit Course)	100008	Intellectual Property Rights (IPR)
VII	DE	120711 Refrigeration and Air-Conditioning 120713 Metrology, Measurement and Control 120714 Total Quality Management	DE	120713 Metrology, Measurement and Control 120714 Total Quality Management
	DE	120751 Foundation of Computational Fluid Dynamics 120752 Introduction to Composites 120753 Advanced Machining Processes	DE	120751 Foundation of Computational Fluid Dynamics 120752 Introduction to Composites 120753 Advanced Machining Processes
	OC	900203 Industrial Automation 900204 Solar Energy	OC	900203 Industrial Automation 900204 Solar Energy
	OC	900214 Engineering Materials for Industrial Applications 900215 Maintenance Engineering	OC	900214 Engineering Materials for Industrial Applications 900215 Maintenance Engineering
	100008	Intellectual Property Rights (IPR)	120701	Reliability and Vibration Lab
	120701	Reliability and Vibration Lab	120702	Summer Internship Project-III (04 weeks) (Evaluation)
	120702	Summer Internship Project-III (04 weeks) (Evaluation)	120703	Creative Problem Solving (Evaluation)
	120703	Creative Problem Solving (Evaluation)		
	DE	120851 Quality Design and Control 120852 Robotics: Basics and Selected Advanced Concepts 120855 Carbon Materials and Manufacturing	DE	120851 Quality Design and Control 120852 Robotics: Basics and Selected Advanced Concepts 120855 Carbon Materials and Manufacturing

VIII	OC	900605 Waste to Energy Conversion 900609 Product Design and Manufacturing 900610 Automatic Control	OC	900605 Waste to Energy Conversion 900609 Product Design and Manufacturing 900610 Automatic Control
	120801	Internship/Project	120801	Internship/Project
	120802	Professional Development	120802	Professional Development

OLD SCHEME (2019-23)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)
Department of Mechanical Engineering

Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering
GROUP B: I Semester
For batches admitted in Session 2019-20

B.Tech. I Semester (Mechanical Engineering)

S.No	Subject Code	Category Code	Subject Name	Maximum Marks Allowed					Total Marks	Contact Hours per week			Total Credits
				Theory Slot		Quiz Assignment	Practical Slot			L	T	P	
				End Sem.	Mid Sem.		End Sem.	Lab work & Tutorial					
1	100101	800	Engineering Chemistry (ESC-1)	70	20	10	30	20	150	3	1	2	4
2	100102	800	Engineering Mechanics-I (EMC-1)	70	20	10	-	-	100	3	1	-	4
1	100103	800	Technical English (EMC-2)	70	20	10	30	20	150	3	-	2	4
4	100104	ESC	Basic Electrical & Electronic Engineering (ESE-1)	70	20	10	30	20	150	3	-	2	4
3	100105	ESC	Engineering Graphics (ESC-2)	70	20	10	30	20	150	3	-	2	4
6	100106	ESC	Manufacturing Practice (ESC-3)	-	-	-	30	20	50	-	-	2	1
Total				350	100	50	150	150	750	15	3	14	28

SSS/SCC Qualifier

Induction programme of first three weeks (ESC-1) Physical activity, Creative art, Cultural Human Values, Library, Proficiency Modules, Lectures by eminent People, Visit to local Areas, Familiarization to Dept. Branch & Institute.

GROUP A: (Electrical, Electronics, Computer Science & Engineering, Information Technology, Electronic & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)
01 Theory Period-1 Credit, 02 Practical Periods -1 Credit

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)
Department of Mechanical Engineering

Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering
Group B: II Semester
For batches admitted in Session 2019-20

B.Tech. II Semester (Mechanical Engineering)

S.No	Subject Code	Category Code	Subject Name	Maximum Marks Allowed					Total Marks	Contact Hours per week			Total Credits
				Theory Slot		Quiz Assignment	Practical Slot			L	T	P	
				End Sem.	Mid Sem.		End Sem.	Lab work & Tutorial					
1	100201	800	Engineering Physics (EP-1)	70	20	10	30	20	150	2	1	2	4
2	100202	800	Energy, Environment, Safety & Society (EMC-2)	70	20	10	-	-	100	2	-	-	2
3	100203	ESC	Basic Computer Engineering (ESC-4)	70	20	10	30	20	150	3	-	2	4
4	100204	ESC	Basic Mechanical Engineering (ESC-5)	70	20	10	30	20	150	3	-	2	4
5	100205	ESC	Basic Civil Engineering & Mechanics (ESC-6)	70	20	10	30	20	150	3	-	2	4
6	100206	800	Language Lab & Seminar (EMC-3)	-	-	-	30	20	50	-	-	4	1
Total				350	100	50	150	150	750	14	3	12	24

SSS/SCC Qualifier

Summer Internship Project - I (Institute Level) (Qualifier): Minimum two week duration

GROUP A: (Electrical, Electronics, Computer Science & Engineering, Information Technology, Electronic & Telecommunication)
GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)
01 Theory Period-1 Credit, 02 Practical Periods -1 Credit

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REVISED SCHEME (2020-24)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous Institute & NAAC Accredited Institute Affiliated to RGPV, Bhopal, MP)
Department of Mechanical Engineering
Scheme of Examination For batch admitted in Academic Session 2020-21

B.Tech. I Semester (Mechanical Engineering)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed					Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.		
				Theory Slot		Quiz Assignment	Practical Slot			L	T	P					
				End Term Evaluation	Proficiency in subject course		Mid Term Exam	End Sem.								End Sem.	Lab Work & Tutorial
1	100101	800	Engineering Mathematics-I (EMC-1)	50	30	20	20	-	-	-	100	3	1	-	4	Offline (100)	PT
2	100102	800	Engineering Chemistry (ESC-1)	50	30	20	20	40	20	30	200	2	2	1	4	Blended (100)	SCQ
1	100103	ESC	Engineering English (ESC-2)	50	30	20	20	-	-	-	100	1	1	-	4	Offline (100)	A/O
4	100104	ESC	Energy, Environment, Safety & Society (EMC-1)	50	30	20	20	-	-	-	100	1	-	-	2	Online (100)	SCQ
3	100105	ESC	Technical Language (ESC-3)	50	30	20	20	-	-	-	100	1	-	-	2	Blended (100)	PT
4	100106	ESC	Language Lab (ESC-3)	-	-	-	-	40	20	30	100	-	-	1	1	Offline (100)	SC
5	100107	ESC	Engineering English Lab (ESC-3)	-	-	-	-	40	20	30	100	-	-	1	1	Offline (100)	SC
Total				250	30	100	100	180	40	40	60	500	12	4	6	18	

Induction programme of three weeks (ESC-1) Physical activity, Creative art, Cultural Human Values, Library, Proficiency Modules, Lectures by eminent People, Visit to local Areas, Familiarization to Dept. Branch & Institute.

Mode of Teaching				Mode of Examination				Total Credits
Offline	Online	Blended	Lab	Offline	PT	A/O	SCQ	
1	1	1	1	1	1	1	1	12
100	100	200	100	100	100	100	100	100

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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Department of Mechanical Engineering
Scheme of Examination For batch admitted in Academic Session 2020-21

B.Tech. II Semester (Mechanical Engineering)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed					Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam.		
				Theory Slot		Quiz Assignment	Practical Slot			L	T	P					
				End Term Evaluation	Proficiency in subject course		Mid Term Exam	End Sem.								End Sem.	Lab Work & Tutorial
1	100201	800	Blended Lecture (ESC-1)	50	30	20	20	-	-	-	100	3	-	-	2	Blended (100)	PT
2	100202	800	Basic Civil Engineering & Mechanics (ESC-2)	50	30	20	20	-	-	-	100	3	1	-	3	Blended (100)	SCQ
3	100203	ESC	Basic Mechanical Engineering (ESC-3)	50	30	20	20	-	-	-	100	2	1	-	2	Blended (100)	SCQ
4	100204	ESC	Basic Electrical and Electronic Engineering (ESC-4)	50	30	20	20	40	20	30	200	3	1	1	4	Blended (100)	SCQ
5	100205	ESC	Energy, Environment, Safety & Society (EMC-1)	50	30	20	20	40	20	30	200	-	-	1	1	Offline (100)	SCQ
6	100206	ESC	Manufacturing Practice (ESC-3)	-	-	-	-	40	20	30	100	-	-	1	1	Offline (100)	SCQ
Total				250	30	100	100	180	40	40	60	500	11	4	6	17	

Summer Internship Project - I (Institute Level) (Qualifier): Minimum two week duration. Evaluation in III Semester.

Mode of Teaching				Mode of Examination				Total Credits
Offline	Online	Blended	Lab	Offline	PT	A/O	SCQ	
1	1	1	1	1	1	1	1	17
100	100	200	100	100	100	100	100	100

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OLD SCHEME (2019-23)

MADRHY INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)
Department of Mechanical Engineering

Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering
B.Tech. III Semester (Mechanical Engineering)

(As notified by Institute in Session 2019-20)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed					Total Marks	Contract Hours per week			Total Credits
				Theory Slot			Practical Slot			L	T	P	
				End Sem.	Mid Sem Exam.	Quiz Assignment	End Sem.	Term work Lab Work & Seminar					
1.	10001	09C	Engineering Mathematics-II (MC-4)	70	20	10	-	100	2	1	-	4	
2.	10002	09C	Material Science (MC-5)	70	20	10	-	100	2	1	-	4	
3.	10007	09C	Thermodynamics-I (MC-2)	70	20	10	10	130	2	-	2	4	
4.	10010	09C	Theory of Machines-I (MC-2)	70	20	10	10	130	2	-	2	4	
5.	10004	09C	Fluid Mechanics and Hydraulic Machines (MC-3)	70	20	10	10	130	2	-	2	4	
6.	10005	09C	Software Lab (MC-1)	-	-	-	10	20	10	-	1	1	
7.	10008	09C	Self-learning Project-I (Summer Internship)	-	-	-	20	20	-	-	2	1	
8.	10007	09C	Summer Internship Project-II (Summer Internship)	-	-	-	20	20	-	-	4	2	
Total				250	100	70	140	560	13	2	14	24	

*Virtual Lab to be conducted along with the traditional lab.
*Computer registration for the online course using SW/AS/MS/PTCL/MSOOC, evaluation through attendance, assignment and presentation.
*RGPV B.Tech. Mechanical, Chemical, Biotech, Automobile

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MADRHY INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)
Department of Mechanical Engineering

Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering
B.Tech. IV Semester (Mechanical Engineering)

(As notified by Institute in Session 2019-20)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed					Total Marks	Contract Hours per week			Total Credits	Exam Mode
				Theory Slot			Practical Slot			L	T	P		
				End Sem.	Mid Sem Exam.	Quiz Assignment	End Sem.	Term work Lab Work & Seminar						
1.	10001	09C	Mathematics-II (MC-4)	30	20	10	-	100	2	1	-	4	00	
2.	10001	09C	Theory of Machines-II (MC-2)	30	20	10	10	130	2	1	2	4	00	
3.	10002	09C	Design of Machine Elements (MC-2)	30	20	10	10	130	2	1	2	4	00	
4.	10001	09C	Manufacturing Process (MC-5)	30	20	10	-	100	2	1	-	4	00	
5.	10002	09C	Engineering Graphics (MC-2)	30	20	10	-	100	2	1	-	4	00	
6.	10001	09C	Thermodynamics-II (MC-2)	30	20	10	-	100	2	1	-	4	00	
7.	10007	09C	Production Lab (MC-5)	-	-	-	10	20	-	-	4	2		
Total				120	120	60	10	500	13	4	8	24		

*Virtual Lab to be conducted along with the traditional lab.
*Computer registration for the online course using SW/AS/MS/PTCL/MSOOC, evaluation through attendance, assignment and presentation.
*RGPV B.Tech. Mechanical, Chemical, Biotech, Automobile

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REVISED SCHEME (2020-24)

MADRHY INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous Institute NAAC Accredited Institute Affiliated to RGPV, Bhopal, MP)
Department of Mechanical Engineering

B.Tech. III Semester (Mechanical Engineering)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed							Contract Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam	
				Theory Slot				Practical Slot			Total Marks	L	T				P
				End Term Evaluation	Mid Sem Exam	Quiz Assignment	End Sem.	Lab Work & Seminar	Self Based Mini Project								
1.	10001	09C	Engineering Mathematics-II (MC-4)	30	10	20	20	-	-	-	100	2	1	-	3	Offline	00
2.	10001	09C	Material Science (MC-5)	30	10	20	20	-	-	-	100	2	1	-	3	Blended	00
3.	10001	09C	Thermodynamics-I (MC-2)	30	10	20	20	40	20	20	200	2	-	2	3	Offline	00
4.	10001	09C	Theory of Machines-I (MC-2)	30	10	20	20	40	20	20	200	2	1	1	4	Blended	00
5.	10001	09C	Fluid Mechanics and Hydraulic Machines (MC-3)	30	10	20	20	40	20	20	200	2	1	1	4	Blended	00
6.	10001	09C	Software Lab (MC-1)	-	-	-	-	40	20	20	100	-	-	1	1	Offline	00
7.	10001	09C	Self-learning Project-I (Summer Internship)	-	-	-	-	-	-	-	40	-	-	1	1	Online	00
8.	10001	09C	Summer Internship Project-II (Summer Internship)	-	-	-	-	-	-	-	50	-	-	2	1	Interactive	00
9.	10001	09C	Summer Internship Project-III (Summer Internship)	-	-	-	-	-	-	-	40	-	-	4	2	Offline	00
Total				120	40	100	100	200	120	40	100	100	10	4	10	21	

*Virtual Lab to be conducted along with the traditional lab.
*Computer registration for the online course using SW/AS/MS/PTCL/MSOOC, evaluation through attendance, assignment and presentation.
*RGPV B.Tech. Mechanical, Chemical, Biotech, Automobile

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MADRHY INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
(A Govt. Aided UGC Autonomous Institute NAAC Accredited Institute Affiliated to RGPV, Bhopal, MP)
Department of Mechanical Engineering

B.Tech. IV Semester (Mechanical Engineering)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed							Contract Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mode of Exam	
				Theory Slot				Practical Slot			Total Marks	L	T				P
				End Term Evaluation	Mid Sem Exam	Quiz Assignment	End Sem.	Lab Work & Seminar	Self Based Mini Project								
1.	10001	09C	Mathematics-II (MC-4)	30	10	20	20	-	-	-	100	2	1	-	3	Offline	00
2.	10001	09C	Theory of Machines-II (MC-2)	30	10	20	20	40	20	20	200	2	1	2	4	Blended	00
3.	10001	09C	Design of Machine Elements (MC-2)	30	10	20	20	40	20	20	200	2	1	2	4	Blended	00
4.	10001	09C	Manufacturing Process (MC-5)	30	10	20	20	-	-	-	100	2	1	-	3	Blended	00
5.	10001	09C	Engineering Graphics (MC-2)	30	10	20	20	-	-	-	100	2	1	-	3	Blended	00
6.	10001	09C	Thermodynamics-II (MC-2)	30	10	20	20	-	-	-	100	2	1	-	3	Offline	00
7.	10001	09C	Production Lab (MC-5)	-	-	-	-	40	20	20	100	-	-	4	2	Offline	00
8.	10001	09C	Summer Internship Project-III (Summer Internship)	-	-	-	-	-	-	-	50	-	-	2	1	Interactive	00
Total				120	40	100	100	200	120	40	100	100	10	4	11	21	

*Virtual Lab to be conducted along with the traditional lab.
*Computer registration for the online course using SW/AS/MS/PTCL/MSOOC, evaluation through attendance, assignment and presentation.
*RGPV B.Tech. Mechanical, Chemical, Biotech, Automobile

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OLD SCHEME (2019-23)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Department of Mechanical Engineering

**Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering
VII Semester**

For batches admitted in Session 2019-20

S.No.	Subject Code	Category	Subject Name & Title	Maximum Marks Allotted						Total Marks	Contact Hours per week	Total Credits		
				Theory Slot			Practical Slot						MOOCs	
				End Sem	Mid Sem	Quiz Assignments	End Sem	Lab Work & Tutorial	Assignments					Exam
1	BE	BE	Departmental Elective - I (DE-1)	75	20	15	-	-	-	110	4	-	4	
2	BE*	BE	Departmental Elective - I (DE-2)	-	-	-	-	-	21	75	-	-	2	
3	OC	OC	Open Category - I (OC-1)	75	20	15	-	-	-	110	4	-	2	
4	OC	OC	Open Category - I (OC-2)	75	20	15	-	-	-	110	4	-	2	
5	12000	PD	Professional Development (PD)	75	20	15	-	-	-	110	4	-	2	
6	12001	DE	Electronics and Circuits Lab (ECL-1)	-	-	-	30	30	-	60	-	4	2	
7	12002	DE	Machine Designing Project (MDC-1)	-	-	-	30	30	-	60	-	4	2	
8	12003	DE	Creative Problem Solving (CPS-1)	-	-	-	20	20	-	40	-	2	1	
Total				280	80	60	120	120	21	75	700	24	13	13

Additional Courses for Honors/ or other specializations for honors students: Provided to opt for maximum two additional courses for the credit of 10 hours in general disciplines or 10 hours specialization in engineering disciplines other than the parent discipline.

DE-1 (Through Traditional Mode)		DE-1 (Online mode)		Open Category (OC-1)		Open Category (OC-2)		Open Category (OC-3)			
S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name
1	120711	Engineering and Air Conditioning	1	120711	Foundations of Compressible Fluid Dynamics	1	900201	Automated Automobile	1	900214	Engineering Materials for Industrial Applications (Electronics)
2	120712	Industry Internship and Credit	2	120712	Introduction to Propulsion	2	900204	Auto Energy	2	900211	Introduction to Engineering
3	120713	Industry Internship and Credit	3	120713	Advanced Machine Processes	-	-	-	-	-	-

*The course marks can be through OJ or MOODLE MOOC

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal)

Department of Mechanical Engineering

**Scheme of Examination: Bachelor of Technology (B.Tech.) Mechanical Engineering
VIII Semester**

For batches admitted in Session 2019-20

S.No.	Subject Code	Category	Subject Name & Title	Maximum Marks Allotted						Total Marks	Contact Hours per week	Total Credits		
				Theory Slot			Practical Slot						MOOCs	
				End Sem	Mid Sem	Quiz Assignments	End Sem	Lab Work & Tutorial	Assignments					Exam
1	BE*	BE	Departmental Elective - II (DE-2)	-	-	-	-	-	21	75	100	4	-	4
2	OC*	OC	Open Category - II (OC-2)	-	-	-	-	-	21	75	100	2	-	2
4	12003	DE	Inventing Project (IPC-1)	-	-	-	200	130	-	-	400	-	12	8
5	12004	PD	Professional Development	-	-	-	30	30	-	60	-	2	1	
Total				-	-	-	250	290	30	124	400	8	14	12

Additional Courses for Honors/ or other specializations for honors students: Provided to opt for maximum two additional courses for the credit of 10 hours in general disciplines or 10 hours specialization in engineering disciplines other than the parent discipline.

Departmental Elective (DE-2)		Open Category (OC-2)			
S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name
1	120811	Quality Design and Control	1	900001	Waste to Energy Conversion
2	120812	Robotic, Bionic and Selected Advanced Concepts	2	900009	Product Design and Manufacturing
3	120813	Carbon Materials and Manufacturing	3	900010	Automotive Control

*All of these courses will run through OJ or MOODLE MOOC
*Evaluation will be based on participation based brought by the students in the institution in national level website and other events during the complete tenure of the UG program participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOCs and webinars events.

REVISED SCHEME (2020-24)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute NAAC Accredited Institute Affiliated to RGPV, Bhopal, MP)

Department of Mechanical Engineering

Scheme of Examination

For batches admitted in Session 2020-21

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week				Mode of Teaching (Online/Offline)	Min. No. of Exam
				Theory Slot			Practical Slot				MOOCs	L	T	P		
				End Sem	Mid Sem	Quiz Assignments	End Sem	Lab Work & Tutorial	Assignments							
1	BE	BE	Departmental Elective - I (DE-1)	75	20	15	-	-	-	110	3	-	-	4	Blended (OJ)	10
2	BE*	BE	Departmental Elective - I (DE-2)	-	-	-	-	-	21	75	100	4	-	4	Online (OJ)	10
3	OC	OC	Open Category - I (OC-1)	75	20	15	-	-	-	110	3	1	-	2	Blended (OJ)	10
4	OC	OC	Open Category - I (OC-2)	75	20	15	-	-	-	110	3	1	-	2	Blended (OJ)	10
5	12011	PD	Professional Development (PD)	75	20	15	-	-	-	110	3	1	-	2	Blended (OJ)	10
6	12012	DE	Electronics and Circuits Lab (ECL-1)	-	-	-	30	30	-	60	-	4	2	Offline (OJ)	10	
7	12013	DE	Machine Designing Project (MDC-1)	-	-	-	30	30	-	60	-	4	2	Offline (OJ)	10	
8	12014	DE	Creative Problem Solving (CPS-1)	-	-	-	20	20	-	40	-	2	1	Offline (OJ)	10	
Total				280	80	60	120	120	21	70	600	9	1	10	11	11

Additional Courses for Honors/ or other specializations for honors students: Provided to opt for maximum two additional courses for the credit of 10 hours in general disciplines or 10 hours specialization in engineering disciplines other than the parent discipline.

Through Traditional Mode		DE-1		Open Category (OC-1)		Open Category (OC-2)		
S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name
1	120714	Engineering and Air Conditioning	1	120714	Foundations of Compressible Fluid Dynamics	1	900201	Automated Automobile
2	120715	Industry Internship and Credit	2	120715	Introduction to Propulsion	2	900204	Auto Energy
3	120716	Industry Internship and Credit	3	120716	Advanced Machine Processes	-	-	-

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

(A Govt. Aided UGC Autonomous Institute NAAC Accredited Institute Affiliated to RGPV, Bhopal, MP)

Department of Mechanical Engineering

Scheme of Examination

For batches admitted in Session 2020-21

S. No.	Subject Code	Category	Subject Name	Maximum Marks Allotted						Total Marks	Contact Hours per week				Mode of Teaching (Online/Offline)	Min. No. of Exam
				Theory Slot			Practical Slot				MOOCs	L	T	P		
				End Sem	Mid Sem	Quiz Assignments	End Sem	Lab Work & Tutorial	Assignments							
4	BE*	BE	Departmental Elective - II (DE-2)	-	-	-	-	-	21	75	100	3	-	3	Offline (OJ)	10
5	OC*	OC	Open Category - II (OC-2)	-	-	-	-	-	21	75	100	3	-	3	Offline (OJ)	10
6	12003	DE	Inventing Project (IPC-1)	-	-	-	200	130	-	-	400	-	12	8	Interactive (OJ)	10
7	12004	PD	Professional Development	-	-	-	30	30	-	60	-	2	1	Interactive (OJ)	10	
Total				-	-	-	250	290	30	124	400	8	22	17	17	

Additional Courses for Honors/ or other specializations for honors students: Provided to opt for maximum two additional courses for the credit of 10 hours in general disciplines or 10 hours specialization in engineering disciplines other than the parent discipline.

*All of these courses will run through OJ or MOODLE MOOC
*Evaluation will be based on participation based brought by the students in the institution in national level website and other events during the complete tenure of the UG program participation in professional chapter activities, club activities, cultural events, sports, personality development activities, collaborative events, MOOCs and webinars events.

DE-2		Open Category (OC-2)		Open Category (OC-3)	
S.No.	Subject Code	Subject Name	S.No.	Subject Code	Subject Name
1	120814	Quality Design and Control	1	900001	Waste to Energy Conversion
2	120815	Robotic, Bionic and Selected Advanced Concepts	2	900009	Product Design and Manufacturing
3	120816	Carbon Materials and Manufacturing	3	900010	Automotive Control

OLD SYLLABUS (2019-23)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
 (A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPTV, Bhopal)
 Department of Mechanical Engineering
 For Semesters introduced in Academic Session 2019-20

120304: Fluid Mechanics and Hydraulic Machines

Category	Title	Code	Credit			Theory Paper
Departmental Core-CE	Fluid Mechanics and Hydraulic Machines	120304-190314	L	T	P	Max.Marks-70 Min.Marks-22 Duration-3hrs.
			3	-	2	

Course Objectives: To make the students understand:

1. Fundamentals of Fluid Mechanics, which is used in the applications of Aerodynamics, Hydraulics, Marine Engineering, Gas dynamics etc.
2. And give fundamental knowledge of fluid, its properties and behavior under various conditions of internal and external flows.
3. And develop understanding about hydrostatic law, principle of buoyancy and stability of a floating body and application of mass, momentum and energy equation in fluid flow.

Course Pre-Requisite:

Basic Mechanical Engineering (Semester Code – 103204)

Outcomes:

- Unit-I Properties of Fluid:** Pressure, density, specific weight, viscosity, dynamic and kinematic viscosity, Newton's law of viscosity and its application.
- Fluid Statics:** Pressure variation with depth, pressure measurement, pressure on immersed surface, centre pressure, buoyancy, flotation, stability of floating bodies.
- Unit-II Fluid Kinetics:** One dimensional flow, approximation, control volume concept, continuity equation in 3-D, its differential and integral form, velocity and acceleration of fluid particle, stream line, path line, Streakline, vortex and circulation, stream function and velocity potential function, Flow net, Free and forced vortex flow.
- Unit-III Fluid Dynamics:** Momentum theorem, impulse momentum equation and its application, Euler's equation in 3-D, Bernoulli's equation for incompressible fluid flow, engineering applications of energy equation, Pitot-Tube, Venturi meter, orifice meter.
- Unit-IV Flow through Pipes:** Critical Reynolds's number, velocity distribution in pipes, friction factor, Moody's chart, Laminar flow through pipe, Hagen-Poiseuille's equation, Turbulent flow through pipe, Hydraulic gradient line and total energy line, Minor head losses in pipes, Pipe Sizing and Transmission of power through pipes.
- Unit-V Water Turbines:** Impulse and Reaction principles, Pelton, Francis and Kaplan turbines, velocity diagrams, Work done by turbines, Draft Tube theory.

Course Outcomes: After successful completion of this course students will be able to:

- CO1: Define the fundamental properties of fluids.
- CO2: Relate the concepts of mechanics with various laws of fluid mechanics.
- CO3: Identify the laws of fluid mechanics applicable for the body in various fluids under different conditions.
- CO4: Analyse various forces and their effects, related to fluids mechanics.
- CO5: Measure and compare losses in different fluid flow conditions.
- CO6: Compare different turbo machines depending on their behavior and their merits and demerits.

Text & Reference Books:

1. Fluid Mechanics by Serres & Wylie, McGraw-Hill, Edn.
2. Fluid Mechanics by Modak, Saha, Standard publishing house.
3. Fluid Mechanics by D.S. Kulkarni, Karmel publisher.
4. Fluid Mechanics by R.K. Bansal, Laxmi Publishing House.

REVISED SYLLABUS (2020-24)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
 (A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPTV, Bhopal)
 Department of Mechanical Engineering

For batches introduced in Academic Session 2020-21

Fluid Mechanics and Hydraulic Machines

Category	Title	Code	Credit-4			Theory Paper
Departmental Core-CE	Fluid Mechanics and Hydraulic Machines	120314-190314	L	T	P	Max.Marks-50 Min.Marks-14 Duration-3hrs.
			2	1	2	

Course Objectives: To make the students understand:

1. Fundamentals of Fluid Mechanics, which is used in the applications of Aerodynamics, Hydraulics, Marine Engineering, Gas dynamics etc.
2. And give fundamental knowledge of fluid, its properties and behavior under various conditions of internal and external flows.

Outcomes:

- Unit-I Properties of Fluid:** Pressure, density, specific weight, viscosity, dynamic and kinematic viscosity, Newton's law of viscosity and its application.
- Fluid Statics:** Pressure variation with depth, pressure measurement, pressure on immersed surface, centre pressure, buoyancy, flotation, stability of floating bodies.
- Unit-II Fluid Kinetics:** One dimensional flow approximation, control volume concept, continuity equation in 3-D, its differential and integral form, velocity and acceleration of fluid particle, stream line, path line, Streakline, vortex and circulation, stream function and velocity potential function, Flow net, Free and forced vortex flow.
- Unit-III Fluid Dynamics:** Momentum theorem, impulse momentum equation and its application, Euler's equation in 3-D, Bernoulli's equation for incompressible fluid flow, engineering applications of energy equation, Pitot-Tube, Venturi meter, orifice meter.
- Unit-IV Flow through Pipes:** Critical Reynolds's number, velocity distribution in pipes, friction factor, Moody's chart, Laminar flow through pipe, Hagen-Poiseuille's equation, Turbulent flow through pipe, Hydraulic gradient line and total energy line, Minor head losses in pipes, Pipe Sizing and Transmission of power through pipes.
- Unit-V Water Turbines and Pumps:** Impulse and Reaction principles, Pelton, Francis and Kaplan turbines, velocity diagrams, Work done by turbines, Draft Tube theory. **Application of dimensional analysis, similarity in turbines and pumps, Classification, advantages over reciprocating type, definition of manometric head, gross head, net head, fluid, velocity diagram and work done, Performance and Characteristics of turbines and pumps.**

Course Outcomes: After successful completion of this course students will be able to:

- CO1: Define the fundamental properties of fluids.
- CO2: Relate the concepts of mechanics with various laws of fluid mechanics.
- CO3: Identify the laws of fluid mechanics applicable for the body in various fluids under different conditions.
- CO4: Analyse various forces and their effects, related to fluids mechanics.
- CO5: Measure and compare losses in different fluid flow conditions.
- CO6: Compare different turbo machines depending on their behavior and their merits and demerits.

Text & Reference Books:

1. Fluid Mechanics by Serres & Wylie, McGraw-Hill, Edn.
2. Fluid Mechanics by Modak, Saha, Standard publishing house.
3. Fluid Mechanics by D.S. Kulkarni, Karmel publisher.
4. Fluid Mechanics by R.K. Bansal, Laxmi Publishing House.
5. Fluid Mechanics by Venne A Venkate, John M. Corbale, Tam McGraw Hill Edition.

Engineering Thermodynamics

Category	Title	Code	Credit-4			Theory Paper
Departmental Core-DC	Engineering Thermodynamics	1200414/190413	L	T	P	Max.Marks-70 Min.Marks-22 Duration-3hrs.
			S	I	-	

Course Objective: To make students able to:

1. Understand the nature and role of the various thermodynamic properties of matter.
2. Represent a thermodynamic system by a control mass or control volume and identify work and/or heat interactions between the system and surroundings.

Syllabus

Unit-I Basic Concepts: Thermodynamics, Property, Equilibrium, State, Process, Cycle, Zeroth law of thermodynamics, Statement and significance, Concept of an Ideal gas, Gas Laws, Avogadro's Hypothesis, Heat and work transfer, First law of thermodynamics - Statement of first law of thermodynamics, first law - applied to closed system undergoing a cycle, Process analysis of closed system flow process, Flow energy, Steady flow process analysis of closed system processes, Limitations of first law of thermodynamics.

Unit -II Properties of pure substances: P-V-T surfaces, h-s, T-S, P-V, P-h, T-V diagrams of pure substance, saturated and sub-cooled liquid, superheated vapour, quality of steam, Mollier diagram, steam table, different processes, measurement of quality of steam.

Unit -III Second law of thermodynamics: Heat engine, Heat reservoir, Refrigerator, Heat pump, COP, Carnot's theorem, Carnot's cycle, Efficiency of Carnot's cycle, Statement of second law, Reversible and Irreversible processes, Consequences of second law.

Unit -IV Availability and Irreversibility: Entropy, Entropy change of Ideal gas, Available energy, T-S diagram, Availability and Irreversibility.

Unit-V Thermodynamics Relations: Thermodynamics relations, e.g Maxwell relations and their applications.

Course Outcome: After successful completion of this course students will be able to:

- CO1: Define energy interactions between system and surroundings.
 CO2: Correlate the law of thermodynamics to real life applications.
 CO3: Apply the laws of thermodynamics to analyze boilers, heat pumps, refrigerators, heat engines, compressors and nozzles.
 CO4: Investigate the effectiveness of energy conversion device in mechanical power generation.
 CO5: Analyze air standard cycles applied in prime movers.
 CO6: Describe benefits of improvements to thermodynamic systems.

Text & Reference Books:

1. Engineering thermodynamics by P.K. Nag
2. Thermal engineering by R.K. Rajput
3. Thermal engineering by P.L. Dhallany

Engineering Thermodynamics

Category	Title	Code	Credit-4			Theory Paper
Departmental Core-DC	Engineering Thermodynamics	120414/ 190413	L	T	P	Max.Marks-50 Min.Marks-10 Duration-2 hrs.
			S	I	-	

Course Objective: To make students able to:

1. Understand the nature and role of the various thermodynamic properties of matter.
2. Represent a thermodynamic system by a control mass or control volume and identify work and/or heat interactions between the system and surroundings.

Syllabus

Unit-I Basic Concepts: Thermodynamics, Property, Equilibrium, State, Process, Cycle, Zeroth law of thermodynamics, Statement and significance, Concept of an Ideal gas, Gas Laws, Avogadro's Hypothesis, Heat and work transfer, First law of thermodynamics - Statement of first law of thermodynamics, first law - applied to closed system undergoing a cycle, Process analysis of closed system flow process, Flow energy, Steady flow process analysis of closed system processes, Limitations of first law of thermodynamics.

Unit -II Properties of pure substances: P-V-T surfaces, h-s, T-S, P-V, P-h, T-V diagrams of pure substance, saturated and sub-cooled liquid, superheated vapour, quality of steam, Mollier diagram, steam table, different processes, measurement of quality of steam.

Unit -III Second law of thermodynamics: Heat engine, Heat reservoir, Refrigerator, Heat pump, COP, Carnot's theorem, Carnot's cycle, Efficiency of Carnot's cycle, Statement of second law, Reversible and Irreversible processes, Consequences of Second law.

Unit -IV Availability and Irreversibility: Entropy, Entropy changes of Ideal gas, Available energy, T-S diagram, Availability and Irreversibility.

Unit-V Thermodynamics Relations: Thermodynamics relations, e.g Maxwell relations and their applications.

Air Standard Cycles: Carnot, Otto, Diesel, Dual cycles and determination of their air standard efficiencies and their comparisons, Dual cycle, Atkinson cycle, P-V relationship, Mixture of ideal gases, Properties of mixture of gases.

Course Outcome: After successful completion of this course students will be able to:

- CO1: Define energy interactions between system and surroundings.
 CO2: Correlate the law of thermodynamics to real life applications.
 CO3: Apply the laws of thermodynamics to analyze boilers, heat pumps, refrigerators, heat engines, compressors and nozzles.
 CO4: Analyze the thermal efficiency of air standard cycles.
 CO5: Analyze the entropy concept in thermodynamic systems.
 CO6: Describe benefits of improvements to thermodynamic systems.

Text & Reference Books:

1. Engineering thermodynamics by P.K. Nag
2. Thermal engineering by R.K. Rajput
3. Thermal engineering by P.L. Dhallany

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 Department of Mechanical Engineering
 For batches admitted in Session 2019-21

Industrial Engineering

Category	Title	Code	Credits/2			Theory Paper
Departmental Core-DC	Industrial Engineering	120501/120501	L	T	P	Max.Marks-30 Min.Marks-22 Duration-1hr
			3	-	-	

Course Objectives: To make the students understand:

1. Professional, technical managerial, or leadership roles within industrial organizations.
2. The knowledge through discovery, synthesis, and integration for the betterment of their organization or society.

Syllabus

UNIT-I

Production Systems and Productivity: Production Management: design of production systems (product, job shop and batch). Definition and types of productivity. Measurement of productivity; factors affecting the productivity and productivity improvement programs.

Production Planning and Control: Objective, importance, need and function of production planning and control, planning, routing, scheduling, dispatching, follow up & progress report, production planning and production control.

UNIT-II

Forecasting techniques: Need and type of forecasting, factors affecting forecasting, forecasting in decision making, time series analysis, demand patterns, qualitative methods- measures of forecast accuracy and error analysis in quantitative forecasting.

Capacity and aggregate planning: Capacity planning, capacity measurement, long-term and short-term strategies, aggregate production planning and graphical method to choose aggregate plan.

UNIT-III

Inventory Control – Objective and function, need and classification- justification and standardization ABC analysis, deterministic inventory models, quantity discount, perpetual and periodic inventory control systems, Probabilistic inventory management, economic ordering quantity procurement cost, carrying charges, leadtime, re-order point.

Project management – PERT and CPM.

UNIT-IV

Product Design and Development: Principles of good product design, tolerance, quality and cost considerations, product life cycle, standardization, simplification, diversification, value engineering and analysis, methodology, applications, concurrent engineering; comparison of production alternatives. **Facility Location and Plant Layout:** Facility location factors and evaluation of alternate locations; qualitative aspects, quantitative models for layout decision, types of plant layout and their evaluation; computer aided layout design techniques; assembly line balancing; materials handling systems.

UNIT-V

Master Production Scheduling and MRP: Functions, planning horizon and planning periods for master production schedule, types of master production schedule, Bill of Material, Independent Demand versus dependent demand, Functions of material requirements planning and manufacturing resource planning (MRP I and MRP II), inputs for MRP system, performance characteristics of MRP system, materials requirement planning application.

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 For batches admitted in Academic Session 2020-21

190511/120511: Industrial Engineering

Category	Title	Code	Credits/2			Theory Paper
Departmental Core-DC	Industrial Engineering	190511/120511/ 190501/120501	L	T	P	Max.Marks-30 Min.Marks-18 Duration:2hrs.
			2	-	-	

Course Objectives: Industrial engineering is concerned with the design, improvement, installation, and management of integrated systems of men, material, and machine. After completing this course, students will learn a set of skills that includes mathematical modeling, probability and statistics, computer science, human factors, interpersonal skills, project management, and an ability to manage and administer large technical engineering and research projects. Thus, industrial engineering may be thought of as applied problem-solving from inception to implementation.

Syllabus

UNIT-I

Production Systems and Productivity: Production Management: design of production systems (product, job shop and batch). Definition and types of productivity. Measurement of productivity; factors affecting the productivity and productivity improvement programs.

Production Planning and Control: Aggregate production planning, Capacity planning, capacity measurement, long-term and short-term strategies, aggregate production planning, and graphical method to choose aggregate plan.

UNIT-II

Forecasting techniques: Need and type of forecasting, factors affecting forecasting, forecasting in decision making, time series analysis, demand patterns, qualitative methods- measures of forecast accuracy and error analysis in quantitative forecasting.

UNIT-III

Inventory Control – Objective and function, need and classification- justification and standardization ABC analysis, deterministic inventory models, quantity discount, perpetual and periodic inventory control systems, Probabilistic inventory management, economic ordering quantity procurement cost, carrying charges, leadtime, re-order point.

Unit-IV

Facility Location and Plant Layout: Facility location factors and evaluation of alternate locations; qualitative aspects, quantitative models for layout decisions, types of plant layout and their evaluation; computer aided layout design techniques; assembly line balancing; materials handling systems.

Project management - Project Scheduling, Network diagram, critical path method (CPM), Project Evaluation and review technique (PERT), Time cost trade off.

UNIT-V

Master Production Scheduling and MRP: Functions, planning horizon and planning periods for master production schedule, types of master production schedule, Bill of Material, Independent Demand versus dependent demand, Functions of material requirements planning and manufacturing resource planning (MRP I and MRP II), inputs for MRP system; performance characteristics of MRP system; materials requirement planning application.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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 Department of Mechanical Engineering
 For Semesters admitted to Session 2023-24

120504: Thermal Engineering

Category	Title	Code	Credit -4	Theory Paper
Departmental DC	Thermal Engineering	120504	L T P 2 1 2	Max.Marks-70 Min.Marks-22 Duration-3hrs

Syllabus

UNIT I – Air Standard Cycles and Vapor Power Cycles: Carnot, Otto, Diesel, Dual cycles and determination of their air standard efficiencies and their comparison, Brayton cycle, Air-Standard cycle P-V-I relationship, Mixture of ideal gases Properties of mixture of gases, Vapor Carnot cycle and its limitations, Rankine cycle and modified Rankine cycle, actual vapor power cycle, Reheat cycle, ideal regenerative cycle, actual regenerative cycle, Reheat – regenerative cycle, feed water heaters, working fluids in vapor power cycle, binary vapor cycles, efficiency of coupled cycles, gross heat, efficiencies in power cycles, Basics of condensers.

UNIT II – Engine Construction, Operation and Performance:

Basics of CI and SI engines, Valve timing diagram, Timing order and its significance – relative merits and demerits of SI and CI engines, Two stroke engine construction and operation, Comparison of two-stroke and four-stroke engines, Performance parameters, Heat balance: Testing of engine.

UNIT III – Combustion in SI and CI Engines:

Combustion process in IC engines; Stages of combustion, Flame propagation velocity and area of flame front, Rate of pressure rise - Cycle to cycle variation - Abnormal combustion - Theories of detonation - Effect of engine operating variables on combustion, Combustion characteristics for SI and CI engines, Importance of air motion - Swirl, squawk and turbulence - Scavill ratio, Fuel air mixing - Stages of combustion - Delay period - Factors affecting delay period, Knock in CI engines - methods of controlling diesel knock.

UNIT IV – Turbines and Pumps:

Classification, Pelton, Francis and Kaplan turbines; velocity diagrams and work done Draft Tubes, governing in water turbines, Impulse staging, velocity and pressure compressing utilization factor, analysis for optimum U.F. Curtis stage, and Rateau stage, including qualitative analysis. Effect of blade and nozzle losses on Vane efficiency, Stage efficiency, Analysis for optimum efficiency vortex types of flow, flow with constant reaction, Application of dimensional analysis, similarity in turbines and pumps, Classification, advantage over reciprocation type, definition of runner: head gross head, static head, water diagram and work done, Performance and Characteristics of turbines and pumps.

Unit V Refrigeration and Air Conditioning

Reversed Brton Cycle, Bell-Coleman Cycle, Air Cycle for Aircraft Refrigeration, Properties Refrigerant, & Application of Refrigerants, CFC & HCFC Refrigerants, Simple vapour Absorption Systems, Electrolytic Refrigeration, Refrigerants, Hydrocarbons refrigerants, Vapour Compression System, Simple Systems, Multi pressure systems, Compound Compression, Multi Evaporator Systems, Cascade Systems, Vapour absorption system, **Air Conditioning:** Introduction to Psychrometry and Air Conditioning.

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 Department of Mechanical Engineering

120514: Thermal Engineering

Category Departmental Cons-DC	Title Thermal Engineering	Code 120514	Credits -4			Theory Paper Max.Marks-50 Min.Marks-18 Duration-2 hrs.
			L	T	P	
			2	1	2	

Course Objectives: To make the students understand:

1. the fundamental principles of IC engines and combustion phenomena
2. the basic principles of nozzles and diffusers
3. the application of basic thermodynamics and fluid mechanics in steam and gas turbine power plants

Syllabus

UNIT I – Vapor Power Cycles: Vapor Carnot cycle and its limitations, Rankine cycle and modified Rankine cycle, actual vapor power cycle, Reheat cycle, ideal regenerative cycle, actual regenerative cycle, Reheat – regenerative cycle, feedwater heaters, regeneration of preheat and process heat, working fluids in vapor power cycle, binary vapor cycles, the efficiency of coupled cycles, Basics of condensers.

UNIT II – IC Engine Basics and Combustion in IC Engines:

Basics of CI and SI Engines, Basics of two-stroke and four-stroke IC engines, Valve timing diagram, Performance parameters, Heat balance, Testing of the engine, Stages of combustion in SI engines, Flame propagation, Rate of pressure rise, Abnormal combustion, Theory of detonation, Effect of engine operating variables on knock, Stages of combustion in CI engines, Delay period - Factors affecting delay period, Knock in CI engines - methods of controlling diesel knock, Combustion characteristics for SI and CI engines.

UNIT III – Gas Turbine

Open cycle and closed cycle arrangements, applications, assumptions in ideal cycle analysis, simple gas turbine cycle, heat exchange cycle, intercooled cycle, various combinations of reheat, heat exchange and intercooling, comparison of various cycles, Continuous Brayton and Rankine Cycle and SI-SC plants, Advantages of Combined Cycle.

UNIT IV – Steam Turbines

Classification of steam turbine, Impulse and reaction turbines, Staging, Stage and overall efficiency, Reheat factor, Utilization factor, Blading, Velocity diagram & work calculations, Impulse Reaction Turbines, Losses in steam turbines, Governing of turbines.

Unit V. Nozzles and Diffusers

Introduction, STEJ and continuity equation for nozzles & diffusers, momentum equation for the steam nozzle, entropy change due to friction in the nozzle, nozzle efficiency, critical pressure, maximum velocity & pressure, Relation between area, velocity & pressure in nozzle, the effect of friction on critical pressure ratio, supersonic flow in nozzles, the effect of reaction of back pressure.

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MECHANICAL ENGINEERING DEPARTMENT
B.Tech. Automobile Engineering

SEM.	2019-2023 BATCH		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	100101	Engineering Chemistry	100011	Engineering Mathematics-I	25.031
	100102	Engineering Mathematics-I	100012	Engineering Chemistry	
	100103	Technical English	100014	Engineering Graphics	
	100104	Basic Electrical & Electronics Engineering	100015	Energy, Environment, Ecology & Society	
	100105	Engineering Graphics	100016	Technical Language	
	100106	Manufacturing Practices	100017	Language Lab	
			100018	Engineering Graphics Lab	
II	100201	Engineering Physics	190211	Material Science	
	100202	Energy, Environment, Ecology & Society	100020	Basic Civil Engineering & Mechanics	
	100203	Basic Computer Engineering	100021	Basic Mechanical Engineering	
	100204	Basic Mechanical Engineering	100022	Basic Electrical and Electronics Engineering	
	100205	Basic Civil Engineering & Mechanics	100023	Basic Computer Engineering	
	100206	Language Lab. & Seminars	100024	Manufacturing Practices	
			120026	Basic Mechanical Engineering Lab	
III	100001	Engineering Mathematics-II	100025	Engineering Mathematics-II	
	190301	Material Science	190311	Automotive Materials	
	190302	Mechanics of Materials	190312	Mechanics of Materials	
	190303	Automotive Engines	190313	Automotive Engines	
	190304	Fluid Mechanics and Hydraulic Machines	190314	Fluid Mechanics and Hydraulic Machines	
	120305	Software Lab	190315	Software Lab	
	120306	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	190316	Self-learning/Presentation	
	120307	Summer Internship Project-I (Institute Level) (Evaluation)	200XXX	Novel Engaging Course	
			190318	Summer Internship Project-I	
		1000001	Indian Constitution and Traditional Knowledge		
IV	100003	Mathematics- III	100003	Mathematics- III	
	190401	Theory of Machines -I	190411	Theory of Machines -I	
	190402	Automotive Electrical and Electronics System	190412	Automotive Electrical and Electronics System	
	190403	Engineering Thermodynamics	190413	Engineering Thermodynamics	
	190404	Manufacturing Processes	190414	Manufacturing Processes	
	100004	Cyber Security	100004	Cyber Security	

	190405	Production Lab	190415	Production Lab
	100002	Biology for Engineers	200XXX	Novel Engaging Course (Informal Learning)
			1000002	Biology for Engineers
V	190501	Industrial Engineering	190519	Data Science
	190502	Metal Cutting and Machine Tools	190511	Industrial Engineering
	190503	Heat and Mass Transfer	190513	Heat and Mass Transfer
	190504	Design of Machine Elements	190514	Design of Machine Elements
	190505	Automotive Chassis	190515	Automotive Chassis
	190506	Minor Project-I	190516	Minor Project-I
	190507	Summer Internship Project-II (Evaluation)	190517	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)
	190508	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	200XXX	Novel Engaging Course (Informal Learning)
			190518	Summer Internship Project-II (Evaluation)
			1000006	Disaster Management
			1000005	Project Management & Financing
VI	100005	Ethics, Economics, Entrepreneurship & Management	190615	Automotive Transmission
	190601	Automotive Transmission	190616	Refrigeration and Air-Conditioning
	DE	190611 Automotive Materials 190612 Work Study and Ergonomics 190613 Automotive Pollution and Control 190614 Automotive Component Design	190617	Artificial Intelligence & Machine Learning
	DE	190652 Robotics and Control: Theory and Practice 190653 Fundamental of Automotive System 190654 Viscous Fluid Flow 190655 Nature and Properties of Materials	DE	190661 Fundamentals of Automotive Systems 190662 Viscous Fluid Flow
	OC	900101 Robotics 900102 Product Design	OC	910108 Product Design 910109 Robotics
	100007	Disaster Management	190618	Minor Project-II
	190605	Minor Project-II	200XXX	Novel Engaging Course (Informal Learning)
	100006	Indian Constitution & Traditional Knowledge (Audit Course)	100008	Intellectual Property Rights (IPR)
VII	DE	190711 Vehicle Dynamics 190713 Hybrid Electric Vehicles	DE	190711 Vehicle Dynamics 190713 Hybrid Electric Vehicles
	DE	190751 Farm Machinery 190753 Introduction to Mechanical Vibration	DE	190751 Farm Machinery 190753 Introduction to Mechanical Vibration
	OC	900203 Industrial Automation 900204 Solar Energy	OC	900203 Industrial Automation 900204 Solar Energy
	OC	900214 Engineering Materials for Industrial Applications 900215 Maintenance Engineering	OC	900214 Engineering Materials for Industrial Applications 900215 Maintenance Engineering

	100008	Intellectual Property Rights (IPR)	190701	Automotive Maintenance
	190701	Automotive Maintenance	190702	Summer Internship Project-III (04 weeks) (Evaluation)
	190702	Summer Internship Project-III (04 weeks) (Evaluation)	190703	Creative Problem Solving (Evaluation)
	190703	Creative Problem Solving (Evaluation)		
VIII	DE	120851 Quality Design and Control 120852 Robotics: Basics and Selected Advanced Concepts 120855 Carbon Materials and Manufacturing	DE	120851 Quality Design and Control 120852 Robotics: Basics and Selected Advanced Concepts 120855 Carbon Materials and Manufacturing
	OC	900605 Waste to Energy Conversion 900609 Product Design and Manufacturing 900610 Automatic Control	OC	900605 Waste to Energy Conversion 900609 Product Design and Manufacturing 900610 Automatic Control
	190801	Internship/Project	190801	Internship/Project
	190802	Professional Development	190802	Professional Development

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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 Department of Mechanical Engineering
 Scheme of Examination: Bachelor of Technology (B.Tech.) Automobile Engineering
GROUP B: I Semester For batches admitted in Session 2019-20
B. Tech I Semester (Automobile Engineering)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot		Quiz Assignment	Practical Slot			L	T	P	
				End Sem	Mid Sem		End Sem	Lab work & Seminar					
1.	10004	BSC	Engineering Chemistry (ESC-1)	30	20	10	10	30	10	3	-	3	4
2.	10005	BSC	Engineering Mathematics-I (EM-1)	30	20	10	-	-	100	3	3	-	4
3.	10006	BEMC	Technical English (TEM-1)	30	20	10	10	30	100	3	-	3	4
4.	10004	ESC	Basic Electrical & Electronic Engineering (EE-1)	30	20	10	10	30	100	3	-	3	4
5.	10005	ESC	Engineering Graphics (EG-1)	30	20	10	10	30	100	3	-	3	4
6.	10006	ESC	Manufacturing Processes (EM-2)	-	-	-	10	30	10	-	-	3	1
Total				150	100	50	150	300	700	15	3	10	23
SSS/NCC				Qualifier									

Induction programme of first three weeks (SC, Physical activity), Creative Arts, Universal Human Values, Literary, Pedagogical Modules, Lectures by eminent Faculty, Visit to local Areas, Familiarization to Dept. Branch & Institution.

GROUP A: (Electrical, Electronics, Computer Science & Engineering, Information Technology, Electronics & Telecommunication)
 GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)
 10 Theory Periods (1 Credit), 12 Practical Periods (2 Credit)

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 Department of Mechanical Engineering
 Scheme of Examination: Bachelor of Technology (B.Tech.) Automobile Engineering
Group B: II Semester For batches admitted in Session 2019-20
B. Tech II Semester (Automobile Engineering)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted					Total Marks	Contact Hours per week			Total Credits
				Theory Slot		Quiz Assignment	Practical Slot			L	T	P	
				End Sem	Mid Sem		End Sem	Lab work & Seminar					
1.	10004	BSC	Engineering Physics (EP-1)	20	20	10	30	20	110	2	3	2	4
2.	10005	BEMC	Energy, Environment, Safety & Society (EES-1)	20	20	10	-	-	100	3	-	-	3
3.	10005	ESC	Basic Computer Engineering (ESC-2)	20	20	10	30	20	110	3	-	2	4
4.	10004	ESC	Basic Mechanical Engineering (EM-3)	20	20	10	30	20	110	3	-	3	4
5.	10004	ESC	Basic Civil Engineering & Mechanics (EC-1)	20	20	10	30	20	110	3	-	3	4
6.	10004	BEMC	Language Lab - A Seminar (BEMC-1)	-	-	-	30	20	50	-	-	4	2
Total				100	100	60	150	100	500	14	3	12	29
SSS/NCC				Qualifier									

Summer Internship Project - I (Fourth Level) (Qualifier): Minimum two-week duration.

GROUP A: (Electrical, Electronics, Computer Science & Engineering, Information Technology, Electronics & Telecommunication)
 GROUP B: (Civil, Mechanical, Chemical, Biotech, Automobile)

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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 Department of Mechanical Engineering
 Scheme of Examination: For batches admitted in Session 2020-21

B.Tech. I Semester (Automobile Engineering)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted								Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mark of Exam.
				Theory Slot				Practical Slot					L	T	P			
				End Sem		Quiz Assignment	Practical Slot		Lab work & Seminar	Mid Sem Exam	Quiz Assignment							
				End Term Evaluation	Mid Term Exams		Mid Term Exam	Quiz Assignment					End Term	Lab Work & Seminar	Mid Term Exam Project			
1.	10004	BSC	Engineering Mathematics-I (EM-1)	30	20	10	20	20	-	-	100	3	3	-	4	Offline	100	
2.	10005	BSC	Engineering Chemistry (ESC-1)	30	20	10	20	20	30	20	200	3	3	3	4	Blended	100	
3.	10004	BSC	Engineering Graphics (EG-1)	30	20	10	20	20	-	-	100	3	3	-	3	Offline	100	
4.	10007	BEMC	Energy, Environment, Safety & Society (EES-1)	30	20	10	20	20	-	-	100	3	-	-	3	Online	100	
5.	10004	BEMC	Technical English (TEM-1)	30	20	10	20	20	-	-	100	3	-	-	3	Blended	100	
6.	10007	BEMC	Language Lab (BEMC-1)	-	-	-	-	-	30	20	20	100	-	3	3	Offline	100	
7.	10007	BEMC	Manufacturing Processes (EM-2)	-	-	-	-	-	30	20	20	100	-	3	3	Offline	100	
Total				240	160	60	240	240	160	160	60	600	11	6	6	19		

Induction programme of three weeks (SC, Physical activity), Creative Arts, Universal Human Values, Pedagogical Modules, Lectures by eminent Faculty, Visit to local Areas, Familiarization to Dept. Branch & Institution.

Mode of Teaching						Mode of Examination						Total Credits
Theory			Lab			Theory			Lab			
Offline	Online	Blended	Offline	Online	Blended	Offline	PP	A-O	MCQ	OT	OT	OT
3	0	0	0	0	0	3	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

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 Department of Mechanical Engineering
 Scheme of Examination: For batches admitted in Session 2020-21

B.Tech. II Semester (Automobile Engineering)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allotted								Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Offline/Online)	Mark of Exam.
				Theory Slot				Practical Slot					L	T	P			
				End Sem		Quiz Assignment	Practical Slot		Lab work & Seminar	Mid Sem Exam	Quiz Assignment							
				End Term Evaluation	Mid Term Exams		Mid Term Exam	Quiz Assignment					End Term	Lab Work & Seminar	Mid Term Exam Project			
1.	10011	ESC	Material Science (ESC-3)	30	20	10	20	20	-	-	100	3	-	-	3	Blended	100	
2.	10009	BSC	Basic Civil Engineering & Mechanics (EC-1)	30	20	10	20	20	-	-	100	3	3	-	3	Blended	100	
3.	10007	BSC	Basic Mechanical Engineering (EM-3)	30	20	10	20	20	-	-	100	3	3	-	3	Blended	100	
4.	10021	BSC	Basic Electrical & Electronic Engineering (EE-2)	30	20	10	20	20	30	20	200	3	3	3	4	Blended	100	
5.	10007	ESC	Basic Computer Engineering (ESC-2)	30	20	10	20	20	30	30	200	3	3	3	4	Blended	100	
6.	10004	ESC	Manufacturing Processes (EM-2)	-	-	-	-	-	30	20	20	100	-	3	3	Offline	100	
7.	10004	BSC	Basic Thermal Engineering (ESC-4)	-	-	-	-	-	30	20	20	100	-	3	3	Offline	100	
Total				240	160	60	240	240	240	160	60	600	11	6	6	19		

Summer Internship Project - I (Fourth Level) (Qualifier): Minimum two-week duration; Evaluation in III Semester.

Mode of Teaching						Mode of Examination						Total Credits
Theory			Lab			Theory			Lab			
Offline	Online	Blended	Offline	Online	Blended	Offline	PP	A-O	MCQ	OT	OT	OT
3	0	0	0	0	0	3	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

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Scheme of Examination: Bachelor of Technology (B.Tech.) Automobile Engineering
B.Tech. III Semester (Automobile Engineering)

S.No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot			L	T	P	
				End Sem.	Mid Sem. Exam.	Quiz Assignment	End Sem.	Term work Lab Work & Seminar					
1.	20001	DC	Engineering Mathematics-II (DC-02)	70	30	10	-	100	1	1	-	4	
2.	20001	EM	Elementary Mechanics (EM-01)	70	30	10	-	100	1	1	-	4	
3.	20002	DC	Mechanics of Materials (DC-03)	70	30	10	30	100	1	-	2	4	
4.	20003	DC	Automotive Engine (DC-01)	70	30	10	30	100	1	-	2	4	
5.	20004	DC	Fluid Mechanics & Hydraulic Machines (DC-05)	70	30	10	30	100	1	-	2	4	
6.	20005	DC	Software Lab (DC-01)	-	-	-	30	30	-	-	2	1	
7.	20006	MECH/AD	Summer Internship Project-I (Soft Skills Based)	-	-	-	20	20	-	-	2	1	
8.	20007	DC	Summer Internship Project-2 (Industry Level II) (Industrial)	-	-	-	20	20	-	-	2	2	
Total				350	350	50	140	140	750	17	2	14	54

*Virtual Lab to be conducted along with the traditional lab
*Campus registration for the summer course using SO/AYAS/NPEU/ MPOC, evaluation through attendance, assignments and presentation.
GROUP B: Civil, Mechanical, Chemical, Biotech, Automobile

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Scheme of Examination: Bachelor of Technology (B.Tech.) Automobile Engineering
B.Tech. IV Semester (Automobile Engineering)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed					Total Marks	Contact Hours per week			Total Credits
				Theory Slot			Practical Slot			L	T	P	
				End Sem.	Mid Sem. Exam.	Quiz Assignment	End Sem.	Term work Lab Work & Seminar					
1.	20008	DC	Mechanics-III (DC-04)	70	30	10	-	100	1	1	-	4	
2.	20009	DC	Theory of Machines-I (DC-06)	70	30	10	30	100	2	1	1	4	
3.	20010	DC	Automotive Electrical and Electronic System (DC-07)	70	30	10	30	100	2	1	1	4	
4.	20011	DC	Engineering Thermodynamics (DC-08)	70	30	10	-	100	1	1	-	4	
5.	20012	DC	Manufacturing Process (DC-09)	70	30	10	-	100	1	1	-	4	
6.	20013	DC	Other Seminars (DC-1)	70	30	10	-	100	2	1	-	4	
7.	20014	DC	Production Lab (DC-2)	-	-	-	30	30	-	-	4	2	
Total				420	120	60	60	560	12	4	8	22	
Summer Internship Project-II (Soft skills Based) for two weeks duration: Evaluation in V Semester				-	-	-	20	20	-	-	-	2	1
Total				-	-	-	20	20	-	-	-	2	1

*Virtual Lab to be conducted along with the traditional lab
*Campus registration for the summer course using SO/AYAS/NPEU/ MPOC, evaluation through attendance, assignments and presentation.
GROUP B: Civil, Mechanical, Chemical, Biotech, Automobile

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B.Tech. III Semester (Automobile Engineering)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Other Dates)	Mark of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Sem. Evaluation	Proficiency in subject course	Mid Sem. Exam.	Quiz Assignment	End Sem.	Lab Work & Seminar	Skill Based Mini Project							
1.	20021	DC	Engineering Mathematics-II (DC-02)	70	30	20	20	-	-	100	2	1	-	1	Offline (10)	3F	
2.	20021	DC	Elementary Mechanics (DC-01)	70	30	20	20	-	-	100	2	1	-	1	Blended (10)	3F	
3.	20022	DC	Mechanics of Materials (DC-03)	70	30	20	20	40	20	100	2	1	2	1	Offline (10)	3F	
4.	20023	DC	Automotive Engine (DC-01)	70	30	20	20	40	20	100	2	1	2	1	Blended (10)	3F	
5.	20024	DC	Fluid Mechanics & Hydraulic Machines (DC-05)	70	30	20	20	40	20	100	2	1	2	1	Blended (10)	3F	
6.	20025	DC	Software Lab (DC-01)	-	-	-	-	40	20	20	-	-	2	1	Offline (10)	3F	
7.	20026	DC	Summer Internship Project-I (Soft Skills Based)	-	-	-	-	-	40	40	-	-	2	1	Online (10)	3F	
8.	20027	DC	Summer Internship Project-2 (Industry Level I)	-	-	-	-	-	-	40	-	-	4	2	Offline	3F	
Total				280	90	140	140	160	110	40	400	12	4	14	22		
9.	20028	MAC	Indian Constitution and Technical Knowledge	50	10	20	20	-	-	100	2	-	-	-	Open	100Q	

*Virtual Lab to be conducted along with the traditional lab
*Campus registration for the summer course using SO/AYAS/NPEU/ MPOC, evaluation through attendance, assignments and presentation

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B.Tech. IV Semester (Automobile Engineering)

S. No.	Subject Code	Category Code	Subject Name	Maximum Marks Allowed							Total Marks	Contact Hours per week			Total Credits	Mode of Teaching (Other Dates)	Mark of Exam.
				Theory Slot				Practical Slot				L	T	P			
				End Sem. Evaluation	Proficiency in subject course	Mid Sem. Exam.	Quiz Assignment	End Sem.	Lab Work & Seminar	Skill Based Mini Project							
1.	20030	DC	Mechanics-III (DC-04)	70	30	20	20	-	-	100	2	1	-	1	Offline (10)	3F	
2.	20030	DC	Theory of Machines-I (DC-06)	70	30	20	20	40	20	100	2	1	2	1	Blended (10)	3F	
3.	20031	DC	Automotive Electrical and Electronic System (DC-07)	70	30	20	20	40	20	100	2	1	2	1	Blended (10)	3F	
4.	20032	DC	Engineering Thermodynamics (DC-08)	70	30	20	20	-	-	100	2	1	-	1	Blended (10)	3F	
5.	20033	DC	Manufacturing Process (DC-09)	70	30	20	20	-	-	100	2	1	-	1	Blended (10)	3F	
6.	20034	DC	Other Seminars (DC-1)	70	30	20	20	-	-	100	2	-	-	2	Open (10)	100Q	
7.	20035	DC	Production Lab (DC-2)	-	-	-	-	40	20	20	-	-	4	2	Offline (10)	3F	
8.	20036	DC	Summer Internship Project-II (Soft skills Based) for two weeks duration: Evaluation in V Semester	-	-	-	-	20	-	20	-	-	2	1	Interactive	3F	
Total				350	90	110	110	110	40	40	440	12	4	14	22		
9.	20037	MAC	Ecology for Engineers	50	10	20	20	-	-	100	2	-	-	-	Open	100Q	

*Virtual Lab to be conducted along with the traditional lab
*Campus registration for the summer course using SO/AYAS/NPEU/ MPOC, evaluation through attendance, assignments and presentation

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OLD SYLLABUS (2019-23)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
IA Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal

Department of Mechanical Engineering
For further information contact us on 0532-265000

120104: Fluid Mechanics and Hydraulic Machines

Category	Title	Code	Credit-4			Theory Paper
Departmental Core-DE	Fluid Mechanics and Hydraulics	120104/190514	L	T	P	Max Marks-70 Min Marks-22 Duration-3hrs.
			1	1	2	

Course Objectives: To make the students understand

1. Fundamentals of Fluid Mechanics, which is used in the applications of Aerodynamics, Hydrology, Marine Engineering, Gas Turbines etc.
2. And give fundamental knowledge of fluid, its properties and behavior under various conditions of internal and external flows.
3. And develop understanding about hydrostatic law, principle of buoyancy and stability of a floating body and application of mass, momentum and energy equation in fluid flow.

Course Pre-Requisite:

Basic Mechanical Engineering, Subject Code – 19E204

Syllabus

Unit-I Properties of Fluid: Pressure, density, specific weight, viscosity, dynamic and kinematic viscosity, Newton's law of viscosity and its applications.

Fluid Statics: Pressure variation with depth, pressure measurement, pressure on immersed surface, centre pressure, buoyancy, flotation, stability of floating bodies.

Unit-II Fluid Kinetics: One dimensional flow approximation, control volume concept, continuity equation in 1-D, its differential and integral form, velocity and acceleration of fluid particle, stream line, path line, streakline, vortexity and circulation, stream function and velocity potential function, Flow net, Free and forced vortex flow.

Unit-III Fluid Dynamics: Momentum theorem, impulse momentum equation and its application, Euler's equation in 1-D, Bernoulli's equation for incompressible fluid flow, engineering applications of energy equation, Pitot-Tube, Venturi meter, Orifice meter.

Unit-IV Flow through Pipes: Critical Reynolds's number, velocity distribution in pipes, friction factor, Moody's chart, Laminar flow through pipe, Hagen-Poiseuille's equation, turbulent flow through pipe, Hydraulic gradient line and total energy line, Minor head losses in pipes, Pipe Sizing/Design and Transmission of power through pipes.

Unit-V Water Turbines: Impulse and Reaction principles, Pelton, Francis and Kaplan turbines, velocity diagrams, Work done by turbines, Draft Tube theory.

Course Outcomes: After successful completion of this course students will be able to:

- CO1: Define the fundamental properties of fluids.
- CO2: Relate the concepts of mechanics with various laws of fluid mechanics.
- CO3: Identify the laws of fluid mechanics applicable for the body in various fluid under different conditions.
- CO4: Analyse various forces and their effects, related to fluid mechanics.
- CO5: Measure and compare losses in different fluid flow conditions.
- CO6: Compare different turbo machines depending on their behaviour and flow entry and density.

Text & Reference Books:

1. Fluid Mechanics by Munson & Wylie, McGraw-Hill India.
2. Fluid Mechanics by Modak Saha, Standard publishing house.
3. Fluid Mechanics by D.S. Kumar, Karmay publisher.
4. Fluid Mechanics by R.K. Bansal, Laxmi Publishing House.

REVISED SYLLABUS (2020-24)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Department of Mechanical Engineering

120104: Fluid Mechanics and Hydraulic Machines

Fluid Mechanics and Hydraulic Machines

Category	Title	Code	Credit-4			Theory Paper
Departmental Core-DE	Fluid Mechanics and Hydraulic Machines	120104/190514	L	T	P	Max Marks-80 Min Marks-16 Duration-3hrs.
			2	1	2	

Course Objectives: To make the students understand

1. Fundamentals of Fluid Mechanics, which is used in the applications of Aerodynamics, Hydrology, Marine Engineering, Gas Turbines etc.
2. And give fundamental knowledge of fluid, its properties and behavior under various conditions of internal and external flows.

Syllabus

Unit-I Properties of Fluid: Pressure, density, specific weight, viscosity, dynamic and kinematic viscosity, Newton's law of viscosity and its applications.

Fluid Statics: Pressure variation with depth, pressure measurement, pressure on immersed surface, centre pressure, buoyancy, flotation, stability of floating bodies.

Unit-II Fluid Kinetics: One dimensional flow approximation, control volume concept, continuity equation in 1-D, its differential and integral form, velocity and acceleration of fluid particle, stream line, path line, streakline, vortexity and circulation, Stream function and velocity potential function, Flow net, Free and forced vortex flow.

Unit-III Fluid Dynamics: Momentum theorem, impulse momentum equation and its application, Euler's equation in 1-D, Bernoulli's equation for incompressible fluid flow, engineering applications of energy equation, Pitot-Tube, Venturi meter, Orifice meter.

Unit-IV Flow through Pipes: Critical Reynolds's number, velocity distribution in pipes, friction factor, Moody's chart, Laminar flow through pipe, Hagen-Poiseuille's equation, turbulent flow through pipe, Hydraulic gradient line and total energy line, Minor head losses in pipes, Pipe Sizing/Design and Transmission of power through pipes.

Unit-V Water Turbines and Pumps: Impulse and Reaction principles, Pelton, Francis and Kaplan turbines, velocity diagrams, Work done by turbines, Draft Tube theory, Application of dimensional analysis, similarity in turbines and pumps, Classification, advantages, main components types, behaviour of compressible fluid, free body, static head, total head diagram and work done, Performance and Characteristics of turbines and pumps.

Course Outcomes: After successful completion of this course students will be able to:

- CO1: Define the fundamental properties of fluids.
- CO2: Relate the concepts of mechanics with various laws of fluid mechanics.
- CO3: Identify the laws of fluid mechanics applicable for the body in various fluids under different conditions.
- CO4: Analyse various forces and their effects, related to fluid mechanics.
- CO5: Measure and compare losses in different fluid flow conditions.
- CO6: Compare different turbo machines depending on their behaviour and their heads and diameters.

Text & Reference Books:

1. Fluid Mechanics by Munson & Wylie, McGraw-Hill India.
2. Fluid Mechanics by Modak Saha, Standard publishing house.
3. Fluid Mechanics by D.S. Kumar, Karmay publisher.
4. Fluid Mechanics by R.K. Bansal, Laxmi Publishing House.
5. Fluid Mechanics by Yasa A Chughan, Anil M. Chhabra, Tata Mcgraw Hill Edition.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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 For batches admitted in Session 2019-20

Engineering Thermodynamics

Category	Title	Code	Credit-4			Theory Paper
			L	T	P	
Departmental Core-DC	Engineering Thermodynamics	120404/190403	3	1	-	Max.Marks-70 Min.Marks-22 Duration-3hrs

Course Objective: To make students able to:

1. Understand the nature and role of the various thermodynamic properties of matter
2. Represent a thermodynamic system by a control mass or control volume and identify work and/or heat interactions between the system and surroundings.

Syllabus

Unit-I Basic Concepts: Thermodynamics, Property, Equilibrium, State, Process, Cycle, Zeroth law of thermodynamics, Statement and significance, Concept of an Ideal gas, Gas Laws, Avogadro's Hypothesis, Heat and work transfer. First law of thermodynamics -Statement of first law of thermodynamics, first law applied to closed system undergoing a cycle, Process analysis of closed system flow process, First energy, Steady flow process analysis of closed system processes, Limitations of first law of thermodynamics.

Unit -II Properties of pure substances:- P-V-T surfaces, h-s, T-S, T-V, P-h, T-V diagrams of pure substance, saturated and sub-cooled liquid, superheated vapour, quality of steam, Mollier diagram, steam table, different processes, measurement of quality of steam

Unit -III Second law of thermodynamics: Heat engine, Heat reservoir, Refrigerator, Heat pump, COP, Carnot's theorem, Carnot's cycle, Efficiency of Carnot's cycle, Statement of second law, Reversible and Irreversible processes, Consequences of Second law

Unit -IV Availability and Irreversibility: Entropy, Entropy change of ideal gas, Available energy, T-S diagram, Availability and irreversibility.

Unit-V Thermodynamics Relations: Thermodynamics relations, e.g. Maxwell relations and their applications.

Course Outcome: After successful completion of this course students will be able to:

- CO1: Define energy interactions between system and surroundings
- CO2: Correlate the law of thermodynamics to real life applications
- CO3: Apply the laws of thermodynamics to analyse boilers, heat pumps, refrigerators, heat engines, compressors and nozzles
- CO4: Investigate the effectiveness of energy conversion device in mechanical power generation
- CO5: Analyze air standard cycles applied in prime movers
- CO6: Describe benefits of improvements to thermodynamic systems.

Text & Reference Books:

1. Engineering Thermodynamics by P. K. Nag
2. Thermal engineering by R.K. Rajput
3. Thermal engineering by P.L. Ballaney

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Engineering Thermodynamics

Category	Title	Code	Credit-3			Theory Paper
			L	T	P	
Departmental Core-DC	Engineering Thermodynamics	120414/ 190413	1	1	-	Max.Marks-50 Min.Marks-16 Duration-2 hrs.
			2	1	-	

Course Objective: To make students able to:

1. Understand the nature and role of the various thermodynamic properties of matter
2. Represent a thermodynamic system by a control mass or control volume and identify work and/or heat interactions between the system and surroundings.

Syllabus

Unit-I Basic Concepts: Thermodynamics, Property, Equilibrium, State, Process, Cycle, Zeroth law of thermodynamics, Statement and significance, Concept of an Ideal gas, Gas Laws, Avogadro's Hypothesis, Heat and work transfer. First law of thermodynamics -Statement of first law of thermodynamics, first law applied to closed system undergoing a cycle, Process analysis of closed system flow process, First energy, Steady flow process analysis of closed system processes, Limitations of first law of thermodynamics.

Unit -II Properties of pure substances:- P-V-T surfaces, h-s, T-S, P-h, T-V diagrams of pure substance, saturated and sub-cooled liquid, superheated vapour, quality of steam, Mollier diagram, steam table, different processes, measurement of quality of steam

Unit -III Second law of thermodynamics: Heat engine, Heat reservoir, Refrigerator, Heat pump, COP, Carnot's theorem, Carnot's cycle, Efficiency of Carnot's cycle, Statement of second law, Reversible and Irreversible processes, Consequences of Second law

Unit -IV Availability and Irreversibility: Entropy, Entropy changes of ideal gas, Available energy, T-S diagram, Availability and irreversibility.

Unit-V Thermodynamics Relations: Thermodynamics relations, e.g. Maxwell relations and their applications.

Air Standard Cycles: Carnot, Stirling, Ericsson, Otto, Diesel, Dual cycles and determination of their air standard efficiencies and their comparison, Rankine cycle, Atkinson cycle, P-V-T relationship, Mixture of ideal gases Properties of mixture of gases.

Course Outcome: After successful completion of this course students will be able to:

- CO1: Define energy interactions between system and surroundings
- CO2: Correlate the law of thermodynamics to real life applications
- CO3: Apply the laws of thermodynamics to analyse boilers, heat pumps, refrigerators, heat engines, compressors and nozzles
- CO4: Analyze the thermal efficiency of air standard cycles
- CO5: Analyze the entropy concept in thermodynamic systems.
- CO6: Describe benefits of improvements to thermodynamic systems.

Text & Reference Books:

4. Engineering Thermodynamics by P. K. Nag
5. Thermal engineering by R.K. Rajput
6. Thermal engineering by P.L. Ballaney

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 For batches admitted in Session 2015-16

Industrial Engineering

Category Departmental Core-IE	Title Industrial Engineering	Code 120501/120501	Credits: 3			Theory Paper Max Marks-70 Min Marks-22 Duration-3hrs.
			L	T	P	
			3	-	-	

Course Objectives: To make the students understand

1. Professional, technical management, or leadership roles within industrial organizations.
2. The knowledge through discovery, synthesis, and integration for the betterment of their organization or society.

Syllabus

UNIT-I

Production Systems and Productivity: Production Management; design of production systems (product, job shop and batch); Definition and types of productivity; Measurement of productivity; factors affecting the productivity and productivity improvement programs.

Production Planning and Control: Objectives, importance, need and function of production planning and control; planning, routing, scheduling, dispatching, follow up & progress report, production planning and production control.

UNIT-II

Forecasting techniques: Need and type of forecasting, factors affecting forecasting, forecasting in decision making, time series analysis, demand patterns, qualitative methods- measures of forecast accuracy and error analysis in quantitative forecasting.

Capacity and aggregate planning: Capacity planning; capacity measurement, long-term and short-term strategies, aggregate production planning, and graphical method to choose aggregate plan.

UNIT-III

Inventory Control – Objectives and functions, need and classifications- codification and standardization ABC analysis, deterministic inventory models, quantity discount; perpetual and periodic inventory control systems, Probabilistic inventory management, economic ordering quantity procurement cost, carrying charges, lead-time re-order point.

Project management – PERT and CPM

UNIT-IV

Product Design and Development: Principles of good product design, tolerance, quality and cost considerations, product life cycle, standardization, simplification, diversification, value engineering and analysis, methodology, applications, concurrent engineering, comparison of production alternatives. **Facility Location and Plant Layout:** Facility location factors and evaluation of alternate locations; qualitative aspects, quantitative models for layout decisions, types of plant layout and their evaluation; computer aided layout design techniques; assembly line balancing, materials handling systems.

UNIT-V

Master Production Scheduling and MRP: Functions, planning horizon and planning periods for master production schedule, types of master production schedule, Bill of Material, Independent Demand versus dependent demand, Functions of material requirements planning and manufacturing resource planning (MRP I and MRP II); inputs for MRP system, performance characteristics of MRP system, materials requirement planning explosion.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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 For batches admitted in Academic Session 2020-21

120501/120501: Industrial Engineering

Category Departmental Core-IE	Title Industrial Engineering	Code 120501/120501/ 120501/120501	Credits: 2			Theory Paper Max Marks-70 Min Marks-22 Duration-3hrs.
			L	T	P	
			2	-	-	

Course Objectives: Industrial engineering is concerned with the design, improvement, installation, and management of integrated systems of men, material, and machine. After completing this course, students will learn a set of skills that includes mathematical modeling, probability and statistics, computer science, human factors, interpersonal skills, project management, and an ability to manage and administer large industrial engineering and research projects. Thus, industrial engineering may be thought of as applied problem-solving, from inception to implementation.

Syllabus

UNIT-I

Production Systems and Productivity: Production Management; design of production systems (product, job shop and batch); Definition and types of productivity; Measurement of productivity; factors affecting the productivity and productivity improvement programs.

Production Planning and Control: Aggregate production planning, Capacity planning, capacity measurement, long-term and short-term strategies, aggregate production planning, and graphical method to choose aggregate plan.

UNIT-II

Forecasting techniques: Need and type of forecasting, factors affecting forecasting, forecasting in decision making, time series analysis, demand patterns, qualitative methods- measures of forecast accuracy and error analysis in quantitative forecasting.

UNIT-III

Inventory Control – Objectives and functions, need and classifications- codification and standardization ABC analysis, deterministic inventory models, quantity discount; perpetual and periodic inventory control systems, Probabilistic inventory management, economic ordering quantity procurement cost, carrying charges, lead-time re-order point.

Unit-IV

Facility Location and Plant Layout: Facility location factors and evaluation of alternate locations; qualitative aspects, quantitative models for layout decisions; types of plant layout and their evaluation; computer aided layout design techniques; assembly line balancing, materials handling systems.

Project management – PERT and CPM, Network diagram, critical path method (CPM), Project Evaluation and review technique (PERT), Time cost trade off.

UNIT-V

Master Production Scheduling and MRP: Functions, planning horizon and planning periods for master production schedule, types of master production schedule, Bill of Material, Independent Demand versus dependent demand, Functions of material requirements planning and manufacturing resource planning (MRP I and MRP II); inputs for MRP system, performance characteristics of MRP system, materials requirement planning explosion.

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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 Department of Mechanical Engineering
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190504: Design of Machine Elements

Category Departmental Core-DC	Title Design of Machine Elements	Code 190504	Credit-4			Theory Paper Max.Marks-70 Min.Marks-22 Duration:1hr.
			L	T	P	
			2	1	2	

Note: Use of PSG Design Data book is permitted in exam.

Course Objectives:

To make the students to understand

1. develop an ability to apply knowledge of mathematics, science and engineering.
2. develop an ability to design a system, component or process to meet desired needs within realistic constraints.

Syllabus:

Unit I- Design Philosophy: Principles of mechanical design: Factor of safety, strength, rigidity, fracture, wear and material considerations; Stress concentration; Design for fatigue; Limits and fits; Standardization; selection of materials; theory of failure.

Unit II- Design of shafts and couplings: Shaft, keys and couplings; design of rigid and pin bushed flexible couplings.

Unit III- Design of Elements: Cotter and knuckle joints; screwed fastenings, bolted and riveted joints under direct and eccentric loads; Welded joints; Welded joints, strength of welded joints; eccentrically loaded welded joints, welded joints subjected to bending moments and torsion.

Unit IV- Design of mechanical gears: Design of helical, bevel and worm gears. **Ball and chain drives and Automotive Clutch box assembly.**

Unit V- Design of Bearings: Rolling contact bearing; Types of rolling contact bearing, static and dynamic load capacities, Stribeck's equation, equivalent bearing load, load life relationship, bearing life, bearing life, load factor, selection of bearing from manufacturing catalogue, Lubrication and mounting, dismounting and reworking of bearings; oil seals and packing; Sliding contact bearing; Bearing material and their properties, bearing types and their constructional details, hydrodynamic lubrication- basic theory, design consideration in hydrodynamic bearings, **Raimondi and Boyd method relating bearing variables.**

Course Outcomes:

After successful completion of this course students will able to

- CO1: Illustrate the design Philosophy and Principles of mechanical design
- CO2: Identify appropriate bearing for a given application.
- CO3: Use design data books in designing various mechanical components.
- CO4: Select appropriate drive or power transmission on the basis of load and speed.
- CO5: Analyze the stresses and strain induced in basic mechanical components.



MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
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 Department of Mechanical Engineering
 For batch admitted in Academic Session 2020-21

190514: Design of Machine Elements

Category Departmental Core-DC	Title Design of Machine Elements	Code 190514-190504	Credit-4			Theory Paper Max.Marks-50 Min.Marks-10 Duration:2 hrs.
			L	T	P	
			2	1	2	

Note: Use of PSG Design Data book is permitted in exam.

Course Pre-Requisites:

Engineering Mathematics-I
 Mechanics of Materials

Course Objectives:

To make the students to understand

1. develop an ability to apply knowledge of mathematics, science and engineering.
2. develop an ability to design a system, component or process to meet desired needs within realistic constraints.
3. develop an ability to identify, formulate, and solve engineering problems.
4. develop an ability to use techniques, skills and modern engineering tools.

Syllabus:

Unit I-Design Philosophy: Principles of mechanical design; Factor of safety; Limits and fits; Standardization; Selection of materials; Theory of failure.

Unit II- Design of Keys, Shafts and Couplings: Definitions, classifications and applications; design of rigid and pin bushed flexible couplings.

Unit III- Design of Permanent and Temporary Joints: Cotter and knuckle joints, screwed fastenings, bolted and riveted joints under direct and eccentric loads; Welded joints; Welded joints, strength of welded joints, eccentrically loaded welded joints, welded joints subjected to bending moments and torsion.

Unit IV- Design of Mechanical Gears: Design of spur, helical, bevel and worm gears.

Unit V- Design of Bearings: **Rolling contact bearing;** Types of rolling contact bearing, static and dynamic load capacities, Stribeck's equation, equivalent bearing load, load life relationship, bearing life, bearing life, load factor, selection of bearing from manufacturing catalogue, Sliding contact bearing; Bearing material and their properties, bearing types and their constructional details; Design consideration in hydrodynamic bearings.



MADHAV INSTITUTE OF TECHNOLOGY AND SCIENCE, GWALIOR – 474005

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MECHANICAL ENGINEERING DEPARTMENT

M.Tech. Production Technology

SEM.	2019-2023 BATCH		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	560101	Optimization Techniques In Mechanical Engineering	560111	Computational Techniques	47.05
	560102	Integrated Manufacturing & Resources Planning	560112	Production Engineering- I	
	560103	Production Engineering- I	560113	Production and Operations Management	
	560104	Production & Operation Management	DE-I	560114: Maintenance Management 560115: Flexible Manufacturing Systems 560116: Ergonomics and Work Study 560117: Total Quality Management	
	DE	560105 Ergonomics and Work Study 560106 Project Management 560107 Reliability Availability and Maintainability 560108 World-Class Manufacturing	OC-I	800111: Product Design & Development 800112: Computer Integrated Manufacturing	
	560109	Simulation & Modeling Lab. -I	560120	Production Engineering Lab-I	
	560110	Production Engineering Lab. – I	560121	Self Learning / Presentation	
II	560201	Automation & Robotics in Production	560211	Automation & Robotics	
	560202	Advanced Statics & System Reliability	560212	Production Engineering-II	
	560203	Production Engineering-II	560213	Logistics and Supply Chain Management	
	560204	Total Quality Management	DE-2	560214: Quality Design and Control 560215: Traditional and Non-Traditional Optimization Tools 560216: Product Design and Manufacturing 560217: Material characterization 560218: Generative Design for Additive Manufacturing	
	DE	560205 Engineering Estimation & Costing 560206 Flexible Manufacturing System 560207 Concurrent Engineering 560208 Logistics & Supply Chain Management	OC-2	800210 : Introduction to Operations Management 800211 : Tools in Scientific Computing	
	560209	Computer Lab-I	560220	Production Engineering Lab-II	
	560210	Production Engineering Lab-II	560221	Self Learning / Presentation	

III	560301	Computer Integrated Manufacturing	560311	Dissertation Part-I
	560302	Maintenance Management	800310	Automation in Manufacturing
	560303	Seminar		
	560304	Dissertation Part – I		
IV	560401	Dissertation Part- II	560405	Dissertation Part-II

SEMESTER	2019-2023 BATCH		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	100201	Engineering Physics	230102	Introduction to Computer Programming	32.17
	100202	Energy, Environment, Ecology & Society	100022	Basic Electrical & Electronics Engineering	
	100203	Basic Computer Engineering	100020	Basic Civil Engineering & Mechanics	
	100204	Basic Mechanical Engineering	100021	Basic Mechanical Engineering	
	100205	Basic Civil Engineering & Mechanics	100015	Energy, Environment, Ecology & Society	
	100206	Language Lab. & Seminars	160111	IT workshop	
II	100101	Engineering Chemistry	100011	Engineering Mathematics –I	
	100102	Engineering Mathematics-I	160211	Data Structures	
	100103	Technical English	160212	Object Oriented Programming & Methodology	
	100104	Basic Electrical & Electronics Engineering	160213	Digital Electronics	
	100105	Engineering Graphics	100016	Technical Language	
	100106	Manufacturing Practices	100017	Language Lab	
III	100001	Mathematics-II	100025	Engineering Mathematics-II	
	160301	Digital Electronics	160311	Computer System Organization	
	160302	Data Structures	160312	Design & Analysis of Algorithms	
	160303	Computer Graphics & Multimedia	160313	Database Management System	
	160304	Object Oriented Programming and Methodology	160314	Operating System	
	160305	Hardware Lab	160315	Java Programming Lab	
	160306	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)#	160316	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
	160307	Summer Internship Project–I (Institute Level) (Evaluation)	200XXX	Novel Engaging Course (Informal Learning)	
	100002	Biology for Engineers	160317	Summer Internship Project–I (Institute Level) (Evaluation)	
IV	100003	Mathematics- III	100003	Engineering Mathematics- III	
	160401	Design & Analysis of Algorithms	160411	Computer Graphics & Multimedia	
	160402	Database Management System	160412	Software Engineering	
	160403	Operating System	160413	Computer Networks	
	160404	Computer System Organization	100009	Cyber Security	
	100004	Cyber Security	160414	Python Programming Lab	
	160405	Programming Lab	200XXX	Novel Engaging Course (Informal Learning)	
			1000001	Indian Constitution and Traditional Knowledge	
V	100005	Ethics, Economics, Entrepreneurship & Management	160511	Discrete Structures	
	160501	Discrete Structures	160512	Data Science using Python	
	160502	Software Engineering	160513	Theory of Computation	
	160503	Theory of Computation	160514	Microprocessor & Interfacing	
	160504	Microprocessor & Interfacing	160515	Soft Computing Techniques	
	160505	Minor Project-I	160516	Minor Project-I	
	160506	Summer Internship Project-II (Evaluation)	160517	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)	
	160507	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	200XXX	Novel Engaging Course (Informal Learning)	
	100006	Indian Constitution & Traditional Knowledge (Audit Course)	160518	Summer Internship Project-II (Evaluation)	
			1000005	Project Management & Financing	
VI	160601	Compiler Design	160611	Compiler Design	
	160602	Computer Networks	160612	Data Mining & Pattern Warehousing	
	DE	160611 Network & Web Security 160613 Agile Methodology 160614 Cloud Computing	160613	Artificial Intelligence & Machine Learning	
	DE	160651 Data Analytics with Python 160652 Introduction to Machine Learning 160654 Artificial Intelligence: Knowledge Representation And Reasoning	DE	160661 Introduction To Internet Of Things 160662 Information Security - 5 - Secure Systems Engineering 160663 Advanced Graph Theory	
	OC	900108 Software Engineering 900116 Data Mining & Warehousing 900119 Robotics & Vision Control	OC	910102 Data Mining & Warehousing 910103 Software Engineering	
	100007	Disaster Management	160614	Minor Project-II	
	160603	Minor Project-II	200XXX	Novel Engaging Course (Informal Learning)	
			1000007	Intellectual Property Rights (IPR)	
	VII	DE	160714 Data Mining & Predictive Modelling 160715 Soft Computing 160716 Mobile Computing	DE	160714 Data Mining & Predictive Modelling 160715 Soft Computing 160716 Mobile Computing
		DE	160752 Scalable Data Science (8 Week) 160754 Social Networks (12 Week) 160756 Big Data Computing (8 Week)	DE	160752 Scalable Data Science (8 Week) 160754 Social Networks (12 Week) 160756 Big Data Computing (8 Week)
OC		900208 Soft Computing	OC	900208 Soft Computing	
OC		900227 Analytics Using R Programming	OC	900227 Analytics Using R Programming	

Department of Information Technology

Programme: B. Tech (Information Technology)

SEMESTER	2019-2023 BATCH		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
	100008	Intellectual Property Rights (IPR)	160701	Departmental Lab	
	160701	Departmental Lab	160702	Summer Internship Project-III (04 weeks) (Evaluation)	
	160702	Summer Internship Project-III (04 weeks) (Evaluation)	160703	Creative Problem Solving (Evaluation)	
	160703	Creative Problem Solving (Evaluation)			
VIII	DE	160854 Blockchain and its Applications 160857 Advanced Graph Theory 160859 Natural Language Processing	DE	160854 Blockchain and its Applications 160857 Advanced Graph Theory 160859 Natural Language Processing	
	OC	900632 Information Security - 5 - Secure Systems Engineering 900621 Social Networks	OC	900632 Information Security - 5 - Secure Systems Engineering 900621 Social Networks	
	160801	Internship/Project	160801	Internship/Project	
	160802	Professional Development	160802	Professional Development	

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Department of Information Technology

DESIGN & ANALYSIS OF ALGORITHMS 150401/160401 (DC-5)

COURSE OBJECTIVES

- To introduce the topic of algorithms as a precise mathematical concept.
- To study the techniques like recursion, divide and conquer, dynamic programming, greedy approach, backtracking and branch and bound.
- To practice their skills on many well-known algorithms and data structures designed to solve real-life problems.

Unit-I

Introduction to Computational Model: RAM, Turing machine, Circuit model, P-RAM, Bellman's optimality (BSP) Model, Algorithms and its Importance, Recurrences and Asymptotic Notations, Mathematical Analysis of Non-Recursive and Recursive Algorithms, Review of Sorting & Searching Algorithms, Basic Tree and Graph Concepts: Binary Search Trees, Height Balanced Trees, B-Trees and Traversal Techniques.

Unit-II

Divide and Conquer Method: Introduction and its Examples such as Finding the Maximum and Minimum, Binary Search, Merge Sort, Quick Sort and Strassen's Matrix Multiplication.

Unit-III

Greedy Method: Introduction, Characteristics. Examples of Greedy Methods such as Single-Source Shortest Paths, Minimum Cost Spanning Trees: Prim's and Kruskal's Algorithms, Knapsack Problem, Dijkstra's single source shortest path algorithm, Optimal Storage on Tapes.

Unit-IV

Dynamic Programming: Introduction, The Principle of Optimality, Examples of Dynamic Programming Methods such as - 0/1 Knapsack, Traveling salesman problem, Floyd's All Pairs Shortest Path, Longest Common Subsequence and Reliability Design.

Unit-V

Backtracking: Concept and its Examples like 4-Queen's Problem, Knapsack problem Hamiltonian Circuit Problem, Graph Coloring Problem etc. Branch & Bound: Introduction and its Examples like - Traveling Salesperson Problem etc. NP-Completeness: Introduction, Class P and NP, Polynomial Reduction, NP-Hard and NP-Complete Problems.

RECOMMENDED BOOKS

- Fundamentals of Computer Algorithms, Horowitz & Sahani, Universities press.
- Introduction to Algorithms, Cormen Thomas, Leiserson CE, Rivest RL, PHL.
- Design & Analysis of Computer Algorithms, Ullmann, Pearson.
- Algorithms Design, Michael T Goodrich, Roberto Tamassia, Wiley India.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. tell the basic features of an algorithm.
- CO2. demonstrate a familiarity with major algorithms and data structures.
- CO3. apply important algorithmic design paradigms and methods of analysis.
- CO4. analyze the asymptotic performance of algorithms.
- CO5. compare different design techniques to develop algorithms for computational problems.
- CO6. design algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch and bound approach.

DESIGN & ANALYSIS OF ALGORITHMS 160312

L	T	P	Total Credits
3	-	2	4

COURSE OBJECTIVES

- To introduce the topic of algorithms as a precise mathematical concept.
- To study the techniques like recursion, divide and conquer, dynamic programming, greedy approach, backtracking and branch and bound.
- To practice their skills on many well-known algorithms and data structures designed to solve real-life problems.

Unit-I

Introduction to Computational Model: Algorithms and its Importance, Recurrences and Asymptotic Notations, Mathematical Analysis of Non-Recursive and Recursive Algorithms, Review of Sorting & Searching Algorithms, Basic Tree and Graph Concepts: B-Trees and Traversal Techniques, Topological sort.

Unit-II

Divide and Conquer Method: Introduction and its Examples such as Finding the Maximum and Minimum, Binary Search, Merge Sort, Quick Sort and Strassen's Matrix Multiplication and additional and world problems on divide and conquer.

Unit-III

Greedy Method: Introduction, Characteristics, Examples of Greedy Methods such as Single-Source Shortest Paths, Minimum Cost Spanning Trees: Prim's and Kruskal's Algorithms, Knapsack Problem, Dijkstra's single source shortest path algorithm, Optimal Storage on Tapes.

Unit-IV

Dynamic Programming: Introduction, The Principle of Optimality, Examples of Dynamic Programming Methods such as - 0/1 Knapsack, Traveling salesman problem, Floyd's All Pairs Shortest Path, Longest Common Subsequence and Reliability Design, Matrix chain multiplication.

Unit-V

Backtracking: Concept and its Examples like 4-Queen's Problem, Knapsack problem Hamiltonian Circuit Problem, Graph Coloring Problem etc. Branch & Bound: Introduction and its Examples like - Traveling Salesperson Problem etc. NP-Completeness: Introduction, Class P and NP, Polynomial Reduction, NP-Hard and NP-Complete Problems.

RECOMMENDED BOOKS

- Fundamentals of Computer Algorithms, Horowitz & Sahani, Universities press.
- Introduction to Algorithms, Cormen Thomas, Leiserson CE, Rivest RL, PHL.
- Design & Analysis of Computer Algorithms, Ullmann, Pearson.
- Algorithm Design, Michael T Goodrich, Roberto Tamassia, Wiley India.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. demonstrate a familiarity with major algorithms and data structures.
- CO2. apply important algorithmic design paradigms and methods of analysis.
- CO3. analyze the asymptotic performance of algorithms.
- CO4. compare different design techniques to develop algorithms for computational problems.
- CO5. design algorithms using greedy strategy, divide and conquer approach, dynamic programming, backtracking and branch and bound approach.
- CO6. understand the hardness and different classes of hardness. Further, design approximate solutions for computationally hard problems.

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Department of Information Technology

DATABASE MANAGEMENT SYSTEM
150402/160402 (DC-6)

DATABASE MANAGEMENT SYSTEM
160313

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical and network models.
- To understand and use data manipulation language to query, update and manage a database.

Unit-I

DBMS: Concepts & Architecture, Introduction of File Organization Techniques, Database Approach vs Traditional File Approach, Advantages of Database System, Schemas, Instances, Data Independence, Functions of DBA, Entities & Attributes, Entity Types, Value Sets, Key Attributes, Relationships, E-R Diagrams.
Data Models: Hierarchical Data Model, Network Data Model & Relational Data Model, Comparison between Models.

Unit-II

Relational Data Model: Domain, Tuples, Attributes, Relations, Characteristics of Relations, Keys, Attributes of Relation, Relational Database, Integrity Constraints.
Query Languages: Relational Algebra & Relational Calculus, Relational Algebra Operations like Select, Project, Division, Intersection, Union, Division, Rename, Join etc.

Unit-III

SQL: Data Definition, Data Manipulation in SQL, Update Statements & Views in SQL, Query & Subquery, Query by example, Data Storage Definition, Data Retrieval Queries, Set Operations, Aggregate functions, Nested Sub-Queries, Data Manipulation Statements etc. **Overview of Tuple Oriented & Domain Oriented Relational Calculus & Operations.**

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COURSE OBJECTIVES

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical and network models.
- To understand and use data manipulation language to query, update and manage a database.

Unit-I

DBMS: Database Approach vs Traditional File Approach, Advantages of Database System, Database Users and Administrator, Database System Environment, Application Architectures, Schemas, Instances, Data Independence, Data Models: Hierarchical Data Model, Network Data Model & Relational Data Model, Comparison between Models.
Entity and Relationship Model: Entity types, Entity sets, Attributes and Keys, Relationship Types and Sets, Constraints, Design Issues, E-R Diagram, Weak Entity Sets.

Unit-II

Relational Model: Structure of Relational Database: Relation, Attribute, Domain, Tuples, Degree, Cardinality, Views, Database Relation, Properties of Relations, Attributes, Keys, Attributes of Relation, Domain Constraints, Integrity Constraints.
Relational Algebra: Concepts and Operations: Select, Project, Division, Intersection, Union, Division, Rename, Join etc.
Relational Calculus: Tuple Relational Calculus, Domain Relational Calculus.

Unit-III

SQL: Purpose of SQL, Data Definition Language (DDL) Statements, Data Manipulation Language (DML) Statements Update Statements & Views in SQL, Data Control Language (DCL)

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Department of Information Technology

Department of Information Technology

Unit-IV

Database Design: Introduction to Normalization, Various Normal Forms: 1NF, 2NF, 3NF, BCNF, Functional Dependency, Attribute Closure, Decomposition, Dependency Preservation, Lossy Loss & Lossy Join, Problems with Null Valued & Dangling Tuple, Multivalued Dependencies.

Unit-V

Transaction Processing Concepts: Introduction, State Diagram, Properties of Transaction, Types of Transaction, Serializability: Conflict and View Serializability, Concurrency Control: Concepts, Techniques, Concurrent Operation of Databases, Recovery: Introduction, Types of Recovery.

Overview of Distributed Databases: Properties, Security & Integrity Constraints.

Relational Database Management Systems: Oracle & Microsoft Access Tools, Basic Concepts of Object Oriented Database System & Design.

RECOMMENDED BOOKS

- Database System Concepts, Abraham Silberschatz Henry F. Korth S. Sudarshan, McGraw-Hill 6th Edition.
- Database Management System, Ragu Ramakrishnan Johannes Gehrke, McGraw Hill 3rd Edition.
- Fundamentals of Database System, Elmasri & Navathe, Addison-Wesley Publishing, 5th Edition.
- An Introduction to Database Systems, Date C. J., Addison-Wesley Publishing, 8th Edition.

COURSE OUTCOMES

After successful completion of the course students will be able to:

- CO1. tell the terminology, features, classifications, and characteristics embedded in database systems.
- CO2. explain different issues involved in the design and implementation of database system.
- CO3. apply transaction processing concepts and recovery methods over real time data.
- CO4. analyze database schema for a given problem domain.

Unit-IV

Relational Database Design: Purpose of Normalization, Data Redundancy and Update Anomalies, Functional Dependency, The Process of Normalization, Various Normal Forms: 1NF, 2NF, 3NF, BCNF, Decomposition, Desirable Properties of Decomposition: Dependency Preservation, Lossless Join, Problems with Null Valued & Dangling Tuple, Multivalued Dependencies.

Unit-V

Transaction Management: Transaction Concept, Transaction State, Concurrent Executions, Serializability: Conflict and View Serializability, Concurrency Control: Lock-Based Protocol, Recovery: Log-Based Recovery.

RECOMMENDED BOOKS

- Database System Concepts, Abraham Silberschatz Henry F. Korth S. Sudarshan, McGraw-Hill 6th Edition.
- Database Management System, Ragu Ramakrishnan Johannes Gehrke, McGraw Hill 3rd Edition.
- Fundamentals of Database System, Elmasri & Navathe, Addison-Wesley Publishing, 5th Edition.
- An Introduction to Database Systems, Date C. J., Addison-Wesley Publishing, 8th Edition.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. demonstrate the concepts of different type of database system.
- CO2. apply relational algebra concepts to design database system.
- CO3. make use of queries to design and access database system.
- CO4. analyze the evaluation of transaction processing and concurrency control.
- CO5. determine the optimize database for real world applications.
- CO6. design a database system for a real world application.

M.S.

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Department of Information Technology

COMPUTER GRAPHICS & MULTIMEDIA

160411

L	T	P	Total Credits
2	1	2	4

COURSE OBJECTIVES

- To become familiar with computer graphics techniques and display devices.
- To enhance the proficiency in image representations, 2D and 3D graphics transformations.
- To develop awareness with various illumination, color models and multimedia system.

Unit-I

Introduction to Computer Graphics: Interactive Computer Graphics, Application of Computer Graphics, Random and Raster Scan Displays, Storage Tube Graphics Display, Calligraphic Refresh Graphics Display, Flat Panel Display, Refreshing, Flickering, Interlacing, Resolution, Bit Depth, Aspect Ratio etc.

Unit-II

Scan Conversion Technique: Image representation, Line drawing: DDA, Bresenham's Algorithm. Circle Drawing: ~~General Method~~ Mid-Point, DDA, Bresenham's Circle Generation Algorithm, Ellipse Generation Algorithm, Curves: Parametric Function, Bezier Method, B-Spline Method.

Unit-III

2D & 3D Transformations: Translation, Rotation, Scaling, Reflection, Shearing, Inverse Transformation, Composite Transformation, World Coordinate System, Viewing Transformation, Representation of 3D object on Screen, Parallel and Perspective Projections.

Unit-IV

Clipping: Point clipping, Line Clipping, Simple Visibility Line Clipping Algorithm, Cohen Sutherland Line Clipping Algorithm etc, Polygon Clipping, Convex and Concave Polygon, Sutherland Hodgeman Polygon Clipping Algorithm etc, Hidden Surface Elimination: Z- Buffer algorithm and Painter's Algorithm, Area Filling, **Basic Illumination Models:** Diffuse Reflection, Specular Reflection, Phong Shading, Gouraud Shading, Color Models: like RGB, YIQ, CMY, HSV etc.

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Department of Information Technology

Unit-V

Multimedia System: An Introduction, Multimedia hardware and software, Multimedia Applications, Multimedia System Architecture, Multimedia Authoring. Data & File Format standards: RTF, TIFF, MIDI, JPEG, DIB, MPEG. Audio: digital audio, MIDI, ~~processing sound~~ Sampling, compression. Video: AVI, 3GP, MOV, MPEG, Compression standards, Compression through spatial and temporal redundancy.

RECOMMENDED BOOKS

- Donald Hearn and M.P. Becker : Computer Graphics, PHI Publication
 - FoleyVandam, Feiner, Hughes : Computer Graphics principle and Practice
 - Rogers : Principles of Computers Graphics, TMH
 - Sinha and Udai : Computer Graphics, TMH
 - Prabhat K. Andleigh, Kiran Thakrar : Multimedia Systems Design, Prentice Hall PTR
-

COURSE OUTCOMES

After completion of the course students will be able to:

- CO1. explore various display devices and applications of computer graphics.
 - CO2. illustrate various scan conversion techniques like line, circle, curve and shape drawing algorithms.
 - CO3. apply 2-dimensional, 3-dimensional transformations and projections on images.
 - CO4. classify methods of image clipping and various algorithms for line and polygon clipping.
 - CO5. apply appropriate filling algorithms, hidden surface elimination algorithm on images.
 - CO6. summarize various color models, shading methods and multimedia system.
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Department of Information Technology

COMPUTER NETWORKS

160413

L	T	P	Total Credits
2	1	-	3

COURSE OBJECTIVES

- Familiarize the student with the basic taxonomy and terminology of the computer networking.
- Provide detail knowledge about various layers, protocols and devices that facilitate networking.
- Enable Students to deal with various networking problems such as flow control, error control and congestion control.

Unit-I

Introduction: Computer Network, Types- LAN, MAN & WAN, Data Transmission Modes- Serial & Parallel, Simplex, Half Duplex & Full Duplex, Synchronous & Asynchronous Transmission, Transmission Medium- Guided & Unguided, Cables- Twisted Pair, Coaxial Cable & Optical Fiber, Networking Devices-Repeaters, Hub, Switch, Bridge, Router, Gateway and Modem, Performance Criteria- Bandwidth, Throughput, Propagation Time & Transmission Time, Network Standardization- OSI Reference Model & TCP/IP Reference Mode, X.25.

Unit-II

Physical Layer: Network Topologies- Bus, Ring, Star & Mesh, Line Coding- Unipolar, Polar and Bipolar, Switching- Circuit Switching, Message Switching & Packet Switching, Multiplexing: FDM – Frequency Division Multiplexing, WDM – Wavelength Division Multiplexing & TDM – Time Division Multiplexing.

Unit-III

Data Link Layer: Introduction, Design Issues, Services, Framing, Error Control, Flow Control, ARQ Strategies, Error Detection and Correction, Parity Bits, Cyclic Redundant Code (CRC), Hamming Codes, MAC Sub Layer- The Channel Allocation Problem, Pure ALOHA, Slotted ALOHA, CSMA, CSMA/CD, IEEE 802.3, IEEE 802.4 and IEEE 802.5.

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Unit-IV

Network Layer & Transport Layer: Introduction, Design Issues, Services, Routing- Distance Vector Routing, Hierarchical Routing & Link State Routing, Shortest Path Algorithm- Dijkstra's Algorithm & Floyd–Warshall's Algorithm, Flooding, Congestion Control- Open Loop & Closed Loop Congestion Control, Leaky Bucket & Token Bucket Algorithm. Connection Oriented & Connectionless Service, IP Addressing.

Unit-V

Presentation, Session& Application Layer: Introduction, Design Issues, Presentation Layer- Translation, Encryption- Substitutions and Transposition Ciphers, Compression- Lossy and Lossless. Session Layer – Dialog Control, Synchronization. Application Layer- Remote Login, File Transfer & Electronic Mail.

RECOMMENDED BOOKS

- Data Communication and Networking, Behrouz A. Forouzan, McGraw Hill.
- Computer Networks, Andrew S. Tanenbaum, Pearson Education India.
- Computer Networks and Internets, Douglas E. Comer, Pearson India.

COURSE OUTCOMES

After completion of this course, the students would be able to:

- CO1. explain the fundamental concepts of computer network.
 - CO2. illustrate the basic taxonomy & terminologies of computer network.
 - CO3. identify various parameter for affecting the performance of computer network.
 - CO4. analyze the concepts of communication using various layer of OSI model.
 - CO5. evaluate the performance of computer network in congestion and Internet.
 - CO6. design the network environment and applications for implementation of computer networking concept.
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Department of Information Technology

Programme: M. Tech (Information Technology)

SEMESTER	2019-2021 BATCH		2020-2022 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	630101	Mathematical Foundation of Information Technology	630111	Database Systems	58.82
	630102	Distributed System	630112	Distributed Computing	
	630103	Advance Computer Graphics	630113	High Speed Networks	
	630104	Advance Computer Networks	DE-1	630114 Mobile Computing and M-commerce 630115 Adhoc and sensor based networks 630116 Information Security & Systems 630117 Models and Techniques in computer Graphics	
	630105	Mobile Computing and M-Commerce	OC-1	800105 Soft computing 800106 Blockchain Technology 800107 Machine Learning using Python	
	630106	Lab-I	630121	Lab-I	
	630107	Lab-II	630121	Self-Learning Presentation	
II	630201	Web Technology and E-Commerce	630211	Algorithm Design Techniques and Analysis	
	630202	Soft Computing	630212	Advanced Topics in Data Mining and Warehousing	
	630203	Advance Algorithms and Design	630213	Image Processing and Retrieval Techniques	
	630204	Advance Topics in Data Mining and Warehousing	DE-2	630214 Internet of Things 630215 Deep Learning 630216 Cloud Computing 630217 Social Networking	
	630205	Adhoc & Sensor based networks	OC-2		
	630206	Lab-I	630221	Lab-II	
	630207	Lab-II	630222	Self-Learning Presentation	
III	630301	Image processing and retrieval techniques	630311	Dissertation Part-I	
	630302	Information Security and Systems	OC	800306 Big Data Computing 800307 Introduction to Industry 4.0 and Industrial Internet of things	
	630303	Seminar			
	630304	Dissertation Part-I			
IV	630401	Dissertation Part-II	630405	Dissertation Part-II	

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Department of Information Technology

Programme: B. Tech (Internet of Things (IoT))

SEMESTER	TENTATIVE COURSES: 2020-2024 BATCH		IMPLEMENTED COURSES: 2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	PAPER 1	Introduction to Internet of Things (IoT)	230101	Introduction to Internet of Things (IoT)	45
	PAPER 2	Introduction to Computer Programming	230102	Introduction to Computer Programming	
	PAPER 3	Basic Electrical & Electronics Engineering	100022	Basic Electrical & Electronics Engineering	
	PAPER 4	Energy, Environment, Ecology & Society	250100	Linear Algebra	
	PAPER 5	Technical Language and Lab	100015	Energy, Environment, Ecology & Society	
II	PAPER 1	Digital Logic Design	230201	Digital Logic Design	
	PAPER 2	Linear Algebra and Matrix Analysis	220202	Sensor Technology	
	PAPER 3	Sensor Technology	230202	Data Structures	
	PAPER 4	Data Structures	230203	Object Oriented Programming and Methodology	
	PAPER 5	Object Oriented Programming and Methodology	100016	Technical Language	
	PAPER 6	Sensor Technology & Hardware Lab	100017	Language Lab	
III	PAPER 1	Statistics and Random Processes	250106	Probability and Random Process	
	PAPER 2	Data Communication and Computer Networks	230301	Design & Analysis of Algorithms	
	PAPER 3	Impact of IoT & Smart Services on Society	230302	Operating System	
	PAPER 4	Wireless Sensor Networks & IoT Standards	230303	Computer Networks and Protocols	
	PAPER 5	Design & Analysis of Algorithms	230304	Database Management System	
	PAPER 6	IoT Lab	230305	Design and Thinking Lab	
	PAPER 7	Self-learning/Presentation (through SWAYAM/NPTEL /MOOC)# or Interdisciplinary course from other institutions and platforms with credit transfer	230306	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
	PAPER 8	Summer Internship Project-I (Institute Level) (Evaluation)	200XXX	Novel Engaging Course (Informal Learning)	
			230307	Summer Internship Project-I (Institute Level) (Evaluation)	
IV	PAPER 1	Digital Logic Design	230401	Computer Architecture and Microprocessor	
	PAPER 2	Linear Algebra and Matrix Analysis	230402	Cloud Computing	
	PAPER 3	Sensor Technology	230403	Software Engineering	
	PAPER 4	Data Structures	230404	IoT Architecture and Protocols	
	PAPER 5	Object Oriented Programming and Methodology	230405	Network & Web Security	
	PAPER 6	Sensor Technology & Hardware Lab	230406	Python Programming Lab	
			200XXX	Novel Engaging Course (Informal Learning)	
			1000001	Indian Constitution and Traditional Knowledge	
V	PAPER 1	Ethics, Economics, Entrepreneurship & Management	230501	Discrete Structures	
	PAPER 2	Introduction to Human Computer Interaction	230502	Data Sciences in IoT	
	PAPER 3	Data Mining & Analytics	230503	Theory of Computation	
	PAPER 4	IoT Architecture and Protocols	230504	Embedded System & IoT	
	PAPER 5	Artificial Intelligence & Machine Learning	230505	Soft Computing Techniques	
	PAPER 6	Minor Project-I**	230506	Minor Project-I**	
	PAPER 7	Summer Internship Project-II (Evaluation)	230507	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)#	
	PAPER 8	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)	200XXX	Novel Engaging Course (Informal Learning)	
			230508	Summer Internship Project-II (Evaluation)	
			1000005	Project Management & Financing	
VI	PAPER 1	Deep Learning	230601	Compiler Design	
	PAPER 2	Network Security	230602	Data Mining & Pattern Warehousing	
	PAPER 3	Departmental Elective-1	230603	Artificial Intelligence & Machine Learning	
	PAPER 4	Departmental Elective-2*	DE	230661 Programming In Java 230662 Foundation of Cloud IoT Edge ML 230663 Information Security - 5 - Secure Systems Engineering	
	PAPER 5	Open Category-1	OC	910102 Data Mining & Warehousing 910103 Software Engineering	
	PAPER 6	Disaster Management	230604	Minor Project-II**	
	PAPER 7	Minor Project-II**	200XXX	Novel Engaging Course (Informal Learning)	
			1000007	Intellectual Property Rights (IPR)	

Madhav Institute of Technology & Science, Gwalior

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Department of Information Technology

Programme: B. Tech (Internet of Things (IoT))

SEMESTER	TENTATIVE COURSES: 2020-2024 BATCH		IMPLEMENTED COURSES: 2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
VII	PAPER 1	Departmental Elective-3	DE	Departmental Elective (DE-2)	
	PAPER 2	Departmental Elective-4 *	DE	Departmental Elective* (DE-3)	
	PAPER 3	Open Category-2	OC	Open Category (OC-2)	
	PAPER 4	Open Category-3	OC	Open Category (OC-3)	
	PAPER 5	Intellectual Property Rights (IPR)	DLC	Departmental Lab	
	PAPER 6	Departmental Lab	DLC	Creative Problem Solving (Evaluation)	
	PAPER 7	Summer Internship Project-III (04 weeks)(Evaluation)	DLC	Summer Internship Project-III (04 weeks) (Evaluation)	
	PAPER 8	Creative Problem Solving (Evaluation)	MAC	Universal Human Values & Professional Ethics(UHVPE)	
VIII	PAPER 1	Departmental Elective-5 *	DE	Departmental Elective* (DE-4)	
	PAPER 2	Open Category-4*	OC	Open Category* (OC-4)	
	PAPER 3	Open Category-5*	DLC	Internship/Research Project/ Innovation & Start-up***	
	PAPER 4	Internship/Project	-	Professional Development#	
	PAPER 5	Professional Development\$			

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Department of Information Technology

Programme: B. Tech (Information Technology (Artificial Intelligence and Robotics))

SEMESTER	TENTATIVE COURSES: 2020-2024 BATCH		IMPLEMENTED COURSES: 2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	PAPER 1	Introduction to Artificial Intelligence	240101	Introduction to Artificial Intelligence	46.67
	PAPER 2	Introduction to Computer Programming	230102	Introduction to Computer Programming	
	PAPER 3	Basic Electrical & Electronics Engineering	100022	Basic Electrical & Electronics Engineering	
	PAPER 4	Energy, Environment, Ecology & Society	250100	Linear Algebra	
	PAPER 5	Technical Language and Lab	100015	Energy, Environment, Ecology & Society	
II	PAPER 1	Digital Logic Design	230201	Digital Logic Design	
	PAPER 2	Linear Algebra and Matrix Analysis	220202	Sensor Technology	
	PAPER 3	Sensor Technology	230202	Data Structures	
	PAPER 4	Data Structures	230203	Object Oriented Programming and Methodology	
	PAPER 5	Object Oriented Programming and Methodology	100016	Technical Language	
	PAPER 6	Sensor Technology & Hardware Lab	100017	Language Lab	
III	PAPER 1	Statistics and Random Processes	250106	Probability and Random Process	
	PAPER 2	Data Communication and Computer Networks	240301	Design & Analysis of Algorithms	
	PAPER 3	Design and Analysis of Algorithms	240302	Operating System	
	PAPER 4	Basics of Robotics	240303	Computer Networks and Protocols	
	PAPER 5	Graph Theory	240304	Database Management System	
	PAPER 6	Robotics Simulation Lab	240305	Python Programming Lab	
	PAPER 7	Self-learning/Presentation (through SWAYAM/NPTEL /MOOC)# or Interdisciplinary course from other institutions and platforms with credit transfer	240306	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
	PAPER 8	Summer Internship Project-I (Institute Level) (Evaluation)	200XXX	Novel Engaging Course (Informal Learning)	
		240307	Summer Internship Project-I (Institute Level) (Evaluation)		
		1000002	Biology for Engineers		
IV	PAPER 1	Robot Kinematics and Dynamics	240401	Computer Architecture and Microprocessor	
	PAPER 2	Database Management System	240402	Cloud Computing	
	PAPER 3	Operating System	240403	Software Engineering	
	PAPER 4	Artificial Intelligence & Expert Systems	240404	Machine Learning and Optimization	
	PAPER 5	Data Mining & Analytics	240405	Network & Web Security	
	PAPER 6	Cyber Security	240406	Design and Thinking Lab	
	PAPER 7	Python Programming Lab	200XXX	Novel Engaging Course (Informal Learning)	
			1000001	Indian Constitution and Traditional Knowledge	
V	PAPER 1	Ethics, Economics, Entrepreneurship & Management	240501	Discrete Structures	
	PAPER 2	Robotics, Sensors, Actuators and Control	240502	Data Science using Python	
	PAPER 3	Algorithms for Intelligent Systems and Robotics	240503	Theory of Computation	
	PAPER 4	Computer Graphics and Vision	240504	Robotics system and control	
	PAPER 5	Machine Learning	240505	Soft Computing Techniques	
	PAPER 6	Minor Project-I**	240506	Minor Project-I**	
	PAPER 7	Summer Internship Project-II (Evaluation)	240507	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)#	
	PAPER 8	Self- learning/Presentation (SWAYAM/NPTEL/ MOOC)	200XXX	Novel Engaging Course (Informal Learning)	
			240508	Summer Internship Project-II (Evaluation)	
			1000005	Project Management & Financing	
		1000006	Disaster Management		
VI	PAPER 1	Deep Learning	240601	Compiler Design	
	PAPER 2	Microcontrollers & Embedded Systems	240602	Data Mining & Pattern Warehousing	
	PAPER 3	Departmental Elective-1	240603	Artificial Intelligence in Robotics	
	PAPER 4	Departmental Elective-2*	DE	240661 Programming In Java 240662 Introduction to Internet of Things 240663 Advanced Graph Theory	
	PAPER 5	Open Category-1	OC	910102 Data Mining & Warehousing 910103 Software Engineering	
	PAPER 6	Disaster Management	240604	Minor Project-II**	
	PAPER 7	Minor Project-II**	200XXX	Novel Engaging Course (Informal Learning)	
		1000007	Intellectual Property Rights (IPR)		

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Department of Information Technology

Programme: B. Tech (Information Technology (Artificial Intelligence and Robotics))

SEMESTER	TENTATIVE COURSES: 2020-2024 BATCH		IMPLEMENTED COURSES: 2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
VII	PAPER 1	Departmental Elective-3	DE	Departmental Elective (DE-2)	
	PAPER 2	Departmental Elective-4 *	DE	Departmental Elective* (DE-3)	
	PAPER 3	Open Category-2	OC	Open Category (OC-2)	
	PAPER 4	Open Category-3	OC	Open Category (OC-3)	
	PAPER 5	Intellectual Property Rights (IPR)	DLC	Departmental Lab	
	PAPER 6	Departmental Lab	DLC	Creative Problem Solving (Evaluation)	
	PAPER 7	Summer Internship Project-III (04 weeks)(Evaluation)	DLC	Summer Internship Project-III (04 weeks) (Evaluation)	
	PAPER 8	Creative Problem Solving (Evaluation)	MAC	Universal Human Values & Professional Ethics(UHVPE)	
VIII	PAPER 1	Departmental Elective-5 *	DE	Departmental Elective* (DE-4)	
	PAPER 2	Open Category-4*	OC	Open Category* (OC-4)	
	PAPER 3	Open Category-5*	DLC	Internship/Research Project/ Innovation & Start-up	
	PAPER 4	Internship/Project	-	Professional Development#	
	PAPER 5	Professional Development\$			

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Department of Information Technology

Programme: B. Tech (Artificial Intelligence and Data Science)

SEMESTER	TENTATIVE COURSES: 2021-2025 BATCH		IMPLEMENTED COURSES: 2021-2025 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	PAPER 1	Introduction to Artificial Intelligence & Data Science	270101	Introduction to Artificial Intelligence & Data Science	21.67
	PAPER 2	Linear Algebra	270102	Introduction to Computer Programming	
	PAPER 3	Basic Electrical & Electronics Engineering	100022	Basic Electrical & Electronics Engineering	
	PAPER 4	Introduction to Computer Programming	250100	Linear Algebra	
	PAPER 5	Energy, Environment, Ecology & Society	100015	Energy, Environment, Ecology & Society	
	PAPER 6	C++ Programming Lab			
II	PAPER 1	Digital Logic Design	270201	Digital Logic Design	
	PAPER 2	Data Structures	250106	Probability and Random Process	
	PAPER 3	Probability and Random Process	270202	Data Structures	
	PAPER 4	Object Oriented Programming and Methodology	270203	Object Oriented Programming and Methodology	
	PAPER 5	Technical Language	100016	Technical Language	
	PAPER 6	Language Lab	100017	Language Lab	
	PAPER 7	Summer Internship Project-I (Institute Level)			
III	PAPER 1	Discrete Structures	270301	Discrete Structure	
	PAPER 2	Design and Analysis of Algorithms	270302	Design & Analysis of Algorithms	
	PAPER 3	Operating System	270303	Operating System	
	PAPER 4	Database Management System	270304	Computer Networks and Protocols	
	PAPER 5	Computer Networks and Protocols	270305	Database Management System	
	PAPER 6	Python Programming Lab	270306	Python Programming Lab	
	PAPER 7	Self-learning/Presentation (through SWAYAM/NPTEL/MOOC)	270307	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
	PAPER 8	Biology for Engineers (Mandatory Audit Course)	200XXX	Novel Engaging Course (Informal Learning)	
	PAPER 9	Novel Engaging Course (Informal Learning)	270308	Summer Internship Project-I (Institute Level) (Evaluation)	
		1000005	Project Management & Financing		
IV	PAPER 1	Microprocessors and Computer Architecture	270401	Computer Architecture and Microprocessor	
	PAPER 2	Software Engineering	270402	Cloud Computing	
	PAPER 3	Data Mining and Predictive Modelling	270403	Software Engineering	
	PAPER 4	Artificial Intelligence	270404	Machine Learning and Optimization	
	PAPER 5	Theory of Automata and Compilers	270405	Network & Web Security	
	PAPER 6	Data Science and Visualization Lab	270406	Design and Thinking Lab	
	PAPER 7	Summer Internship Project-II	200XXX	Novel Engaging Course (Informal Learning)	
	PAPER 8	Indian Constitution and Traditional Knowledge (Mandatory Audit Course)	1000001	Indian Constitution and Traditional Knowledge	
	PAPER 9	Novel Engaging Course (Informal Learning)			
V	PAPER 1	Ethics, Economics, Entrepreneurship & Management	270501	Computer Vision	
	PAPER 2	Reinforcement Learning	270502	Data Science using Python	
	PAPER 3	Big Data Analytics and Business Intelligence	270503	Theory of Computation	
	PAPER 4	Computer Vision	270504	Reinforcement Learning	
	PAPER 5	Optimization Methods in ML	270505	Soft Computing Techniques	
	PAPER 6	Minor Project-I**	270506	Minor Project-I**	
	PAPER 7	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)	270507	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)#	
	PAPER 8	IT Disaster Management (Mandatory Audit Course)	200XXX	Novel Engaging Course (Informal Learning)	
	PAPER 9	Novel Engaging Course (Informal Learning)	270508	Summer Internship Project-II (Evaluation)	
		1000005	Project Management & Financing		
		1000006	Disaster Management		
VI	PAPER 1	Deep Learning	270601	Compiler Design	
	PAPER 2	Cloud Computing	270602	Data Mining & Pattern Warehousing	
	PAPER 3	Departmental Elective-1	270603	Deep Learning	
	PAPER 4	Departmental Elective-2*	DE	240661 Programming In Java 240662 Introduction to Internet of Things 240663 Advanced Graph Theory	
	PAPER 5	Open Category-1	OC	910102 Data Mining & Warehousing 910103 Software Engineering	
	PAPER 6	Minor Project-II**	270604	Minor Project-II**	
	PAPER 7	Summer Internship Project-III (04 weeks)	200XXX	Novel Engaging Course (Informal Learning)	
	PAPER 8	Intellectual Property Rights (IPR) (Mandatory Audit Course)	1000007	Intellectual Property Rights (IPR)	
	PAPER 9	Novel Engaging Course (Informal Learning)			

Madhav Institute of Technology & Science, Gwalior

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Department of Information Technology

Programme: B. Tech (Artificial Intelligence and Data Science)

SEMESTER	TENTATIVE COURSES: 2021-2025 BATCH		IMPLEMENTED COURSES: 2021-2025 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
VII	PAPER 1	Departmental Elective-3	DE	Departmental Elective (DE-2)	
	PAPER 2	Departmental Elective-4 *	DE	Departmental Elective* (DE-3)	
	PAPER 3	Open Category-2	OC	Open Category (OC-2)	
	PAPER 4	Open Category-3	OC	Open Category (OC-3)	
	PAPER 5	Data Analytics using R	DLC	Departmental Lab	
	PAPER 6	Departmental Lab	DLC	Creative Problem Solving (Evaluation)	
	PAPER 7	Summer Internship Project-II	DLC	Summer Internship Project-III	
	PAPER 8	Creative Problem Solving (Evaluation)	MAC	Universal Human Values & Professional Ethics(UHVPE)	
VIII	PAPER 1	Departmental Elective-5 *	DE	Departmental Elective* (DE-4)	
	PAPER 2	Open Category-4*	OC	Open Category* (OC-4)	
	PAPER 3	Open Category-5*	DLC	Internship/Research Project/ Innovation & Start-up***	
	PAPER 4	Internship/Project	-	Professional Development#	
	PAPER 5	Professional Development\$			

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Department of Information Technology

Programme: B. Tech (Artificial Intelligence and Machine Learning)

SEMESTER	TENTATIVE COURSES: 2021-2025 BATCH		IMPLEMENTED COURSES: 2021-2025 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	PAPER 1	Introduction to Artificial Intelligence & Machine Learning	280101	Introduction to Artificial Intelligence & Machine Learning	23.33
	PAPER 2	Linear Algebra	280102	Introduction to Computer Programming	
	PAPER 3	Basic Electrical & Electronics Engineering	100022	Basic Electrical & Electronics Engineering	
	PAPER 4	Energy Ecology Environment	250100	Linear Algebra	
	PAPER 5	Programming using C++	100015	Energy, Environment, Ecology & Society	
	PAPER 6	C++ lab			
II	PAPER 1	Digital Logic Design	280201	Digital Logic Design	
	PAPER 2	Data Structures	250106	Probability and Random Process	
	PAPER 3	Probability and Random Process	280202	Data Structures	
	PAPER 4	Technical Language	280203	Object Oriented Programming and Methodology	
	PAPER 5	Object Oriented Programming and Methodology	100016	Technical Language	
	PAPER 6	Language Lab	100017	Language Lab	
	PAPER 7	Summer Internship Project-I (Institute Level)			
III	PAPER 1	Discrete Structures	280301	Discrete Structure	
	PAPER 2	Design and Analysis of Algorithms	280302	Design & Analysis of Algorithms	
	PAPER 3	Microprocessors and Computer Architecture	280303	Operating System	
	PAPER 4	Database Management System	280304	Computer Networks and Protocols	
	PAPER 5	Computer Networks and Protocols	280305	Database Management System	
	PAPER 6	Python Programming Lab	280306	Python Programming Lab	
	PAPER 7	Self-learning/Presentation (through SWAYAM/NPTEL /MOOC)	280307	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
	PAPER 8	Biology for Engineers (Mandatory Audit Course)	200XXX	Novel Engaging Course (Informal Learning)	
	PAPER 9	Novel Engaging Course (Informal Learning)	280308	Summer Internship Project-I (Institute Level) (Evaluation)	
		1000005	Project Management & Financing		
IV	PAPER 1	Operating System	280401	Computer Architecture and Microprocessor	
	PAPER 2	Software Engineering	280402	Cloud Computing	
	PAPER 3	Data Mining and Predictive Modeling	280403	Software Engineering	
	PAPER 4	Artificial Intelligence & Expert System	280404	Machine Learning and Optimization	
	PAPER 5	Machine Learning	280405	Network & Web Security	
	PAPER 6	Data Science and Visualization Lab	280406	Design and Thinking Lab	
	PAPER 7	Summer Internship Project-II	200XXX	Novel Engaging Course (Informal Learning)	
	PAPER 8	Indian Constitution and Traditional Knowledge (Mandatory Audit Course)	1000001	Indian Constitution and Traditional Knowledge	
	PAPER 9	Novel Engaging Course (Informal Learning)			
V	PAPER 1	Ethics, Economics, Entrepreneurship& Management	280501	Computer Vision	
	PAPER 2	Reinforcement Learning	280502	Data Science using Python	
	PAPER 3	Big Data Analytics and Business Intelligence	280503	Theory of Computation	
	PAPER 4	Computer Vision	280504	Reinforcement Learning	
	PAPER 5	Theory of Automata and Compilers	280505	Soft Computing Techniques	
	PAPER 6	Minor Project-I	280506	Minor Project-I	
	PAPER 7	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)	280507	Self-learning/Presentation (SWAYAM/NPTEL/ MOOC)#	
	PAPER 8	IT Disaster Management (Mandatory Audit Course)	200XXX	Novel Engaging Course (Informal Learning)	
	PAPER 9	Novel Engaging Course (Informal Learning)	280508	Summer Internship Project-II (Evaluation)	
		1000005	Project Management & Financing		
		1000006	Disaster Management		
VI	PAPER 1	Deep Learning	280601	Compiler Design	
	PAPER 2	Optimization Techniques	280602	Data Mining & Pattern Warehousing	
	PAPER 3	Departmental Elective-1	280603	Deep Learning	
	PAPER 4	Departmental Elective-2*	DE	240661 Programming In Java 240662 Introduction to Internet of Things 240663 Advanced Graph Theory	
	PAPER 5	Open Category-1	OC	910102 Data Mining & Warehousing 910103 Software Engineering	
	PAPER 6	Minor Project-II	280604	Minor Project-II	
	PAPER 7	Summer Internship Project-III	200XXX	Novel Engaging Course (Informal Learning)	
	PAPER 8	Intellectual Property Rights (IPR) (Mandatory Audit Course)	1000007	Intellectual Property Rights (IPR)	
	PAPER 9	Novel Engaging Course (Informal Learning)			

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Department of Information Technology

Programme: B. Tech (Artificial Intelligence and Machine Learning)

SEMESTER	TENTATIVE COURSES: 2021-2025 BATCH		IMPLEMENTED COURSES: 2021-2025 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
VII	PAPER 1	Departmental Elective-3	DE	Departmental Elective (DE-2)	
	PAPER 2	Departmental Elective-4 *	DE	Departmental Elective* (DE-3)	
	PAPER 3	Open Category-2	OC	Open Category (OC-2)	
	PAPER 4	Open Category-3	OC	Open Category (OC-3)	
	PAPER 5	Intellectual Property Rights (IPR)	DLC	Departmental Lab	
	PAPER 6	Departmental Lab	DLC	Creative Problem Solving (Evaluation)	
	PAPER 7	Summer Internship Project-III (04 weeks)(Evaluation)	DLC	Summer Internship Project-III (04 weeks) (Evaluation)	
	PAPER 8	Creative Problem Solving (Evaluation)	MAC	Universal Human Values & Professional Ethics(UHVPE)	
VIII	PAPER 1	Departmental Elective-5 *	DE	Departmental Elective* (DE-4)	
	PAPER 2	Open Category-4*	OC	Open Category* (OC-4)	
	PAPER 3	Open Category-5*	DLC	Internship/Research Project/ Innovation & Start-up***	
	PAPER 4	Internship/Project	-	Professional Development#	
	PAPER 5	Professional Development\$			

Chemical Engineering Department

SEMESTER	2019-2023 BATCH		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	100101	Engineering Chemistry	100012	Engineering Chemistry	35.9375
	100102	Mathematics-I	100020	Basic Civil Engineering and Mechanics	
	100103	Technical English	100021	Basic Mechanical Engineering	
	100104	Basic Electrical and Electronics Engineering	100022	Basic Electrical and Electronics Engineering	
	100105	Engineering Graphics	100023	Basic Computer Engineering	
	100106	Manufacturing Practices	100024	Manufacturing Practices	
				NSS/NCC	
II	100201	Engineering Physics	100011	Engineering Mathematics-I	
	100202	Energy, Environment, Ecology and Society	170211	Chemical Process Calculation	
	100203	Basic Computer Engineering	100014	Engineering graphics	
	100204	Basic Mechanical Engineering	100015	Energy, Environment, Ecology and Society	
	100205	Basic Civil Engineering and Mechanics	100016	Technical Language	
	100206	Language lab and Seminars	100017	Language Lab	
			100018	Engineering graphics Lab	
III	100001	Engineering Mathematics-II	100012	Engineering Mathematics-II	
	170302	Organic Process Technology	170311	Fluid Mechanics	
	170303	Fluid Mechanics	170312	Organic Process Technology	
	170304	Material and Energy Balance	170313	Chemical Engineering thermodynamics	
	170305	Fluid Particle Mechanics	170314	Fluid Particle Mechanics	
	170306	Chemical Synthesis lab	170315	Chemical Synthesis lab	
	170307	Self Learning/Presentation (SWAYAM	170316	Self Learning/Presentation	
	170308	Summer Internship Project-I	200XXX	NSS/NCC/Novel Engaging Courses	
		NSS/NCC	170317	Summer Internship Project-I	
			100006	Indian Constitution and Traditional	
	100003	Engineering Mathematics-III	100028	Engineering Mathematics-III	
	170402	Heat Transfer	170411	Heat Transfer	
	170403	Mass Transfer –I	170412	Instrumentation and Process Control	
	170404	Instrumentation and Process Control	170413	Mechanical Design of Process Equipment	

IV	170405	Mechanical Design of Process Equipment	170414	Mass Transfer –I
	100004	Cyber Security	100009	Cyber Security
	170407	Process Control Lab	170415	Process Control Lab
	100002	Biology for Engineers	200XXX	NSS/NCC/ Novel Engaging Courses
		NSS/NCC	100002	Biology for Engineers
V	170501	Chemical Engineering Thermodynamics	170511	Data Science
	170502	Mass Transfer-II	170512	Mass Transfer-II
	170503	Chemical Reaction Engineering-I	170513	Chemical Reaction Engineering-I
	170504	Computational Methods in Chemical	170514	Computational Methods in Chemical
	170505	Inorganic Process Technology	170515	Inorganic Process Technology
	170506	Minor Project-I	170516	Minor Project-I
	170507	Summer Internship Project-II	170517	Self Learning/ Presentation
	170508	Self Learning/ Presentation	200XXX	NSS/NCC/ Novel Engaging Courses
			170518	Summer Internship Project-II
			1000006	Disaster Management
VI	100005	Ethics Economics Entrepreneurship and	170611	Process Modeling and simulation
	170602	Process Modeling and simulation	170612	Process Equipment Design
	Elective-I	a. Process Equipment Design(170611) b. Fluidization Engineering(170612) c. Multicomponent Distillation(170613) d. Polymer Technology(170614)	170613	Artificial Intelligent and machine learning
	Elective-II	a. Chemical Reaction Engineering-II(170651) b. Multiphase Flows(170652) c. Membrane Technology(170653)	Elective-I	a. Multiphase Flows(170652) b. Membrane Technology(170653) c. Physical and Electrochemical characterizations in Chemical Engineering(170654)
	Open Course –I	a. Fuels and Combustion(900109) b. Nano Technology(900110)	Open Course –I	Fuel and Combustion(910115)
	100007	Disaster management	170614	Minor Project-II
	170603	Minor Project-II	200XXX	NSS/NCC/ Novel Engaging Courses
	100006	Indian Constitution and Traditional Knowledge	1000007	Intellectual Property Rights

VII	Elective-III	a. Transport Phenomena(170711) b. Equilibrium Staged Operations(170712) c. Industrial Pollution Prevention and Control(170713) d. Petrochemical Technology(170714)	Elective-II	a. Transport Phenomena() b. Equilibrium Staged Operations() c. Industrial Pollution Prevention and Control() d. Petrochemical Technology()
	Elective –IV	a. Energy conservation and waste heat recovery(170754) b. Chemical Process Safety(170752) c. Principle and practices of process equipment and plant design(170755) d. Thermal Processing of Feed(170756)	Elective –III	a. Chemical Process Safety() b. Energy Conservation and Waste heat Recovery() c. Principle and practices of process equipment and plant design() d. Thermal Processing of Feed()
	Open Course –II	Petroleum Processing Technology(900211)	Open Course –II	Petroleum Processing Technology()
	Open Course –III	Industrial Safety and Hazards(900223)	Open Course –III	Industrial Safety and Hazards()
	100008	Intellectual Property rights	170711	Process Computation Lab
	170701	Process Computation Lab	170712	Creative Problem Solving
	170702	Summer Internship-III	170713	Summer Internship-III
	170703	Creative Problem Solving		Universal Human Values and professional
VIII	Elective-V	a. Optimization in Chemical Engineering(170851) b. Chemical Process Utilities(170855) c. Biomass Conversion and Biorefinery (170853)	Elective-IV	a. Optimization in Chemical Engineering() b. Biomass Conversion and Biorefinery() c. Chemical Process Utilities()
	Open Course-IV	a. Environmental quality monitoring and analysis(900623) b. Electrochemical technology in	Open Course –IV	a. Environmental quality monitoring and analysis() b. Electrochemical technology in pollution
	170801	Internship/Project	170811	Internship/Research Project
	170802	Professional Development	170812	Professional Development

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Department of Computer Science and Engineering

Change in Syllabus and Scheme for B.Tech Computer Science and Engineering (2017-2022)

SEMESTER	2019-2023 BATCH		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	100201	Engineering Physics	230102	Introduction to Computer Programming	39.44
	100202	Energy, Environment, Ecology & Society	100022	Basic Electrical & Electronics Engineering	
	100203	Basic Computer Engineering	100020	Basic Civil Engineering & Mechanics	
	100204	Basic Mechanical Engineering	100021	Basic Mechanical Engineering	
	100205	Basic Civil Engineering & Mechanics	100015	Energy, Environment, Ecology & Society	
	100206	Language Lab. & Seminars	150111	IT workshop	
II	100101	Engineering Chemistry	100011	Engineering Mathematics –I	
	100102	Engineering Mathematics-I	150211	Data Structures	
	100103	Technical English	150212	Object Oriented Programming & Methodology	
	100104	Basic Electrical & Electronics Engineering	150213	Digital Electronics	
	100105	Engineering Graphics	100016	Technical Language	
	100106	Manufacturing Practices	100017	Language Lab	
III	100001	Mathematics-II	100025	Engineering Mathematics-II	
	150301	Digital Electronics	150311	Computer System Organization	
	150302	Data Structures	150312	Operating System	
	150303	Computer Graphics	150313	Computer Graphics	
	150304	Object Oriented Programming and Methodology	150314	Design & Analysis of Algorithms	
	150305	Hardware Lab	150315	Computer Hardware & Troubleshooting Lab	
	150306	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)#	150316	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
	150307	Summer Internship Project-I (Institute Level) (Evaluation)	200XXX	Novel Engaging Course	
	100002	Biology for Engineers	150317	Summer Internship Project-I (Institute Level) (Evaluation)	
		1000002	Biology for Engineers		
IV	100003	Engineering Mathematics- III	150411	Computer Networks	
	150401	Design & Analysis of Algorithms	150412	Database Management System	
	150402	Database Management System	150413	Software Engineering	
	150403	Operating System	150414	Theory of Computation	
	150404	Computer System Organization	150415	Programming Lab Python Programming	
	100004	Cyber Security	150416	Discrete Structures	
	150405	Programming Lab	200XXX	Novel Engaging Course	
		1000001	Indian Constitution and Traditional Knowledge		
V	100005	Ethics, Economics, Entrepreneurship & Management	150511	Data Science	
	150501	Discrete Structures	150512	Networking with TCP/IP	
	150502	Software Engineering	150513	Information Security	
	150503	Theory of Computation	150514	Compiler Design	
	150504	Microprocessor & Interfacing	150515	Artificial Intelligence	
	150505	Minor Project-I	150516	Minor Project-I	
	150506	Summer Internship Project-II (Evaluation)	150517	Summer Internship Project-II (Evaluation)	
	150507	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	200XXX	Novel Engaging Course (Informal Learning)	
	100006	Indian Constitution & Traditional Knowledge (Audit Course)	150518	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
			1000005	Project Management & Financing	
		1000006	Disaster Management		

VI	150601	Compiler Design	150611	Cloud Computing & Virtualization
	150602	Computer Networks	150612	Digital Image Processing
	DE	150611 Network & Web Security 150612 Image Processing 150613 Mobile Computing	150613	Machine Learning
	DE	150656 Introduction to Internet of Things 150657 Object Oriented System Development Using UML, Java And Patterns 150654 An Introduction to Artificial Intelligence	DE	150658 Ethical Hacking 150651 Data Analytics using Python 150659 Blockchain and its Application
	OC	900106 Data Structures 900107 Python Programming	OC	910100 Data Structures 910101 Python Programming
	100007	Disaster Management	150614	Minor Project-II
	150603	Minor Project-II	200XXX	Novel Engaging Course (Informal Learning)
			1000007	Intellectual Property Rights (IPR)
VII	DE	150711 Networking with TCP/IP 150712 Data Mining & Warehousing 150713 Distributed Systems	DE	150711 Networking with TCP/IP 150712 Data Mining & Warehousing 150713 Distributed Systems
	DE	150756 Software Testing 150757 Big Data Computing 150758 Introduction to Machine Learning	DE	150756 Software Testing 150757 Big Data Computing 150758 Introduction to Machine Learning
	OC	900208 Soft Computing 900209 Network Security	OC	900208 Soft Computing 900209 Network Security
	OC	900220 R Programming 900222 Computer Networks	OC	900220 R Programming 900222 Computer Networks
	100008	Intellectual Property Rights (IPR)	100008	Intellectual Property Rights (IPR)
	150701	Departmental Lab	150701	Departmental Lab
	150702	Summer Internship Project-III (04 weeks) (Evaluation)	150702	Summer Internship Project-III (04 weeks) (Evaluation)
	150703	Creative Problem Solving (Evaluation)	150703	Creative Problem Solving (Evaluation)
VIII	DE	150859 Information Security -5- Secure Systems Engineering 150852 Privacy and Security in Online Social Media 150856 Blockchain and its Applications	DE	150859 Information Security -5- Secure Systems Engineering 150852 Privacy and Security in Online Social Media 150856 Blockchain and its Applications
	OC	Data Science for Engineers Introduction to Internet of Things An Introduction to Artificial Intelligence	OC	Data Science for Engineers Introduction to Internet of Things An Introduction to Artificial Intelligence
	150801	Internship/Project	150801	Internship/Project
	150802	Professional Development	150802	Professional Development

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR

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Department of Computer Science and Engineering

Change in Syllabus and Scheme for B.Tech Computer Science and Design(2021-2022)

SEMESTER	TENTATIVE COURSES: 2021-2025 BATCH		2021-2025 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	Course 1	Digital Logic Design	290101	Introduction to Computer Science and Design	21.43
	Course 2	Introduction to Computer Programming	230102	Introduction to Computer Programming	
	Course 3	Engineering Drawing	100022	Basic Electrical & Electronics Engineering	
	Course 4	Energy, Environment, Ecology & Society	250100	Linear Algebra	
	Course 5	Technical Language and Lab	100015	Energy, Environment, Ecology & Society	
II	Course 6	Object Oriented Analysis and Design	250106	Probability and Random Process	
	Course 7	Numerical Methods and Simulation Techniques	290201	Digital Electronics	
	Course 8	Computer Graphics	290202	Data Structures	
	Course 9	Data Structures	290303	Object Oriented Programming and Methodology	
	Course 10	Computer System Architecture	100016	Technical Language	
	Course 11	Python Programming Lab	100017	Language Lab	
III	Course 12	Discrete Mathematics	290301	Discrete Structures	
	Course 13	Operating Systems	290302	Design and Analysis of Algorithms	
	Course 14	Design and Analysis of Algorithms	290303	Operating System	
	Course 15	Database Management System	290304	Computer System Organization	
	Course 16	Computer Networks	290305	Computer Graphics and Animation	
	Course 17	Computer Network Designing and Modeling Lab.	290306	Digital Circuit Design Lab	
	Course 18	Self-learning/Presentation (through SWAYAM/NPTEL /MOOC)# or Interdisciplinary course from other institutions and platforms with credit transfer	290307	Self Learning Presentation(SWYAM/NPTEL/MOOC)	
	Course 19	Summer Internship Project-I (Institute Level) (Evaluation)	200XXX	Novel Engaging Course	
			290308	Summer Internship Project-I (Institute Level) (Evaluation)	
		1000005	Process Management and Fincancing		
IV	Course 20	Software Engineering	290401	Web Technologies	
	Course 21	Multimedia Computing and Applications	290402	Database Management System	
	Course 22	Website Designing and Publishing	290403	Theory of Computation	
	Course 23	Software Modeling and Design	290404	Computer Networks	
	Course 24	Theory of Computations	290405	Programming Lab Python Programming	
	Course 25	Virtual Reality	200XXX	Novel Engaging Course	
	Course 26	Video Editing & Photography Lab.	1000001	Indian Constitution and Traditional Knowledge	
V	Course 27	Ethics, Economics, Entrepreneurship & Management		Ethics, Economics, Entrepreneurship & Management	
	Course 28	User Interface Design & Usability		User Interface Design & Usability	
	Course 29	Animation Principles and Design		Animation Principles and Design	
	Course 30	Hardware Modeling		Hardware Modeling	
	Course 31	Compiler Design		Compiler Design	
	Course 32	Minor Project-I**		Minor Project-I**	
	Course 33	Summer Internship Project-II (Evaluation)		Summer Internship Project-II (Evaluation)	
	Course 34	Self learning/Presentation (SWAYAM/NPTEL/ MOOC)		Self learning/Presentation (SWAYAM/NPTEL/ MOOC)	
VI	Course 35	Artificial Intelligence and Game Designing		Artificial Intelligence and Game Designing	
	Course 36	Machine Learning		Machine Learning	
	Course 37	Departmental Elective-1		Departmental Elective-1	
	Course 38	Departmental Elective-2*		Departmental Elective-2*	
	Course 39	Open Category-1		Open Category-1	
	Course 40	Disaster Management		Disaster Management	
	Course 41	Minor Project-II**		Minor Project-II**	

VII	Course 42	Departmental Elective-3		Departmental Elective-3
	Course 43	Departmental Elective-4		Departmental Elective-4
	Course 44	Open Category-2		Open Category-2
	Course 45	Open Category-3		Open Category-3
	Course 46	Intellectual Property Rights (IPR)		Intellectual Property Rights (IPR)
	Course 47	Internet of Things(IoT) Lab.		Internet of Things(IoT) Lab.
	Course 48	Summer Internship Project-III (04 weeks)(Evaluation		Summer Internship Project-III (04 weeks)(Evaluation
	Course 49	Creative Problem Solving (Evaluation)		Creative Problem Solving (Evaluation)
VIII	Course 50	Departmental Elective-5		Departmental Elective-5
	Course 51	Open Category-4		Open Category-4
	Course 52	Open Category-5*		Open Category-5*
	Course 53	Internship/Project		Internship/Project
	Course 54	Professional Development		Professional Development

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Department of Computer Science and Engineering

Change in Syllabus and Scheme for Master of Computer Applications(2021-2022)

SEMESTER	2018-2020 Batch		2020-2022 Batch		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	680101	SAD and Software Engineering	680111	Mathematical Foundations	45.83
	680102	Mathematical Foundation of Computer Science	680112	Data Structures and Algorithms	
	680103	Programming and Problem Solving in C	680113	Database Management Systems	
	680104	Computer Organization and Assembly Language Programming	680114	Operating Systems	
	680105	Communication Skills	680115	Management Functions and Oral & written Communication	
	680106	Programming Laboratory in C	680116	Lab-1 (Object Oriented Programming Lab)	
	680107	Assembly Language Laboratory	680117	Lab-II(DBMS Lab)	
II	680201	Multimedia Systems	680211	Software Engineering	
	680202	Computer Graphics	680212	Internet of Things(IoT)	
	680203	Data Structures	680213	Computer Networks	
	680204	Computer Oriented Numerical & Statistical Methods	DE-1	680214 Computer Architecture and Organization 680215 Computer Graphics and Multimedia 680216 Web Technology 680217 Machine Learning using Python	
	680205	Accounting & Management Control	DE-2	680218 Management Economics 680219 Corporate Planning 680220 MIS Framework and Implementation 680221 Management and Software Projects 680222 Organizational Behavior	
	680206	Data Structures Programming Laboratory	680223	Lab-III (Java Programming Laboratory)	
	680207	Programming Laboratory in Computer Graphics	680224	Lab-IV(Business Programming Laboratory)	
III	680301	Computer Oriented Optimization	680311	Artificial Intelligence and Applications	
	680302	Operating System	680312	Management Support System	
	680303	Object Oriented Methodology & C++	680313	Data Mining and Warehousing	
	680304	Database Mgmt. System	DE-III	Department Elective -III(MOOC) 680314 Cloud Computing 680315 Social Networks 680316 Big Data Computing	
	680305	Managerial Economics	OC	680317 Web Technologies 680318 Human Computer Interaction 680319 Network and Cyber Security	
	680306	Minor Project-I(VB+MySql)	680322	Minor Project	
	680307	C++ Programming Laboratory	680323	Lab-V (Python Programming Lab)	
IV	680401	Theory of Computation	680405	Self Learning Presentation Seminar	
	680402	Artificial Intelligence and Machine Learning	680406	System Development Project/Internship	
	680403	Unix and Shell Programming(Elective-I)	-	-	
	680404	Java Programming and Technologies	-	-	
	680405	Computer Networks and Communication	-	-	
	680406	Minor Project-II(Java and My-SQL)	-	-	
	680407	Programming Laboratory in Unix and Shell Programming	-	-	

V	680501	Analysis and Design of Algorithms	NA	NA
	680502	Network and Cyber Security	NA	NA
	680503	Web Technologies and Cloud Computing	NA	NA
	680504	Elective-I(.NET Technologies and C#)	NA	NA
	680505	Elective-II(Data Warehousing and Mining)	NA	NA
	680506	Minor Project-III Web Based Application using .NET	NA	NA
	680507	Programming Laboratory in PHP and Web Technologies	NA	NA
				NA
VI	680601	System Development Project	NA	NA

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Department of Computer Science and Engineering

Change in Syllabus and Scheme for Master of Technology(CSE)(2017-2022)

SEMESTER	2017-2019 Batch		2020-2022 Batch		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	620101	Theoretical Foundations of Computer Science	620111	Database System	58.82
	620102	Distributed System	620112	Distributed Computing	
	620103	Advance Computer Architecture	620113	High-speed Networks	
	620104	Advance Computer Networks	DE-1	620114 Mobile Computing & M-Commerce 620115 Adhoc & Sensor Based Networks 620116 Network Security 620117 Computer Architecture and Parallel Processing	
	620105	Moblie Computing & M-Commerce	OC-1	620118 Soft Computing 620119 Blockchain Technology 620120 Machine Learning using Python	
	620106	Lab I	620121	Lab-1	
	620107	Lab II	620122	Self-Learning/Presentation	
II	620201	Advance Database Management	620211	Algorithm Design Technique and Analysis	
	620202	Soft Computing	620212	Advance Topic in Data Mining & Warehousing	
	620203	Advance Algorithm and Design	620213	Image Processing and Retrival Technique	
	620204	Advance Topics in Data Mining and Warehousing	DE-II	620216 Cloud Computing 620217 Social Networking	
	620205	Adhoc & Sensor Networks	OC-II	620214 Internet of Things 620215 Deep Learning	
	620206	Lab I	620221	Lab-II	
	620207	LabII	620222	Self Learning/Presentation	
III	620301	Image Processing and Retrival Technique	620311	Dissertation Part-1	
	620302	Network Security	OC	Big Data Computing Computer Vision	
	620303	Seminar			
	620304	Disertation Part I			
IV	620401	Disertation Part-II	620405	Disertation Part-II	

B.Architecture

SEMESTER	2019-2023 BATCH		2020-2024 BATCH		Overall Percentage change due to change in content
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	210112	Architectural Design I	210112	Architectural Design I	26.27
	210113	Building Materials	210113	Building Materials	
	210114	Graphics I	210114	Graphics I	
	210115	Structure I	210115	Structure I	
	210116	History of Architecture I	210116	History of Architecture I	
	210117	Workshop I	210117	Workshop I	
	210118	Professional Communication	210118	Professional Communication	
II	210211	Architectural Design II	210211	Architectural Design II	
	210212	Building Construction I	210212	Building Construction I	
	210213	Graphics II	210213	Graphics II	
	210214	Structure II	210214	Structure II	
	210215	History of Architecture II	210215	History of Architecture II	
	210216	Theory of Design	210216	Theory of Design	
	210217	Workshop II	210217	Workshop II	
III	210311	Architectural Design III	210311	Architectural Design III	
	210312	Building Construction II	210312	Building Construction II	
	210313	Graphics III	210313	Graphics III	
	210314	Surveying & Leveling	210314	Surveying & Leveling	
	210315	History of Architecture III	210315	History of Architecture III	
	210316	Structure III	210316	Structure III	
	AR0323S1/S2/S3	Novel engaging courses Summer Internship Project I	AR0323S1/S2/S3	Novel engaging courses Summer Internship Project I	
	210310	Biography for Architects	210310	Biography for Architects	
IV	210413	Architectural Design IV	210413	Architectural Design IV	
	210414	Building Construction III	210414	Building Construction III	
	210415	Building Services I (Water Supply & Sanitation)	210415	Building Services I (Water Supply & Sanitation)	
	210416	History of Architecture IV	210416	History of Architecture IV	
	210417	Structure IV	210417	Structure IV	
	DE I	ELECTIVE I 210421 - Ecology & Environment 210422 - Society, Culture And Architecture Novel engaging courses	DE I	ELECTIVE I 210421 - Ecology & Environment 210422 - Society, Culture And Architecture Novel engaging courses	
	210419	Tour/ Seminar / Workshop/ NASA Training during winter break	210419	Tour/ Seminar / Workshop/ NASA Training during winter break	
	1000001	Indian constitution & Traditional Knowledge	1000001	Indian constitution & Traditional Knowledge	
V	210514	Architectural Design V	210514	Architectural Design V	
	210515	Building Construction IV	210515	Building Construction IV	
	210516	Building Services II (Electrical & Mechanical)	210516	Building Services II (Electrical & Mechanical)	
	210517	Building Sciences & Energy Conservation	210520	Green Building & Rating Systems	
	DE II	ELECTIVE II 210521 - Architectural Photography & Journalism 210522 - Vernacular Architecture	210521	Culturally Responsive Built Environment	
	210518	# Self study, Seminar (SWAYAM/NPTEL & MOOC) Novel engaging courses	210518	# Self study, Seminar (SWAYAM/NPTEL & MOOC) Novel engaging courses	
	210519	Summer Internship Project II	210519	Summer Internship Project II	
	210510	Disaster Management	210510	Disaster Management	
VI	210615	Architectural Design VI	210615	Architectural Design VI	
	210616	Building Services III (Acoustic & Fire Fighting)	210616	Building Services III (Acoustic & Fire Fighting)	
	210617	Site Planning and Landscaping Architecture	210618	Working Drawing	
	210618	Working Drawing	210620	Building System Integration & Management	
	DE III	ELECTIVE III 210611 - Housing 210619 - Design Thinking in Architecture	210621	Advanced Structural Systems	
	DE IV	ELECTIVE IV 210651 - Strategies for Sustainable Design 210652 - Environmental Impact Assessment 210653 - Urban Services Planning Novel engaging courses	DE II	ELECTIVE II 210651 - Strategies for Sustainable Design 210652 - Environmental Impact Assessment 210653 - Urban Services Planning Novel engaging courses	
	210619	Tour/ seminar / Workshop/ Training during winter break	210619	Tour/ seminar / Workshop/ Training during winter break	
	210610	Intellectual Property Rights	210610	Intellectual Property Rights	
VII	210711	Architectural Design VII	210711	Architectural Design VII	
	210712	Adv Building Construction	210712	Adv Building Construction	
	210713	Project Management & Building economics	210714	Estimating and Costing & Specifications	
	210714	Estimating and Costing & Specifications	210720	Building Performance & Compliance	
	DE V	ELECTIVE V 210761 - Structural System in Architecture 210762 - Urban Landuse and transportation planning 210763 - Urban governance and Development Management (UGDM)	DE III	ELECTIVE III 210761 - Structural System in Architecture 210762 - Urban Landuse and transportation planning 210763 - Urban governance and Development Management (UGDM)	
	210717	Urban & Regional Planning	210721	Sustainable Cities & Communities	
	210719	Summer Internship Project III	210719	Summer Internship Project III	
	210815	Architectural Design VIII	210815	Architectural Design VIII	
210816	Urban Design	210817	Professional Practice & Ethics		
210817	Professional Practice & Ethics	210818	Dissertation		
210818	Dissertation	210820	Architectural Conservation & Historic Preservation		
DE VI	ELECTIVE VI 210851 - Architectural Journalism 210852 - Housing	210821	City & Metropolitan Planning		
DE VII	ELECTIVE VII 210861 - Interior Design 210862 - Sustainable Architecture		ELECTIVE IV 210851 - Interior Design 210852 - Housing		
210819	Tour/ seminar / NASA/Workshop/Training during winter break	210819	Tour/ seminar / NASA/Workshop/Training during winter break		
IX	210911	Professional Training	210911	Professional Training	
	210912	Online Course (SWAYAM/ NPTEL/ COURSERA etc)	210912	Online Course (SWAYAM/ NPTEL/ COURSERA etc)	
X	211011	Thesis Project	211011	Thesis Project	
	211012	Professional Development	211012	Professional Development	
	211013	ELECTIVE VIII PROFESSIONAL CERTIFICATION COURSE	211014	Photography, Journalism, Reviews & Travel Diary	
			211015	Geographic Information System	

Masters in Urban Planning

SEMESTER	2019-2021 BATCH		2020-2022 BATCH		Overall Percentage change due to change in content
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	670102	SOCIO-ECONOMIC BASIS FOR PLANNING	670102	SOCIO-ECONOMIC BASIS FOR PLANNING	28.57
	670103	PLANNING TECHNIQUES	670103	PLANNING TECHNIQUES	
	670104	INFRASTRUCTURE AND TRANSPORTATION PLANNING	670104	INFRASTRUCTURE AND TRANSPORTATION PLANNING	
	670106	STUDIO COURSE-I STUDIO ASSIGNMENTS/FILM APPRECIATION/ LITERATURE REVIEW/AREA APPLICATION	670106	STUDIO COURSE-I STUDIO ASSIGNMENTS/FILM APPRECIATION/ LITERATURE REVIEW/AREA APPLICATION	
	670107	STUDIO COURSE-II SITE PLANNING/ CITY DEVELOPMENT PLANNING	670107	STUDIO COURSE-II SITE PLANNING/ CITY DEVELOPMENT PLANNING	
	670101	PLANNING PRINCIPLES AND THEORY	670111	PLANNING PRINCIPLES AND THEORY	
	670105	HOUSING	670115	HOUSING	
II	670202	Urban Heritage Conservation	670202	Urban Heritage Conservation	
	670203	Urban Development Finance & Project Planning	670203	Urban Development Finance & Project Planning	
	670204	Legal Issues & Professional	670204	Legal Issues & Professional	
	670205	Research Methodology	670205	Research Methodology	
	670206	Studio-I	670206	Studio-I	
	670207	Studio-II	670207	Studio-II	
	670201	City and Metropolitan Planning	670211	City and Metropolitan Planning	
III	670303	Seminar	670303	Seminar	
	670304	Pre-Dissertation	670304	Pre-Dissertation	
	670301	Elective - I (Planning for Tourism)	670311/670312	Elective - I (Planning for Tourism)	
	670302	Elective - II (Energy, Climate Change and Urban Development)	670313/670314	Elective - II (Energy, Climate Change and Urban Development)	
IV	670401	Dissertation	670401	Dissertation	

Department of Mathematics & Computing

[Link of Proposed Scheme -2020-24:](https://drive.google.com/file/d/10QvPlsx_OJlQD9iDojyp3BzULMJQKUbA/view?usp=share_link)

https://drive.google.com/file/d/10QvPlsx_OJlQD9iDojyp3BzULMJQKUbA/view?usp=share_link

[Link of Impleted Scheme \(2020-2024\):](https://drive.google.com/file/d/1nzfYUfKUXkCv-3i8CK3p-b7oKrGv1wT/view?usp=share_link)

https://drive.google.com/file/d/1nzfYUfKUXkCv-3i8CK3p-b7oKrGv1wT/view?usp=share_link

SEMESTER	2020-2024 BATCH (Proposed)		2020-2024 BATCH (Implemented)		Percentage change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	MAC-101	Basic Computer Engineering	250101	Introduction to Computing	51.61
	MAC-102	Introduction to Computer Programming	250102	Introduction to Computer Programming	
	MAC-103	Calculus	250103	Statistical Techniques	
	MAC-104	Energy, Environment, Ecology & Society	250104	Element of Calculus	
	MAC-105	Technical Language & Lab	100015	Energy, Environment, Ecology & Society	
	MAC-106	Language Lab	250105	Computing Lab (SPSS)	
II	MAC-201	Digital Logic Design	250201	Computer Organization and Logic Design	
	MAC-202	Differential Equations	250202	Differential Equations	
	MAC-203	Computer Systm Organization	250203	Object Oriented Methodology and Programming with C++	
	MAC-204	Statistical Tool and Techniques	250204	Linear Algebra	
	MAC-2105	Object Oriented Programming	100016	Technical Language	
	MAC-206	Computing Lab	100017	Language Lab.	
III	MAC- 301	Simulation and Modeling	250301	Simulation Modeling and Analysis	
	MAC- 302	Discrete Structure	250302	Discrete Mathematical Structures	
	MAC- 303	Data Structures	250303	Operating System Concepts	
	MAC- 304	Data Communications	250304	Data Structures and Algorithms	
	MAC- 305	Numerical Techniques	250305	Numerical Techniques	
	MAC- 306	Computing Lab	250306	Computing Lab	
	MAC- 307	(SWAYAM/NPTEL/MOOC)#	250307	Self-learning/ Presentation#	
	MAC- 308	Summer Internship Project-I	200XXX	Novel Engaging Course	
	MAC- 309	(Institute Level) (Evaluation)	250308	Summer Internship Project-I	
		MAC	Biology for Engieering		
IV	MAC-401	Advanced Algebra and Its Application	250401	Transform and Vector Calculus	
	MAC-402	Operationg System	250402	Data Base and Management System & SQL	
	MAC-403	Algorithm Design and Analysis	250403	Theory of Computation	
	MAC-404	Computer Networks	250404	Design & Analysis of Algorithm	
	MAC-405	Number Theory and Cryptography	250405	Number Theory and Cryptography	
	MAC-406	Cyber Security/Forensic	100004	Cyber Security	

			200XXX	Novel Engaging Course
			10000001	Indian Constitution and Traditional Knowledge
V	MAC-501	Ethics, Economics, Entrepreneurship & Managem	250501	Computer Networks
	MAC-502	Optimization Techniques	250502	Real and Complex Analysis
	MAC-503	Theory of Computation	250503	Software Engineering
	MAC-504	Database Management System	250504	Data Science using Python
	MAC-505	Real and Complex Analysis	250505	Optimization Techniques
	MAC-506	Minor Project-I**	250506	Minor Project-I
	MAC-507	Summer Internship Project-II (Evaluation)	250507	Self-learning/Presentation [#] (NPTEL/SWAYAM/MOOC)
	MAC-508	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	200xxx	Novel Engaging Course (Informal Learning)
			250508	Summer Internship Project -II
			MAC	Disaster Management
		MAC	Project Management and Financing	
VI	MAC-601	Artificial Intelligence & Machine Learning	250601	Computer Graphics
	MAC-602	Data Mining & Analytics	250602	Compiler Design
	MAC-603	Departmental Elective-I		Departmental Elective (DE-I)
	MAC-604	Departmental Elective-2*	250603	Artificial Intelligence & Machine Learning (AI & ML)
	MAC-605	Open Category-I		Open Category (OC-1)
	MAC-606	Disaster Management	250604	Minor Project-II
	MAC-607	Minor Project-II*	200xxx	Novel Engaging Course
			MAC	Intellectual Property Right (IPR)
VII	DE	Departmental Elective-3	DE	Department Elective (DE-2)
	DE	Departmental Elective-4*	DE	Department Elective* (DE-3)
	OC	Open Category-2	OC	Open Category (OC-2)
	OC	Open Category-3	OC	Open Category (OC-3)
	DLC	Intellectual Property Rights (IPR)	DLC	Departmental Lab
	DLC	Departmental lab Summer Internship Project-III (C	DLC	Creative Problem Solving (Evaluation)
	DLC	Creative Problem Solving (Evaluation)	DLC	Summer Internship Project - III (04 weeks) (Evaluation)
			MAC	Universal Human Values & Professional Ethics (UHVPE)
VIII	DE	Departmental Elective-5	DE	Department Elective* (DE-4)
	OC	Open Category-4*	OC	Open Category* (OC-4)
	DLC	Open Category-5*	DLC	Internship/ Research Project/ Innovation & Start-up **
		Internship/Project		Professional Development
	Professional Development\$			

B.Tech. in Electrical Engineering

Department of Electrical Engineering

SEMESTER	2019-2023 BATCH		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	100201	Engineering Physics	100011	Engineering Mathematics-I	
	100202	Society	100013	Engineering Physics	
	100203	Basic Computer Engineering	100014	Engineering Graphics	
	100204	Basic Mechanical Engineering	100015	Energy, Environment, Ecology & Society	
	100205	Basic Civil Engineering & Mechanics	100016	Technical Language	
	100206	Language Lab. & Seminars	100017	Language Lab	
			130111	Mini Project	
II	100101	Engineering Chemistry	130211	Engineering Material	
	100102	Engineering Mathematics-I	100020	Basic Civil Engineering and Mechanics	
	100103	Technical English	100021	Basic Mechanical Engineering	
	100104	Basic Electrical & Electromics	100022	Basic Electrical and Electronics Engineering	
	100105	Engineering Graphics	100023	Basic Computer Engineering	
	100106	Manufacturing Practices	100024	Electrical Workshop	
III	100001	Engineering Mathametics-II	100025	Engineering Mathametics-II	
	130301	Electromagnetic Field Theory	130311	Electromagnetic Field Theory	
	130302	Measurement and Instrumentation	130312	Electrical and Electronics Measurement	
	130303	Network Analysis	130313	Network Analysis	
	130304	Analog Electronics	130314	Analog Electronics	
	130305	Software Lab-I	130315	Software Lab	
	130306	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)#	130316	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
	130309	Summer Internship Project-I (Institute Level) (Evaluation)	200xxx	Novel Engaging Course (Informal Learning)	
100002	Biology for Engineers	130317	Summer Internship Project-I (Institute Level) (Evaluation)		
		1000001	Indian Constitution and Traditional Knowledge		
IV	100003	Engineering Mathametics-III	100003	Engineering Mathametics-III	
	130401	Digital Electronics & MicroProcessor	130411	Digital Electronics & MicroProcessor	
	130402	Electrical Machines -I	130412	Electrical Machines -I	
	130403	Control System	130413	Power System-I	
	130404	Power System-I	100009	Cyber Security	
	100004	Cyber Security	130414	Python Programming Lab	
	130405	Software Lab-II	130415	Renewable Energy Lab	
		200xxx	Novel Engaging Course (Informal Learning)		
		1000002	Indian Constitution and Traditional Knowledge		
V	100005	Ethics, Economics, Entrepreneurship and Management	130511	Signals and Systems	
	130501	Signal and System	130512	Power System-II	
	130502	Power System-II	130513	Electrical Machines -II	
	130503	Electrical Machines -II	130514	Power Electronics	
	130504	Power Electronics	130515	Data Science	
	130505	Minor Project-I	130516	Minor Project-I	
	130506	Summer Internship Project-II (Evaluation)	130517	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	
	130507	Self-learning/Presentation (SWAYAM/NPTEL/MOOC)	200XXX	Novel Engaging Course (Informal Learning)	
	100006	Indian Constitution & Traditional Knowledge (Audit Course)	130518	Summer Internship Project-II (Evaluation)	
			1000005	Project Management & Financing	
		1000006	Disaster Management		
DE	130601	Switchgear and Protection	130601	Switchgear and Protection	
	130602	Electrical Engineering Material	130602	Control System	
	130611	Computer Aided Power System Analysis	DE	130656 Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems	
	130612	Industrial Automation	DE	130657 Non-Conventional Energy Resources	
130613	Transducers and Sensors	DE	130658 Microprocessor and Interfacing		
		DE	130659 Industrial Automation and Control		

VI	DE	Resources 130652 DC Power Transmission Systems 130653 Fuzzy Logic and Neural Networks 130656 Renewable Energy Engineering: Solar, Wind, and Biomass Energy Systems	130605	Artificial Intelligence and Machine Learning
	OC	900103 Energy Conservation and Management 900115 Biomedical Instrumentation	130603	Minor Project-II
	100007	Disaster Management	200xxx	Novel Engaging Course (Informal Learning)
	130603	Minor Project-II	100008	Intellectual Property Rights (IPR)
VII	DE	130713 IoT in Microgrid 130715 Electric Vehicles 130716 Biomedical Instrumentation	DE	160714 Data Mining & Predictive Modelling 160715 Soft Computing 160716 Mobile Computing
	DE	130751 Introduction to Smart Grid 130755 Fundamentals of Electrical Drives	DE	130751 Introduction to Smart Grid 130755 Fundamentals of Electrical Drives
	OC	900205 Applications of Electrical Equipments and Motors 900230 Sensor Technology	OC	900205 Applications of Electrical Equipments and Motors 900230 Sensor Technology
	OC	900216 IoT in Microgrid 900217 Electric Vehicles	OC	900216 IoT in Microgrid 900217 Electric Vehicles
	100008	Intellectual Property Rights (IPR)	100008	Intellectual Property Rights (IPR)
	130704	Departmental Lab	160701	Departmental Lab
	130702	Summer Internship Project-III (04 weeks) (Evaluation)	160702	Summer Internship Project-III (04 weeks) (Evaluation)
	130703	Creative Problem Solving (Evaluation)	160703	Creative Problem Solving (Evaluation)
VIII	DE	130851 Introduction to Internet of Things 130855 Power System Dynamics Control and Monitoring 130556 Microprocessors and Interfacing 130857 Industrial automation and Control	DE	130851 Introduction to Internet of Things 130855 Power System Dynamics Control and Monitoring 130556 Microprocessors and Interfacing 130857 Industrial automation and Control
	OC	900607 Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems 900608 Non-Conventional Energy Resources 900633 Smart Grid: Basics to Advanced Technologies 900605 Waste to Energy Conversion	OC	900607 Renewable Energy Engineering: Solar, Wind and Biomass Energy Systems 900608 Non-Conventional Energy Resources 900633 Smart Grid: Basics to Advanced Technologies 900605 Waste to Energy Conversion
	130801	Internship/Project	160801	Internship/Project
	130802	Professional Development	160802	Professional Development

27.42

OLD SYLLABUS

REVISED SYLLABUS

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
 (A Govt. Aided UGC Autonomous Institute, NAAC Accredited Institute Affiliated to R.G.P.S., Bhopal MP)
 Electrical Engineering Department

Power System-II: 130502 (Old)

Course Objectives:

- To expose the students to the concepts of Load Flow Studies, Symmetrical and Unsymmetrical Faults, Power System Stability, Power System Control, Underground Cables and HVDC Transmission System
- To enable the students to solve problems related to Load Flow Studies, Fault analysis, Power System Stability, Power System Control and Underground Cables

Unit I. System Representation and Load Flow Analysis: Single line representation, Per unit system, Network Model formulation, Formulation of YBUS, Formulation of static load flow equations, solution of load flow problem by Gauss-Seidel, Newton Raphson (polar and rectangular) and fast decoupled load flow methods.

Unit II. Symmetrical and unsymmetrical fault: Review of symmetrical components, sequence networks, symmetrical fault analysis, unsymmetrical fault analysis, analysis of open conductor fault, fault calculations for symmetrical and unsymmetrical faults.

Unit III. Power System Stability: Basic concepts of steady state, dynamic and transient stability, power angle equation, synchronizing power coefficient, equal area criterion, critical clearing angle, Swing equation, conceptual idea of multi-machine transient stability studies with classical model representation, factor affecting stability and methods of its improvement.

Unit IV. Power System Control: Elementary idea of load-frequency control, reactive power voltage control, Series and shunt compensation techniques, tap changing transformers, phase shift transformers, Inclusion regulator, Economic limit of VAR control.

Unit V. Underground Cables and HVDC Transmission: Types of cables, Insulation resistance of a cable, Electrostatic stress and grading of cables, rating and power factor of cables, Brief history of transmission, comparison of HVDC with EHV AC transmission systems, Basic converter circuit in HVDC system, types of HVDC links.

Recommended Books:

- Advanced Power System Analysis and Dynamics, I.P. Singh, Wiley Eastern Ltd, 8th ed. 2017.
- Modern Power System Analysis, Nagrath & Kothari, TMH Publishers, 4th ed. 2016.
- Elements of Power System Analysis, W.D. Stevenson, McGraw-Hill, 4th ed. 2017.
- Power system operation and control, A.J. Wood & Wollenberg, 2nd ed. 2018.
- HVDC Power Transmission Systems: Technology and System Interaction, K. R. Padiyar, No International, 3rd ed. 2017.

Course Outcomes

After the completion of this course, students will be able to:

- CO-1 Explain the concepts of single line diagram and per unit system
- CO-2 Apply different load flow techniques to solve load flow problem
- CO-3 Perform fault calculations for symmetrical and unsymmetrical faults.
- CO-4 Explain the theoretical and practical aspects of Power System Stability and its enhancement.
- CO-5 Analyze the automatic generation control, reactive power, voltage control, series and compensation.
- CO-6 Analyze the insulation resistance, capacitance of various types of cables and the need of transmission.

EE-130502-01/02/03

REVISED

2024

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MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR
 (A Govt. Aided UGC Autonomous Institute, NAAC Accredited Institute Affiliated to R.G.P.S., Bhopal MP)
 Electrical Engineering Department

Power System-II: 130502 (Revised)

Course Objective:

- To expose the students to the concepts of Load Flow Studies, Symmetrical and Unsymmetrical Faults, Power System Stability, Power System Control, Underground Cables and HVDC Transmission System
- To enable the students to solve problems related to Load Flow Studies, Fault analysis, Power System Stability, Power System Control and Underground Cables

Unit I.

System Representation and Load Flow Analysis: Single line representation, Per unit system, Network Model formulation, Formulation of YBUS, Formulation of static load flow equations, solution of load flow problem by Gauss-Seidel, Newton Raphson (polar and rectangular) and fast decoupled load flow methods.

Unit II.

Symmetrical and unsymmetrical fault: Review of symmetrical components, sequence networks, symmetrical fault analysis, unsymmetrical fault analysis, analysis of open conductor fault, fault calculations for symmetrical and unsymmetrical faults.

Unit III.

Power System Stability: Basic concepts of steady state, dynamic and transient stability, power angle equation, synchronizing power coefficient, equal area criterion, critical clearing angle, Swing equation, **conceptual idea of multi-machine** transient stability studies with classical machine representation, factor affecting stability and methods of its improvement.

Unit IV.

Power System Control: Elementary idea of load-frequency control, **automatic generation control, reactive power** and voltage control, Series and shunt compensation techniques, tap changing transformers, phase shifting transformers, Inclusion regulator, Economic limit of VAR control.

Unit V.

Underground Cables and HVDC Transmission: Types of cables, Insulation resistance of cable, Electrostatic stress and grading of cables, rating and power factor of cables, Brief history of DC transmission, comparison of HVDC with EHV AC transmission systems, Basic converter circuit and HVDC system, types of HVDC links.

Recommended Books:

- Advanced Power System Analysis and Dynamics, I.P. Singh, Wiley Eastern Ltd, 8th ed. 2017.
- Modern Power System Analysis, Nagrath & Kothari, TMH Publishers, 4th ed. 2016.
- Elements of Power System Analysis, W.D. Stevenson, McGraw-Hill, 4th ed. 2017.
- Power system operation and control, A.J. Wood & Wollenberg, 2nd ed. 2018.
- HVDC Power Transmission Systems: Technology and System Interaction, K. R. Padiyar, No International, 3rd ed. 2017.

EE-130502-01/02/03

REVISED

2024

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ELECTRICAL MACHINES-II: (18E03) (04)

Course Objective: To develop basic concepts about AC machines, their constructional details and working principles and to understand the practical applications and operational issues of three phase transformer and other rotating machines.

UNIT-I Transformer: Three phase transformers, Special construction features, Single phase Transformers connected as 3 phase bank, Phasor diagrams of star/star, Star/delta, Delta/delta, Delta/star, connected 3 phase transformers and their uses. Phase conversion, Three to two phase open delta or 3 connection, Parallel operation of single phase and three phase Transformers, load sharing, harmonics in transformer, Magnetizing current wave form, Tertiary winding.

UNIT-II Induction Motor II: Circle diagram and its experimental determination, cogging and Crawling Losses, Efficiency and Testing IM, Double cage induction motor, Operation on unbalanced voltage, Speed control, Rotor resistance control, pole changing method, Frequency control, Induction generator.

UNIT-III Synchronous Machine II: Constructional features, salient pole and cylindrical synchronous machines, Relation between speed, Frequency and no. of poles, excitation, Voltage generation, Generator mode, Interaction between excitation flux and armature EMF, Voltage regulation, phasor diagram on load, Leakage reactance and synchronous reactance, Steady state parameters of synchronous machines, open circuit, short circuit and zero power factor tests, Determination of voltage regulation by synchronous impedance method, MMF method and Potier triangle method.

UNIT-IV Synchronous Machine II: Two reaction theory, Slip test, Expression for power developed and power angle curves, Synchronization of alternator Dark and bright lamp method, Synchro scope Parallel operation and load sharing, Effect of governor characteristics on load sharing operation in infinite bus bar.

UNIT-V Synchronous Machine III: Motoring mode, transition from motoring to generating mode, V curve starting, Synchronous condenser, Hunting, damper winding synchronizing torque and power analysis under sudden short circuit, Transient parameters of synchronous machines, Various transient and sub transient resistance, Time constant, Expression of transient and sub transient reactance Analysis of 3 phase short circuit oscillogram and determination of transient parameters from oscillogram, Short circuit ratio.

Recommended Books:

1. Theory of Alternating current Machinery by Alexander S Langsdorf.
2. The performance and design of AC machines by M.G. Say, CBS Publication.
3. Electric machine by Nagrath and Khator, TMH.
4. Generalized theory of electrical machine by P.S. Bimbhra, Khanna publication.
5. Electrical machines by P.S. Bimbhra, Khanna publication.
6. The Performance and Design of AC Converter Machines by Opendran Taylor, CBS Publication.

Handwritten notes and diagrams in blue ink, including a circuit diagram with a transformer and various mathematical symbols and equations.

ELECTRICAL MACHINES-II: (18E03) (Revised)

Course Objective: To develop basic concepts about AC machines, their constructional details and working principles and to understand the practical applications and operational issues of three phase transformer and other rotating machines.

UNIT-I Transformer: Three phase transformers, Special construction features, Single phase Transformers connected as 3 phase bank, Phasor diagrams of star/star, Star/delta, Delta/delta, Delta/star, connected 3 phase transformers and their uses. Phase conversion, Three to two phase open delta or 3 connection, Parallel operation of single phase and three phase Transformers, load sharing, harmonics in transformer, Magnetizing current wave form, Tertiary winding.

UNIT-II Induction Motor II: Circle diagram and its experimental determination, cogging and Crawling Losses, Efficiency and Testing IM, Double cage induction motor, Operation on unbalanced voltage, Speed control, Rotor resistance control, pole changing method, Frequency control, Induction generator. **18E03(04)001**

UNIT-III Synchronous Machine I: Constructional features, Salient pole and cylindrical synchronous machines, Relation between speed, Frequency and no. of poles, excitation, Voltage generation, Generator mode, Interaction between excitation flux and armature EMF, Voltage regulation, phasor diagram on load, Leakage reactance and synchronous reactance, Steady state parameters of synchronous machines, open circuit, short circuit and zero power factor tests, Determination of voltage regulation by synchronous impedance method, MMF method and Potier triangle method.

UNIT-IV Synchronous Machine II: Two reaction theory, Slip test, Expression for power developed and power angle curves, Synchronization of alternator Dark and bright lamp method, Synchro scope Parallel operation and load sharing, Effect of governor characteristics on load sharing, Operation on infinite bus bar.

UNIT-V Synchronous Machine III: Motoring mode, transition from motoring to generating mode, V curve starting, Synchronous condenser, Hunting, damper winding synchronizing torque and power analysis under sudden short circuit, Transient parameters of synchronous machines, Various transient and sub transient resistance, Time constant, Expression of transient and sub transient reactance Analysis of 3 phase short circuit oscillogram and determination of transient parameters from oscillogram, Short circuit ratio.

Recommended Books:

1. Theory of Alternating current Machinery by Alexander S Langsdorf.
2. The performance and design of AC machines by M.G. Say, CBS Publication.
3. Electric machine by Nagrath and Khator, TMH.
4. Generalized theory of electrical machine by P.S. Bimbhra, Khanna publication.
5. Electrical machines by P.S. Bimbhra, Khanna publication.
6. The Performance and Design of AC Converter Machines by Opendran Taylor, CBS Publication.

Power Electronics: 130504 (Old)

Course Objective: To introduce the students the basic theory of power semiconductor devices and passive components, their practical application in power electronics and to familiarize the operating principle of AC-DC, DC-DC, DC-AC conversion circuits and their applications, also to provide the basis for further study of power electronics circuits and systems.

Unit I. Power Semiconductor Devices: Power diodes, Transistors, Power MOSFET, IGBT, Thyristor TRIAC and GTO. Thyristor static and dynamic characteristics. Two transistor equivalent model, turn on and turn off. Thyristor performance parameters, Thyristor types Ratings and protection. Firing circuits, Design of snubber circuit. Series and parallel operation.

Unit II. Controlled Rectifiers: Line commutated converter. Principle of AC phase control, Single and three phase AC voltage controllers, Principle of phase-controlled converter operation. Single phase half wave, full wave and semi converters, Three phase half wave, full wave and semi converters and inverters, Power factor improvement, Symmetrical angle control, Pulse width modulation control, Effect of load and source inductance.

Unit III. Cyclo-Converter: practical cyclo-converter circuits, Single phase to single phase, three phase to single phase, three phase to three phase out put voltage control circuit, Cyclo-converter drives, circulating and non-circulating type dual converters.

Unit IV. Inverter circuits: Principle of operation of voltage source inverter, Single phase and three phase inverters, Voltage control using PWM technique, Forced commutated thyristors, Current source inverters, Series inverter, Inverter applications.

Unit V. Chopper: Thyristor commutation schemes, Principles of single quadrant, Two quadrant, four quadrant chopper. Control strategies, Pulse width modulation, Frequency modulation, Voltage commutated Chopper, switched mode power supplies, buck-boost regulation.

Recommended Books:

1. Power Electronics by P.C. Sen, McGraw-Hill, 1st Ed., 2011
2. Power Electronics by P.S. Bimbhra, Khanna Publishers, 5th Ed., 2012
3. Power Electronics Circuits, Devices & Applications by M.H. Rashid, Pearson, 5th Ed., 2012
4. Power Electronics by Cyril W. Lasker, McGraw-Hill, 2nd Ed., 1987
5. Power Electronics Principles and Applications by Joseph Voldybal, TMH, 2010

Handwritten notes in blue ink, including mathematical symbols like $\frac{1}{s}$, $\frac{1}{s^2}$, $\frac{1}{s^3}$, and various circuit diagrams and derivations.

Power Electronics: 130504 (Revised)

Course Objective: To introduce the students the basic theory of power semiconductor devices and passive components, their practical application in power electronics and to familiarize the operating principle of AC-DC, DC-DC, DC-AC conversion circuits and their applications. Also to provide the basis for further study of power electronics circuits and systems.

Unit I. Power Semiconductor Devices: Classification of Power electronic switches, Power diodes, Transistors, Power MOSFET, IGBT, Thyristor TRIAC and GTO, Thyristor static and dynamic characteristics, two transistor equivalent model, Turn on and turn off **Firing circuit protection**, Design of snubber circuit, Series and parallel operation.

Unit II. Controlled Rectifiers: Principle of phase-controlled converter operation, Single and half wave, full wave and semi converters. Three phase half wave, full wave and semi converters and inverters, Power factor improvement, Symmetrical angle control, Pulse width modulation control, Effect of load and source inductance.

Unit III. Chopper: Principles of single quadrant, Two quadrant, four quadrant chopper, control strategies, Pulse width modulation, Frequency modulation, Thyristor commutation schemes, switched mode power supplies, buck-boost regulation.

Unit IV. AC voltage controller: Principle of AC phase control, Single and three phase AC voltage controllers, practical cyclo-converter circuits, Single phase to single phase, three phase to single phase, three phase to three phase out put voltage control circuit, Cyclo-converter, Circulating and Non Circulating type, Dual converters.

Unit V. Inverter circuits: Principle of operation of voltage source inverter, Single phase and three phase inverters, **Voltage control using PWM technique**, Forced commutated thyristors, current source inverters, Series inverter, **Inverter applications**.

Recommended Books:

- Power Electronics by P.S. Bimbhra, Khanna Publishers, 5th Ed., 2012
Power Electronics Circuits, Devices & Applications by M.H. Rashid, Pearson, 5th Ed., 2012
Power Electronics by Cyril W. Lasker, McGraw-Hill, 2nd Ed., 1987
Power Electronics Principles and Applications by Joseph Voldybal, TMH, 2010
Bose, E.K., Handbook of Power Electronics, IEEE Publications.

Course Outcomes:

On completing this course, the student will be able to

01. Name power electronic devices and explain their static/dynamic characteristics.
02. Ability to analyze the configuration of AC to DC converter, Dual converter, chopper, cyclic converters.
03. Classify converters and identify their applications.
04. Develop different model of different converters to calculate their performance parameters.
05. Identify the problems/limitations of power electronic devices, converters and suggest solutions.

Handwritten notes in blue ink, including mathematical symbols like $\frac{1}{s}$, $\frac{1}{s^2}$, $\frac{1}{s^3}$, and various circuit diagrams and derivations.

Department of Electrical Engineering					
Internet of Things					
SEMESTER	2020-2024 BATCH (Tentative Scheme)		2020-2024 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	220101	Basic of Internet of Things (IoT)	220101	Basic of Internet of Things (IoT)	25.42
	230102	Introduction to Computer Programming	230102	Introduction to Computer Programming	
	100022	Basic Electrical & Electronics Engineering	100022	Basic Electrical & Electronics Engineering	
	250100	Linear Algebra and Matrix Analysis	250100	Linear Algebra	
	100015	Energy, Environment, Ecology & Society	100015	Energy, Environment, Ecology & Society	
II	220201	Digital Electronics and Logic Design	220201	Digital Electronics and Logic Design	
	220202	Sensor Technology	220202	Sensor Technology	
	230202	Data Structures	230202	Data Structures	
	230203	Object Oriented Programming and Methodology	230203	Object Oriented Programming and Methodology	
	100016	Technical Language	100016	Technical Language	
	100017	Language Lab	100017	Language Lab	
III	250106	Probability theory and Random process	250106	Probability theory and Random process	
	220301	Fundamentals of Signals and Control Systems	220301	Fundamentals of Signals and Control Systems	
	220302	Design & Analysis of Algorithms	220302	Design & Analysis of Algorithms	
	220303	Operating system	220303	Operating system	
	220304	Software Engineering	220304	Analog Electronics	
	220305	Arduino Programming and Simulation	220305	Programming and Simulation Lab	
	220306	Self-learning/ Presentation (SWAYAM/NPTEL)	220306	Self-learning/ Presentation (SWAYAM/NPTEL)	
	200xxx	Novel Engaging Courses	200xxx	Novel Engaging Courses	
	220307	Summer Internship Project-I (Institute Level)	220307	Summer Internship Project-I (Institute Level) (Evaluation)	
IV	220401	Database Management System	220401	Database Management System	
	220402	Computer Networks & Protocols	220402	Computer Networks & Protocols	
	220403	Robotics and Mechatronics	220403	Power Electronics	
	220404	Microprocessor & Embedded Systems	220404	Microprocessor & Embedded Systems	
	220405	Network and Web Security	220405	Network and Web Security	
	220406	Software Lab	220406	Programming with Python	
	200xxx	Novel Engaging Course	200xxx	Novel Engaging Course	
V	220501	IoT in Microgrid	220501	IoT in Microgrid	
	220502	Theory of Computation	220502	Cloud computing	
	220503	Energy Conversion Systems	220503	Embedded Control of Electrical Machines	
	220504	Special Machines	220504	IoT Architecture & Protocol	
	220505	IoT in Smart Grid	220505	Data Science in IOT	
	220506	Minor Project-I	220506	Minor Project-I	
	220507	Self-learning/ Presentation (SWAYAM/NPTEL)	220507	Self-learning/ Presentation (SWAYAM/NPTEL)	
	200xxx	Novel Engaging Course	200xxx	Novel Engaging Course	
	220508	Summer Internship Project-II (Evaluation)	220508	Summer Internship Project-II (Evaluation) (DLC)	
	1000006	Disaster Management	1000005	Project Management & Financing	
		1000006	Disaster Management		
VI	220601	Industrial Automation and IoT	220601	Soft Computing	
	220602	Wireless Sensor Networks	220602	Software Engineering	
	DE	DE-I(a):Data Analytics using Python DE-1	DE	220651 Introduction to Industry 4.0 and Industrial Internet of Things 220652 Data Mining 220653 Foundation of Cloud IoT Edge ML 220654 Industrial Automation and Control	

	OC	910104 Energy Conservation and Management	OC	910104 Energy Conservation and Management 910105 Biomedical Instrumentation 910106 Industrial Automation 910107 Solar PV Systems: Design and
	220603	Artificial Intelligence	220603	AI and ML
	220604	Minor Project -II	220604	Minor Project-II
	200xxx	Novel Engaging Course	200xxx	Novel Engaging Course
	100008	Intellectual Property Rights (IPR)	100008	Intellectual Property Rights (IPR)
VII	DE	220711 Ethical Hacking220712 Object Ori	DE	220711 Ethical Hacking220712 Object Oriented
	DE	220751 Embedded Systems Design220752	DE	220751 Embedded Systems Design220752 Desig
	OC	910108 Applications of Electrical Equipments and Motors 910109 Sensor Technology	OC	910108 Applications of Electrical Equipments and Motors 910109 Sensor Technology
	OC	910110 IoT in Microgrid 910111 Electric Vehicles	OC	910110 IoT in Microgrid 910111 Electric Vehicles
	220701	IoT is Smart Grid Lab	220701	Industrial Internet of Things Lab
	220702	Summer Internship Project-III (04 weeks)	220702	Summer Internship Project-III (04 weeks)
	220703	Creative Problem Solving (Evaluation)	220703	Creative Problem Solving (Evaluation)
VIII	DE	220851 Deep Learning220852 Big Data An	DE	220851 Deep Learning220852 Big Data Analytica
	OC	900607 Renewable Energy Engineering:	OC	900607 Renewable Energy Engineering: Solar,
	220801	Internship/Project	220801	Internship/Project
	220802	Professional Development	220202	Professional Development
				Total Change
				25.42

Department of Electrical Engineering
M.E Industrial Systems and Drives

SEMESTER	2019-2021 BATCH (Old Scheme)		2020-2022 BATCH (New Scheme)		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	580101	Computational Techniques	580111	Computational Techniques	68.42
	580102	Static Power Converters	580112	Power Electronics Converters	
	580103	Advanced Microprocessors and	580113	Intelligent Control Techniques	
	580104	Advanced Control System	Elective-I	580114 Power Quality and FACTS Controllers 580115 Smart grid Technology	
	Elective-I	580105 Power Quality and FACTS Controllers	OC-I	800100 Industrial Instrumentation	
	580106	Systems & Drives Lab-I	580118	Systems & Drives Lab -I	
	580107	Computer Simulation Lab-I	580119	Self Learning / Presentation (run through SWAYAM)	
II	580201	Advanced Power Electronics	580211	Semiconductor Controlled Drives	
	580202	Computer Aided Protection	580212	Electrical Machines Modeling and	
	580203	Modeling Simulation and Evolutionary Techniques	580213	Microcontroller and Its Applications to Power Converters	
	580204	Electrical Machine Modeling and Drives	Elective -II 5802014	580214 Industrial Automation and Control	
	Elective-II	580205 Restructured Power System 580206 Digital Signal Processing	OC-II	800200 Optimal Control	
	580207	Systems & Drives Lab II	580216	Systems & Drives Lab II	
	580208	Computer Simulation Lab-II	580217	Self Learning / Presentation	
III	580301	Semiconductor Controlled Drives	580311	Dissertation Part-I (Literature	
	Elective-III	580302 Industrial Instrumentation 580303 Fuzzy Control 580304 Power System Instrumentation and Control 580305 Power System Analysis and Control	MOOCS	580312 Advances in UHV Transmission and Distribution 580312 Introduction to Internet of things	
	580306	Industrial Training			
	580307	Prelim Dissertation			
IV	580401	Dissertation Evaluation and Defense	580411	Dissertation Part-II	
				Total Change	

Masters of Business Administration

SEMESTER	2020-2022 BATCH		2021-2023 BATCH		Percentage Change
	COURSE CODE	COURSE NAME	COURSE CODE	COURSE NAME	
I	700111	Management Functions and Behaviour	700101	Managerial Functions and Practices	35.12
	700112	Teamwork, Leadership and Corporate Finance	700102	Accounting for Managers	
	700113	Business, Government, Society and International Economy	700103	Operations Management	
	700114	Managerial Communication	700104	Managerial Economics	
	700115	Microeconomics	700105	Organizational Behaviour	
	700116	Marketing Management	700106	Transforming Business Through Technology	
	700117	Managing People and Performance in Organizations	700107	Syndicate Personality Development Program (SPDP)	
	700118	Financial & Management Accounting and Control	700114	Managerial Communication	
	700219	Self-learning/Presentation (through SWAYAM/NPTEL/MOOC or Interdisciplinary course from other institutions and platforms)	700116	Marketing Management	
		MC0101	Corporate Governance & Ethics (MAC)		
II	700211	Organizational Behavior	700201	Managing People and Performance in Organizations	
	700212	Operations Management	700202	Statistics for Managers	
	700213	Financial Management	700203	Business Research Methods	
	700214	Research Methodology & Statistics	700204	International Business Perspectives	
	700215	Entrepreneurship & Innovation	700213	Financial Management	
	700216	Legal Aspects of Business	700215	Entrepreneurship & Innovation	
	700217	International Business Management	700216	Legal Aspects of Business	
	700218	Business, Environment and Sustainability	700218	Business, Environment and Sustainability	

	MC0201	Self-learning/Presentation	MC0201	Digital Business (MAC)
III	700311	Strategic Management	700301	Strategic Management
	700318	Summer Internship/Minor Project	700302	Summer Internship/Minor Project
	MC0201	Data Analytics in Business (MAC)	MC0201	Data Analytics in Business (MAC)
	MB0111	Strategic HRM	MB0111	Strategic HRM
	MB0112	Talent and Competency Management	MB0112	Talent and Competency Management
	MB0113	Industrial Relations & Labour Laws	MB0113	Industrial Relations & Labour Laws
	MB0114	e-HRM	MB0114	e-HRM
	MB0221	Consumer Behavior	MB0221	Consumer Behavior
	MB0222	Service Marketing	MB0222	Service Marketing
	MB0223	Sales & Distribution Management	MB0223	Sales & Distribution Management
	MB0224	Advertising & Promotion Management	MB0224	Advertising & Promotion Management
	MB0331	Total Quality Management	MB0331	Total Quality Management
	MB0332	Project Management	MB0332	Project Management
	MB0333	Production Planning and Control	MB0334	Services Operation Management
	MB0334	Services Operation Management	MB0335	Analytics for Supply Chain Management
	MB0441	Investment & Portfolio Management	MB0441	Investment & Portfolio Management
	MB0442	Financial Services	MB0442	Financial Services
	MB0443	Working Capital Management	MB0443	Working Capital Management
MB0444	Corporate Tax Planning & Management	MB0444	Corporate Tax Planning & Management	
IV	700401	Internship/Major Project	700401	Internship/Major Project
	MB0115	Managing Change in Organization	MB0115	Managing Change in Organization
	MB0116	Leadership & Team Effectiveness	MB0116	Leadership & Team Effectiveness
	MB0117	Training & Development	MB0119	Talent Acquisition & Management
	MB0118	International Human Resource Management	MB0120	Organizational Theory/ Structure & Design
	MB0225	Product & Brand Management	MB0229	Integrated Marketing Communication
	MB0226	Global Marketing Management	MB0226	Global Marketing Management
	MB0227	Retail Management	MB0227	Retail Management
	MB0228	Digital Marketing	MB0230	Marketing Analytics
	MB0335	Analytics for Supply Chain Management	MB0339	Six Sigma

MB0336	Management of Inventory System	MB0336	Management of Inventory System
MB0337	Operations Strategy	MB0340	Quality Design & Control
MB0338	Productivity Management	MB0341	Introduction to Operations Research
MB0445	Financial Institutions & Markets	MB0445	Financial Institutions & Markets
MB0446	Financial Statement Analysis & Reporting	MB0446	Financial Statement Analysis & Reporting
MB0447	Cost Accounting	MB0449	Management of Commercial Banking
MB0448	Corporate Finance	MB0450	Financial Derivatives & Risk Management

Old Syllabus

New Syllabus

MAHARAJA INSTITUTE OF TECHNOLOGY, RAIPUR

Approved by NMAC Council till 30/06/2019. Affiliated to I.I.T.T.V., Raipur, M.P.

Sl. No.	Subject Code	Subject Name	Maximum Marks		Total Marks	Credits			Total Credits
			Theory	Practical		T	L	P	
1	MB0447	Managing People and Performance in Organizations	100	00	100	3	0	0	3

Course Objectives:
 Providing a broad and emerging awareness with a deeper insight into the crucial role of the management of the organization in an uncertain and turbulent business environment.

UNIT I:
 Introduction to HRM: Definition, Classification of HRM, Evolution of HR Management, **Importance of HRM**, Scope of HRM, Functions of HRM, **Evolution of HRM**, **Important Trends in HR Management**.

UNIT II:
 HR Planning, Recruitment and Selection: HR Planning, Job Analysis Job description and job specification, Job Design, Recruitment & Selection process, Sources of Recruitment, Importance of careful selection, Types of Tests for selection, Interview- Methods of Selection, Placement & Induction.

UNIT III:
 Performance Management and Training & Development: Performance Management: Appraisal, **Identification of Issues in performance appraisal**, Use of Performance Appraisal, **Performance Appraisal**, Performance Management, **Talent Management**, Training and Development: Objectives, Concept and Needs, Training methods, Management development, Career planning and Succession Planning, Motivation, Training, Supervision, HRD.

UNIT IV:
 Wage and Salary Administration, Job Evaluation: meaning and methods, **Money & Motivation**, **Individual & group incentives**, Employee benefits: leaves, Insurance, retirement, **Desirable benefits**, Pay for performance.

UNIT V:
 Emerging Trends in People Management and Industrial Relations: **HRD (Human Resource Development)**, **HRM (Human Resource Management)**, **HR Analytics**, **Employee engagement**, **Work-life balance**, **HRIS (Human Resource Information System)**, **HRIS (Human Resource Information System)**, **HRIS (Human Resource Information System)**.

Course Outcomes: After completing the course student will be able to:
 CO1: Identify the various roles of the HR in the effective management of organization.
 CO2: Discuss issues in training by applying a structured tool (JITB).
 CO3: Apply various methods for recruitment, job analysis and job description.
 CO4: Design a performance appraisal system in an organization in the area of HR Management.
 CO5: Identify various methods for job evaluation and business strategy.
 CO6: Develop a career plan for an individual in an organization in the field of HRM.

Reference Texts:
 1. Human Resource Management: An Introduction, 10th Edition, by David A. Coltrane, Education First, New Delhi.
 2. Human Resource Management: An Introduction, 10th Edition, by David A. Coltrane, Education First, New Delhi.

Sl. No.	Subject Name	Theory			Practical/Workshop/Project/Case Study/Assignment		Total	Credits		
		T	L	P	Internal	External		T	L	P
1	Managing People and Performance in Organizations	60	20	20	-	-	100	3	0	3

Course Objectives:
 The objective of the course is to teach the basic principles of human resource management—how an organization recruits, rewards, motivates, work and generally manages its people effectively. In addition to providing a theoretical and conceptual framework for managers, the course will introduce the manager to practices and techniques for evaluating performance, structuring teams, working and motivating people, and performing the wide range of other people related duties of a manager in today's increasingly complex workplace.

Unit I
 Introduction to HRM: Definition, nature, features, characteristics, functions, objectives & scope of HRM; Evolution of HRM, Role & skills of HR Manager, Importance of HRM, Important Trends in HR Management.

Unit II
 HR Planning, Recruitment and Selection: HR Planning, Job Analysis-Job description and job specification, Job Design, Recruitment & Selection process, Sources of Recruitment, Importance of careful selection, Types of Tests for selection, Interview- Methods of Selection, Placement & Induction.

Unit III
 Performance Management System: Introduction, Identification of issues in performance appraisal, Uses of Performance Appraisal, Techniques of Performance Appraisal, Performance Management, Talent Management, Training and Development: Objectives, Concept and Needs, Training methods, Management development program.

Unit IV
 Wage and Salary Administration: Job Evaluation: meaning and methods, Money & motivation, Individual & group incentives, Employee benefits: leaves, Insurance, retirement, Desirable benefits, Pay for performance.

Letters, inquiries, orders & replying to them, sales letters, Job application Letters, Writing Effective Memos, Format and Principles of writing Memos, Identifying potential career opportunities, Preparing Resumes, Composing Application Messages, Writing E-mail, Business Reports, Business Proposals, Effective E-mail, E-mail Etiquettes, Writing Business Reports and Proposals, Purpose of Business Reports, Parts of Report, Format of Business Proposals, Practice for Writing Business Reports.

Course Outcomes focused on employability/entrepreneurship/skill development:

COs	After successful completion of this course, students would be able to:	Mapping
CO1	Define the concept, process and barriers of corporate communication	Employability
CO2	Describe verbal communication with its implications	Entrepreneurship
CO3	Apply the concept of Non-Verbal Communication	Skill Development
CO4	Analyse the concept of Interpersonal communication	Skill Development
CO5	Evaluate cross-cultural communication and its implication while interacting with foreign clients	Employability
CO6	Create the concept of Media management and Business negotiation	Entrepreneurship

Suggested Text and Reference Books:

1. Essentials of Business Communication, Mary Ellen Guffey, South-Western Educational
2. Business Communication AshaKaul Prentice Hall of India
3. M.K. Sehgal & V. Khatri - Business Communication (Excel Books).
4. Rajendra Pal - Business Communication (Sultanchand & Sons Publication)
5. P.D., Chaturvedi - Business Communication (Pearson Education, 1st Edition 2006).
6. Communication for Business (Pearson Education, 4th Edition)

Lab/Practical Work	700117: Managerial Communication
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Tentative activities* of Lab/Practical Work in Managerial Communication:

1. Email writing, writing Business letters, preparing reports and minutes of the meeting
2. CV and Cover letter writing,
3. Facing Interviews
4. Presentation Skills
5. Effective oral communication/ Public speaking skills
6. Role Play
7. Personal branding, story telling

*These activities are tentative and can be modified as per the industrial requirements in the same domain.



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Sl. No.	Subject Code	Subject Name	Maximum Marks Allocation					Total Marks	Contact Hours			Total Credits
			Unit I	Unit II	Unit III	Unit IV	Unit V		L	T	P	
5	700116	Marketing Management	25	25	25	25	100	3	0	0	3	

Course objectives: Facilitate students to gain necessary skills and knowledge in marketing, understand marketing, providing the opportunity to apply the learning in various scenarios, assess and giving a range of marketing plan.

UNIT I
Understanding the Marketing Management; Introduction to Marketing; Need and Scope of Marketing; Marketing Concepts, Marketing Philosophy, Customer Value, Ethics, Marketing, Emerging Trends in Marketing.

UNIT II
Market Segmentation, Targeting and Positioning: Basis for segmenting a company, market, factors influencing selection of market segments; Criteria for effective market segmentation; Target market selection and strategy formulation – concept, essential points.

UNIT III
Product and Pricing Decisions: Product – conceptual framework, Major product decisions, New product

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Subject Code	Subject Name	Maximum Marks Allowed					Total Marks	Contact Hours per week			Total Credits
		Theory			Project/Assignment/ Presentation/Self Learning			L	T	P	
		End Sem	Mid Sem	Quiz/Assignment	Internal	External					
700116	Marketing Management	40	20	20	-	-	100	3	-	-	3

Course Objectives:

Marketing management course enables a student to understand the fundamentals of marketing concept and the role marketing plays in business. This course enables a student to understand the 'Marketing

development, Packaging and Labelling, Product design, services, training systems, research and development, concept and response strategies to be adopted in different life cycle stages.

UNIT 4

Promotion Decisions: Role of promotion in marketing, Knowledge about advertising, public relations and direct selling, Integrated Marketing Communications – Concept, Characteristics, Objectives and processes, Determining promotion mix, Promotional mix: Types of mix, **Advertising Decisions:** Sales Promotion, Organizing and Control, Factors influencing promotion mix, Effect, media and measurement decisions in promotional mix.

UNIT 5

Distribution Decisions: Channels of distribution – concept and importance, Role of Channel intermediaries and their functions, Channel management, **Distribution Logistics – concept, importance and water, by land, air, sea, Channel strategies and systems.**

Course Outcomes: After successful completion of this course students will be able to:

- CO1 Learn fundamental concepts of marketing management.
- CO2 Classify the distribution system and functions of channel members.
- CO3 Apply the promotion tools to generate and increase demand.
- CO4 Analyze the contents of service marketing and its mix.

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mix' elements and the strategies and principles underlying the modern marketing practices. Students should be able to demonstrate their comprehension of marketing concepts and knowledge by applying those in their written exams, case studies discussions, presentations and projects.

Unit I

Understanding Marketing Management: Introduction to Marketing: Nature and Scope of Marketing, Marketing Concepts, Marketing Philosophies, Customer Value, Holistic Marketing, Emerging Trends in Marketing. The marketing process: Introduction, Marketing Mix-The Traditional 4Ps, The Modern Components of the Mix- The Additional 3Ps, Developing an Effective Marketing Mix, Marketing Planning, Marketing Implementation and Control

Unit II

Segmentation, Targeting and Positioning: Introduction, Concept of Market Segmentation, Benefits of Market Segmentation, Requisites of Effective Market Segmentation, The Process of Market Segmentation, Bases for Segmenting Consumer Markets, Targeting (T), Market Positioning (P), Product Management: Decisions, Development and Lifecycle Strategies: Introduction, Levels of Products, Classification of Products, Product Hierarchy, Product Line Strategies, Product Mix Strategies, Packaging and Labelling, New Product Development, Product Life Cycle (PLC)

Unit III

Product Management-Brand and Branding Strategy: Introduction, **Brand and Branding, Advantages and disadvantages of branding,** Brand Equity, Brand Positioning, Brand Name Selection, **Brand Sponsorship,** Brand Pricing: Introduction, Factors Affecting Price Decisions, Cost Based Pricing, Value Based and Competition Based Pricing, Product Mix Pricing Strategies, Adjusting the Price of the Product, Initiating and Responding to the Price Changes.

Unit IV

Promotion Management-Managing Non-personal Communication Channels: Introduction, Integrated Marketing Communications (IMC), Communication Development Process, **Budget Allocation**

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Decisions in Marketing Communications, Introduction to Advertising Fundamentals of Sales Promotion, **Basics of Public Relations and Publicity**

Unit V

Personal Communication Channels: Introduction, Personal Selling, **Sales Management Basics, HR Practices in Sales Management, Evaluation of Training, Personal Selling Process, Direct Marketing,** Channels of distribution – concept and importance; Role of Channel intermediaries and their functions;

Course Outcomes focused on employability/entrepreneurship/skill development:

COs	After successful completion of this course, students would be able to:	Mapping
CO1	Learn fundamental concepts of marketing management for customer satisfaction.	Employability
CO2	Classify the distribution system and functions of channel members.	Entrepreneurship
CO3	Apply the promotion tools to generate and increase demand.	Skill Development
CO4	Analyze the concept of service marketing and its mix.	Skill Development
CO5	Evaluate various elements of marketing mix as well as their influence on functioning of an organization.	Employability
CO6	Select various evolving marketing concepts for the better solutions.	Entrepreneurship

Suggested Text and Reference Books:

1. Kotler Philip - Marketing Management, Analysis, Planning, Implementations and Control (Pearson Education Ltd, India)

1. *Principles of Marketing* (14th Edition)
2. Station William J- *Fundamentals of Marketing* (MC Graw Hill)
 3. Kotler, Philip and ArmstrongGraw - *Principles of Marketing* (Pearson Education, 11th Edition)
 4. Kotler, Philip, Keller, Kevin Lane, Koshy Abraham and JhaMithileshwar - *Marketing Management: A South Asian Perspective* (Pearson Education 12th Edition)
 5. McCarthy and Perreault - *Basic Marketing: A Global Marketing Approach* (Tata McGraw Hill, 15th)
 6. Kurtz and Boone - *Principles of Marketing* (Thomson India Edition, 2007)