2.6.1. Teachers and students are aware of the stated Programme and course outcomes of the Programmes offered by the institution.

Head of the department and teachers discussed POs and framed PEOs & PSOs of their program considering the Vision and Mission of the department.

Every course has its own learning outcomes defined by the university in the curriculum and adopted by the institute. Course Outcomes which are not defined in the syllabus of the university are prepared by the respective subject teacher along with domain experts as per of objectives mentioned in the university syllabus.

The Program outcomes and Course outcomes of the department are disseminated to internal and external stakeholders through the following ways:

- **HOD cabins**
- **Notice Boards**
- **Department Library**
- **Department Laboratories**
- **Course File**

The course planner of each subject is prepared according to the program outcomes & course outcomes. The learning outcomes of each subject are also informed to the students by the teachers at the beginning of every academic year during the introductory lecture of respective course and also during lecture delivery.

All newly admitted first year students and their parents are briefed about the institute's vision, mission and program objectives in the Induction Programme.

Principal
Shree Chanakya Education Society's
Indira College of Engineering & Management
Parandwadi, Pune.

INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT

Approved By AICTE New Delhi, DTE (MS) and Affiliated to Pune University

ACADEMIC YEAR 2021-22

COURSE OUTCOMES

COURSE PATTERN 2019 (FY & SY)

YEAR	COURSE CODE	COURSE NAME	COURSE OUTCOME NO.	COURSE OUTCOMES
MBA Sem I(2019 Pattern)	101	Accounting for Business Decisions	CO1	To understand the basic concepts of financial accounting, cost accounting and management accounting.
			CO2	To know various tools from accounting and cost accounting this would facilitate the decision making.
			CO3	To develop analytical abilities to face the business situations
	102	Economic Analysis for Business Decisions (SEM I	CO1	To equip the students of management with time tested tools and techniques of managerial economics to enable them to appreciate its relevance in decision making.
			CO2	To explore the economics of information and network industries and to equip students with an understanding of how economics affect the business strategy of companies in these industries.
			CO3	To develop economic way of thinking in dealing with practical business problems and challenges.
	103	Legal Aspects of Business (SEM I	CO1	To acquaint students with general business law issues to help become more informed, sensitive and effective business leaders.
			CO2	To provide the students with an understanding of fundamental legal issues pertaining to the business world to enhance their ability to manage businesses effectively.
	105	Organizational Behaviour (SEM I	CO1	To gain a solid understanding of human behavior in the workplace from an individual, group, and organizational perspective.
			CO2	To obtain frameworks and tools to effectively analyze and approach various Organizational situations.
			CO3	To reflect upon your own beliefs, assumptions, and behaviors with respect to how individuals, groups, and organizations act in order to expand your options of approaches and increase your own effectiveness.
	106	Basics of Marketing (SEM I	CO1	To introduce marketing as a business function and a philosophy
			CO2	To emphasize importance of understanding external environment in marketing decision making
			CO3	To expose students to a systematic frame work of marketing &implementations and to highlight need for different marketing approaches for services, goods, and for household consumers, organizational buyers.
	107	Management Fundamentals SEM I	CO1	To explain the various concepts of management
			CO2	To make the students understand the contemporary management practices
			CO3	To highlight professional challenges that managers face in various organization
			CO4	To enable the students to appreciate the emerging ideas and practices in the field of management.

	108	Business Communication Lab (SEM I	CO1	To acquaint the students with fundamentals of communication and help them to transform their communication abilities.
			CO2	To help the students to acquire some of the necessary skills to handle day-to-day managerial responsibilities, such as - making speeches, controlling one-to-one communication, enriching group activities and processes, giving effective presentations, writing letters, memos, minutes, reports and advertising, and maintaining one's poise in private and in public.
			CO3	To build the students' confidence and to enhance competitiveness by projecting a positive image of themselves and of their future.
	110	Selling and Negotiating SkillsLab (SEM I	CO1	To imbibe in the students, critical sales competencies that drives buying decisions.
			CO2	To give insights into how to boost individual and organizational productivity through effective sales lead management.
			CO3	To introduce basic theoretical principles and practical steps in the negotiating process.
	115	Enterprise Analysis - Desk Research (SEMI	CO1	To acquaint students with basic aspects of an Enterprise.
			CO2	To guide the students in analyzing an Enterprise w.r.t a set of basic parameters.
			CO3	To help the students assimilate basic jargon and its meaning w.r.t. Enterprise Analysis.
MBA Sem III(2019 Pattern)	201	Marketing Management SEM II)	CO1	To introduce the concept of Marketing Mix as a framework for Marketing Decision making.
			CO2	To emphasise the need, importance and process of Marketing Planning and Control.
			CO3	To sensitize the students to the dynamic nature of Marketing Function.
	202	Financial Management SEM II)	CO1	To understand various concepts related to financial management.
			CO2	To study in detail, various tools and techniques in the area of finance.
			CO3	To develop the analytical skills this would facilitate the decision making in Business situations.
	203	Human Resource Management SEM II)	CO1	To understand the role of HRM in an organization
			CO2	To learn to gain competitive advantage through people
			CO3	To learn to study and design HRM system
	204	Decision Science SEM II	CO1	To understand role of quantitative techniques in managerial decision making.
			CO2	To understand process of decision problem formulation.
			CO3	To understand applications of various quantitative techniques in managerial settings.
	205	Operations and Supply Chain Management SEM II	CO1	To develop an understanding of the strategic importance of Operations & SCM and how it can provide a competitive advantage in the marketplace
			CO2	To understand the relationship between Operations & SCM and other business functions, such as Marketing, Finance, Accounting, and Human Resources.
			CO3	To develop knowledge of the issues related to designing and managing Operations & SCM and the techniques to do so.
	206	Management Information Systems II SEM)	CO1	To develop conceptual understanding about latest developments in the field of Information Technology and the impact of I.T. in managing a business
			CO2	To learn to use Information Technology to gain competitive advantage in business
			CO3	To learn from, with a view to emulate, entrepreneurial ventures in e-Commerce and m-Commerce
	207	Emotional Intelligence and Managerial Effectiveness Lab SEM II	CO1	To equip students with individual and group learning methods
			CO2	To understand intelligence and develop emotional competence
			CO3	To develop understanding and competence for personal and managerial effectiveness.
	210	Life Skills SEM II	CO1	To encourage students to develop and use balanced self-determined Behavior.
			CO2	To help students in enhancing self, increasing life satisfaction and improving relationships with others.

			CO3	To develop new ability to practice new problem solving skills in group and use these skills in personal life.
	213	Computer Aided Personal Productivity Tools Lab SEM II	CO1	To give students mastery of MS Office.
			CO2	To enhance personal productivity through advanced features of MS Word, MS Excel & MS PowerPoint
			CO3	To impart skills of using MS Outlook and basic social networking tools.
	215	Industry Analysis - Desk Research SEM II	CO1	To help the students understand the dynamics of a specific industry.
			CO2	To acquaint students with various issues particular to an industry.
			CO3	To provide a cross-functional perspective of the functioning of a business enterprise and an industry.
	301	Strategic Management (SEM III	CO1	To expose participants to various perspectives and concepts in the field of Strategic Management
			CO2	To help participants develop skills for applying these concepts to the solution of business problems
			CO3	To help students master the analytical tools of strategic management.
	302	Mobile Application Development	CO1	To acquaint the students with a perspective of different facets of management of an enterprise
			CO2	To provide inputs with reference to the Investment Decisions along with the techniques for those decisions
			CO3	To inculcate the evaluation parameters of enterprise in terms of expenses, control systems and pricing
			CO4	To develop the knowledge of the concept of auditing and its applicability as performance management tool
	303	Startup and New Venture Management (SEM III	CO1	To instill a spirit of entrepreneurship among the student participants.
			CO2	To provide an overview of the competences needed to become an entrepreneur
			CO3	To give insights into the Management of Small Family Business
	304	Summer Internship Project (SEM III	CO1	To offer the opportunity for the young students to acquire on job the skills, knowledge, attitudes, and perceptions along with the experience needed to constitute a professional identity.
			CO2	To provide means to immerse students in actual supervised professional experiences.
			CO3	To give an insight into the working of the real organizations.
			CO4	To gain deeper understanding in specific functional areas.
			CO5	To appreciate the linkages among different functions and departments.
			CO6	To develop perspective about business organizations in their totality.
			CO7	To help the students in exploring career opportunities in their areas of interest.
	305MKT	Contemporary Marketing Research (SEM III	CO1	To give the students an understanding of marketing research from both user's (management) and doer's (the researchers) perspective.
			CO2	To design and produce, evaluate a research proposal & understand the quality of research studies.
			CO3	To learn the basic skills to conduct professional marketing research.
			CO4	To understand the applications of business research tools in Marketing decision making.
	306MKT	Consumer Behaviour (SEM III	CO1	To highlight the importance of understanding consumer behavior in Marketing.
			CO2	To study the environmental and individual influences on consumers
			CO3	To understand consumer behavior in Indian context.
			CO1	To provide an overview of the range of tools available for Marketing Communications

MBA Sem III(2019 Pattern)	307 MKT	Integrated Marketing Communications (SEM III	CO2	To provide an understanding of the basic principles of planning and execution in Marketing Communications
			CO3	To acquaint the students with concepts and techniques in the application for developing and designing an effective advertising and sales promotion program.
			CO4	To sensitize students to the various facets of advertising, public relation and promotion management.
			CO5	To develop a managerial perspective and an informed decision-marking ability for effective and efficient tackling of promotional situations.
	308MKT	Product Management project	CO1	To make the students appreciate the various facets of the job of a product manager.
			CO1	To highlight the strategic role of product management in organizational and functional context.
			CO2	To emphasize the financial and other metrics of effective product management.
	313MKT	Marketing and the Law	CO1	To understand the pervasive impact of the Law and our legal system on marketing activities.
			CO2	To highlight how decisions of marketing executives raise issues which should be carefully evaluated as to their legal consequences before they are implemented?
			CO3	The underline that a failure to appreciate these legal implications can lead to seriously damaging, if not disastrous, results for a firm
			CO4	To address National Laws and court decisions that relate to the four main areas of marketing study, the so-called "four P's" of marketing: product, price, place and promotion.
	317 MKT	Agricultural Marketing	CO1	The Agricultural sector, offers immense opportunities for the employment. This sector requires managerial talent for both input and produce side. The course will prepare the students to be employable in agricultural marketing
			CO2	Understand the functions performed by agricultural marketing system
			CO3	Develop strategies to manage the marketing of agriculture organizations.
	305FIN	Direct Taxation SEM III	CO1	To understand the basic concepts in Income Tax Act, 1961.
			CO2	To Calculate Gross Total Income and Tax Liability of an Individual.
			CO3	To acquaint with online filling of various forms and Returns.
	306FIN	Financial Systems of India, Markets & Services(SEM III	CO1	To enlighten the students with the Concepts & Practical dynamics of the Indian Financial System, Markets, Institution and Financial Services.
	307FIN	Strategic Cost Management	CO1	To acquaint students with various techniques used for Strategic Cost Management
			CO2	To develop an understanding of the adoption of various techniques of Strategic Cost
			CO3	Management for obtaining sustainable competitive advantage
	313 FIN	Banking Operations – I	CO1	To understand the basics of Banking and the emergence of Banking in India.
			CO2	To get acquainted with the functionality of the Banks.
			CO3	To know the meaning and use of commonly used technologies in Banking.
	315 FIN	Futures and Options III	CO1	To develop an understanding of financial derivatives and the institutional structure of the markets
				on which they are traded.
			CO2	To have an understanding of the analytical tools necessary to price such instruments.
			CO3	To highlight the role of financial derivatives in the modern capital markets, in particular for risk management.
	316FIN	Financial Instruments & Derivatives III	CO1	To provide students with an introduction to the theory and practice of financial instruments.
			CO2	To develop an understanding and importance of financial derivatives and institutional structure of the market
	305OPE	Planning & Control of Operations III	CO1	To give an overview of Planning & Control of Operations
			CO2	To explain the role of forecasting in the operations planning process.
			CO3	To explain the need for aggregate planning and the steps in aggregate planning.

		CO4	To explain how is capacity planning done in organizations and what is its relationship with MRP.
		CO5	To highlight the importance of scheduling in operations management.
306 OPE	Inventory Management III	CO1	To give an overview of various aspects of inventory.
		CO2	To explain the impact of types of inventory costs on inventory management decisions.
		CO3	To explain the principles of JIT
307 OPE	Productivity Management III	CO1	To understand and appreciate significance of productivity management
		CO2	To study various productivity management methods
		CO3	To learn applicability of popular productivity management tools
310 OPE	Manufacturing Resource Planning III	CO1	To understand role and importance of Manufacturing Resource Planning (MRP II)
		CO2	To know the inputs, processing and outputs of MRP II
313 OPE	Designing Operations Systems III	CO1	To give an overview of the various process options in Manufacturing and Services.
		CO2	To give insights into factors that influence process choice.
		CO3	To impart fundamental concepts in Job Design and Work Measurement.
315 OPE	Project Management III	CO1	To provide the students with a holistic, integrative view of Project Management.
		CO2	To highlight the role of projects in modern day business organizations.
		CO3	To sensitize the students to complexities of project management.
305 HR	Labour & Social Security Laws III	CO1	To make the students understand rationale behind labour laws
		CO2	To equip students with important provisions of various labour laws
		CO3	To give students insight into the implementation of labour laws.
306HR	Human Resource Accounting & Compensation Management III	CO1	To orient the students with the concepts related to human resource accounting & compensation management.
		CO2	To facilitate learning related to human resource accounting & compensation management for employees.
307 HR	Employee Health, Safety III	CO1	To learn the basic concepts of safety management
		CO2	To study the various provisions of employee health and safety.
313HR	Quality Management System III	CO1	To create an awareness of fundamental principles, significance and implementation of quality management
		CO2	To use new concepts of TQM in the process of continuous improvement and learning
315 HR	Lab in Job Design & Analysis III	CO1	To give hands of experience to the students of designing jobs at various levels
317HR	Lab in Labor Laws – I	CO1	To give students insight into the implementation of labour laws
		CO2	To acquaint students with calculation of due/ compensations/ contributions etc.
401	401 Managing for Sustainability SEM IV)	CO1	Apply general ethical principles to particular cases or practices in business.
		CO2	Think independently and rationally about contemporary moral problems.
		CO3	Recognize the complexity of problems in practical ethics.
		CO4	Demonstrate how general concepts of governance apply in a given situation or given circumstances.
402	Dissertation SEM IV	CO1	To offer the opportunity for the young students to acquire on job the skills, knowledge, attitudes, and perceptions along with the experience needed to constitute a professional identity.
		CO2	To provide means to immerse students in actual supervised professional experiences
		CO3	To gain deeper understanding in specific areas.
403 MKT	Services Marketing	CO1	To emphasize the significance of services marketing in the global economy.
		CO2	To make the students understand the deeper aspects of successful services marketing.
		CO3	To provide insights to the challenges and opportunities in services marketing.
		CO1	To provide foundations in components of sales and distribution management.

MBA Sem IV(2019 Pattern)	404 MKT	Sales & Distribution Management	CO2	To introduce various facets of the job of a sales manager.
			CO3	To focus on decision making aspects and implementation of decisions in sales and distribution management.
	405 MKT	Retail Marketing	CO1	To provide insights into all functional areas of retailing.
			CO2	To give an account of essential principles of retailing.
			CO3	To give a perspective of the Indian retailing scenario.
	408 MKT	International Marketing	CO1	To make the students understand the concept and techniques of international marketing.
			CO2	To train the students to develop plans and marketing strategies for entering into international markets and managing overseas operations.
	410 MKT	Marketing Strategy	CO1	To introduce a systematic understanding of marketing strategy and decision making in dynamic marketing environment.
			CO2	To understand and apply the STP of marketing (segmentation, targeting, positioning).
			CO3	To understand and appreciate the concept of marketing strategy formulation and implementation.
	412MKT	Marketing of High Technology Products	CO1	To provide students with the concepts and tools necessary to effectively market a high technology product.
			CO2	To help the students learn the marketing mix aspect of marketing high technology products.
	415 MKT	Marketing of Financial Services	CO1	To equip young managers with the knowledge of retail banking, corporate banking and investment banking practices in India.
			CO2	To familiarize the students to the requisite regulatory compliances in Wealth Management industry.
			CO3	To make the student understand the Risk-Return principle and its practical use in marketing of financial services.
	403 FIN	Indirect Taxation	CO1	To understand the basic concepts in various Indirect Tax Acts.
			CO2	To understand procedural part of Indirect Taxes
			CO3	To acquaint with online filling of various Forms & Returns.
	404FIN	International Finance	CO1	To make students familiar with the operations in foreign exchange markets.
			CO2	To sensitize students with complexities of managing finance of multinational firm.
			CO3	To highlight the importance of the regulatory framework within which international financial transactions can take place, with special reference to India.
	407 FIN	Financial Risk Management	CO1	To understand what is risk and the basic concepts of modeling its application for measuring and managing financial risks
			CO2	To measure volatility in market prices, highlight Risk Management issues in investments.
	409 FIN	Banking Operations – II	CO1	To get acquainted with the changed role of Banking post 1991 Reforms.
			CO2	To know the lending and borrowing rates along with the various mandatory reserves.
			CO3	To know the procedural compliances by bank's functionality.
	410 FIN	Wealth and Portfolio Management	CO1	To understand the concept of Wealth Management.
			CO2	To understand the concept of Portfolio Management.
			CO3	To understand various tools and methods of evaluating the portfolio.
	411 FIN	Fixed Income Securities & Technical Analysis	CO1	To analyze the fixed income securities markets and its implications for investments.
			CO2	To explain the market characteristics, instruments, selling techniques, pricing and valuation issues with money market instruments.
			CO3	To explain the specific features of the Indian Fixed Income Securities Markets.
	403 OBE	Operations Strategy and Research IV	CO1	To emphasize the key role of operations in bringing about the growth and profitability of organizations.

[illegible]	[illegible]	CO2	To impart ideas, concepts and principles in operations strategy.
		CO3	To understand use of quantitative tools in solving typical Operations Domain Problems
404 OPE	Total Quality Management IV	CO1	To give various perspectives on Quality and various contributors to Quality.
		CO2	To provide an in-depth understanding of the various QC tools.
		CO3	To introduce the frameworks of Global Quality Awards.
405 OPE	Quality Management Standards IV	CO1	To introduce various management system standards.
		CO2	To explain the implementation and role of MR for IMS.
		CO3	To help the students understand the implementation of IMS through cases in services and manufacturing.
406 OPE	World Class Manufacturing IV	CO1	To bring out the relevance and basics of World Class Manufacturing.
		CO2	To highlight the current state of Indian Manufacturing
		CO3	To provide a road map for World Class Manufacturing
408 OPE	Enterprise Resource Planning IV	CO1	To understand how a business works and how information systems fit into business operations.
		CO2	To understand the cross functional integration aspects of a business.
		CO3	To understand better managerial decision making through real time data integration and sharing.
		CO4	To understand the host of underlying technological tools of ERP.
413 OPE	Lean Manufacturing IV	CO1	To provide the concepts of Lean Manufacturing.
		CO2	To give a hands on – How To – series of steps in Lean Manufacturing Implementation.
		CO3	To highlight the role of company culture in transformation to Lean.
403 HR	Employment Relations IV	CO1	Give students insight into the IR scenario in India
		CO2	Make students understand important laws governing IR
		CO3	Create understanding about role of Govt., society and trade union in IR
404 HR	Strategic Human Resource Management IV	CO1	To make students understand HR implications of organizational strategies
		CO2	Understand the various terms used to define strategy & its process
		CO3	Understand HR strategies in Indian & global perspective
405 HR	Organizational Design & Development IV	CO1	To develop an understanding of the nature, functioning and design of organization
		CO2	Be able to understand the theory and practice relating to the processes of organization development and change
		CO3	Develop insight and competence in diagnostic and intervention processes and skills for initiating and facilitating organizational processes and change in organizations
407 HR	Employee Reward Management IV	CO1	To appraise students with reward management system practiced in organizations
		CO2	To make students understand the process of setting reward management system
		CO3	To give students exposure to the reward management practices followed various organizations
410 HR	LAB in CSR IV	CO1	To help students understand & design CSR initiatives
414 HR	Emerging Trends in HR IV	CO1	To expose students to organizations to know emerging trends in HR.

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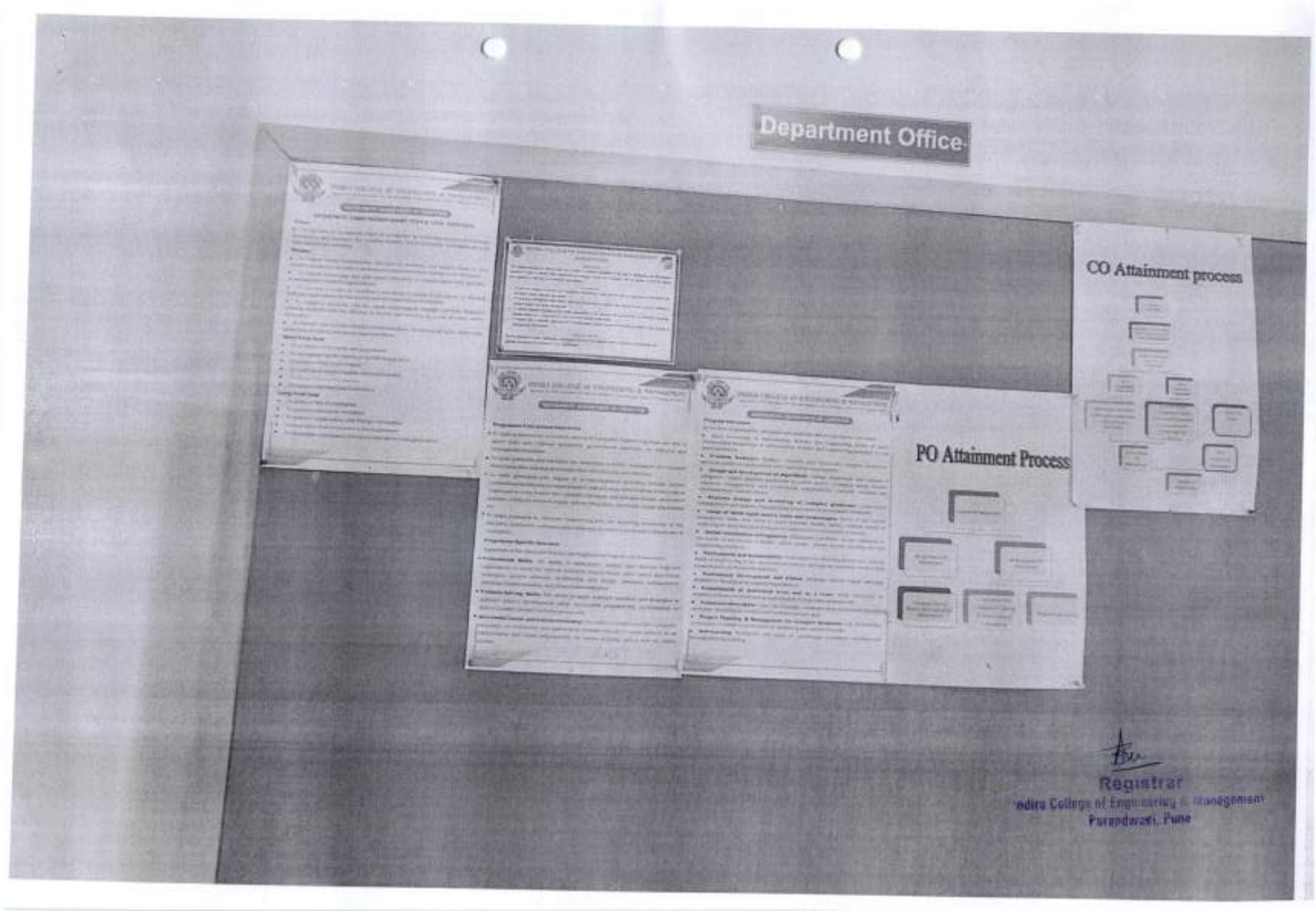

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INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT

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ACADEMIC YEAR 2021-22

COURSE OUTCOMES

Course Pattern :

SE(MECHANICAL)(2019)				
YEAR	**COURSE CODE**	**COURSE NAME**	**COURSE OUTCOME NO.**	**COURSE OUTCOMES**
SE (SEM-	202041	Solid Mechanics	202041.1	DEFINE various types of stresses and strain developed on determinate and indeterminate
			202041.2	DRAW Shear force and bending moment diagram for various types of transverse loading and
			202041.3	COMPUTE the slope & deflection, bending stresses and shear stresses on a beam
			202041.4	CALCULATE torsional shear stress in shaft and buckling on the column
			202041.5	APPLY the concept of principal stresses and theories of failure to determine stresses on a 2-D
			202041.6	UTILIZE the concepts of SFD & BMD, torsion and principal stresses to solve combined loading application based problems
	202042	Solid Modeling and Drafting	202042.1	UNDERSTAND basic concepts of CAD system, need and scope in Product Lifecycle Management
			202042.2	UTILIZE knowledge of curves and surfacing features and methods to create complex solid
			202042.3	CONSTRUCT solid models, assemblies using various modeling techniques & PERFORM
			202042.4	APPLY geometric transformations to simple 2D geometries
			202042.5	USE CAD model data for various CAD based engineering applications viz. production
			202042.6	USE PMI & MBD approach for communication
	202043	Engineering Thermodynamics	202043.1	DESCRIBE the basics of thermodynamics with heat and work interactions.
			202043.2	APPLY laws of thermodynamics to steady flow and non-flow processes.
			202043.3	APPLY entropy, available and non available energy for an Open and Closed System,
			202043.4	DETERMINE the properties of steam and their effect on performance of vapour
			202043.5	ANALYSE the fuel combustion process and products of combustion.
			202043.6	SELECT various instrumentations required for safe and efficient operation of

III, TERM-I)

202044	Engineering Materials and Metallurgy	202044.1	COMPARE crystal structures and ASSESS different lattice parameters.
		202044.2	CORRELATE crystal structures and imperfections in crystals with mechanical
		202044.3	DIFFERENTIATE and DETERMINE mechanical properties using destructive and non-destructive testing of materials
		202044.4	IDENTIFY & ESTIMATE different parameters of the system viz., phases, variables, component, grains, grain boundary, and degree of freedom. etc.
		202044.5	ANALYSE effect of alloying element & heat treatment on properties of ferrous &
		202044.6	SELECT appropriate materials for various applications.
203156	ectrical and Electronics Engineerin	203156.1	APPLY programming concepts to UNDERSTAND role of Microprocessor and
		203156.2	DEVELOP interfacing of different types of sensors and other hardware devices with Atmega328 based Arduino Board
		203156.3	UNDERSTAND the operation of DC motor, its speed control methods and braking
		203156.4	DISTINGUISH between types of three phase induction motor and its characteristic
		203156.5	EXPLAIN about emerging technology of Electric Vehicle (EV) and its modular
		203156.6	CHOOSE energy storage devices and electrical drives for EVs
202045	Geometric Dimensioning and Tolerancing Lab	202045.1	SELECT appropriate IS and ASME standards for drawing
		202045.2	READ & ANALYSE variety of industrial drawings
		202045.3	APPLY geometric and dimensional tolerance, surface finish symbols in drawing
		202045.4	EVALUATE dimensional tolerance based on type of fit, etc.
		202045.5	SELECT an appropriate manufacturing process using DFM, DFA, etc.
202046	Audit Course - III Developing soft skills and personality	202046.1	To know about various aspects of soft skills and learn ways to develop personality
		202046.2	Understand the importance and type of communication in personal and
		202046.3	To provide insight in to much needed technical and non-technical qualities in
		202046.4	Learn about Leadership, team building,decision makin gand stress management
207002	Engineering Mathematics - III	207002.1	SOLVE higher order linear differential equations and its applications to model and
		207002.2	APPLY Integral transform techniques such as Laplace transform and Fourier
		207002.3	APPLY Statistical methods like correlation, regression in analyzing and interpreting
		207002.4	PERFORM Vector differentiation & integration, analyze the vector fields and APPLY
		207002.5	SOLVE Partial differential equations such as wave equation, one and two
202047	Kinematics of Machinery	202047.1	APPLY kinematic analysis to simple mechanisms
		202047.2	ANALYZE velocity and acceleration in mechanisms by vector and graphical method
		202047.3	SYNTHESIZE a four bar mechanism with analytical and graphical methods
		202047.4	APPLY fundamentals of gear theory as a prerequisite for gear design
		202047.5	CONSTRUCT cam profile for given follower motion
		202048.1	DETERMINE COP of refrigeration system and ANALYZE psychrometric processes.
		202048.2	DISCUSS basics of engine terminology,air standard, fuel air and actual cycles.
		202048.3	IDENTIFY factors affecting the combustion performance of SI and CI engines.

SE (SEM-IV,TERM-II)	202048	Applied Thermodynamics	202048.4	DETERMINE performance parameters of IC Engines and emission control.
			202048.5	EXPLAIN working of various IC Engine systems and use of alternative fuels
			202048.6	CALCULATE performance of single and multi stage reciprocating compressors and DISCUSS rotary positive displacement compressors
	202049	Fluid Mechanics	202049.1	DETERMINE various properties of fluid
			202049.2	APPLY the laws of fluid statics and concepts of buoyancy
			202049.3	IDENTIFY types of fluid flow and terms associated in fluid kinematics
			202049.4	APPLY principles of fluid dynamics to laminar flow
			202049.5	ESTIMATE friction and minor losses in internal flows and DETERMINE boundary layer formation over an external surface
			202049.6	CONSTRUCT mathematical correlation considering dimensionless parameters, also ABLE to predict the performance of prototype using model laws
	202050	Manufacturing Processes	202050.1	SELECT appropriate moulding, core making and melting practice and estimate pouring time, solidification rate and DESIGN riser size and location for sand casting
			202050.2	UNDERSTAND mechanism of metal forming techniques and CALCULATE load
			202050.3	DEMONSTRATE press working operations and APPLY the basic principles to DESIGN dies and tools for forming and shearing operations
			202050.4	CLASSIFY and EXPLAIN different welding processes and EVALUATE welding
			202050.5	DIFFERENTIATE thermoplastics and thermosetting and EXPLAIN polymer
			202050.6	UNDERSTAND the principle of manufacturing of fibre-reinforce composites and
	202051	Machine Shop	202051.1	PERFORM welding using TIG/ MIG/ Resistance/Gas welding technique
			202051.2	MAKE Fibre-reinforced Composites by hand lay-up process or spray lay-up
			202051.3	PERFORM cylindrical/surface grinding operation and CALCULATE its machining
			202051.4	DETERMINE number of indexing movements required and acquire skills to PRODUCE a spur gear on a horizontal milling machine
			202051.5	PREPARE industry visit report
			202051.6	UNDERSTAND procedure of plastic processing
	202052	Project Based Learning - II	202052.1	IDENTIFY the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives.
			202052.2	ANALYZE the results and arrive at valid conclusions
			202052.3	PROPOSE a suitable solution based on the fundamentals of mechanical engineering by possibly integration of previously acquired knowledge.
			202052.4	CONTRIBUTE to society through proposed solutions by strictly following
			202052.5	USE of technology in proposed work and demonstrate learning in oral and written
			202052.6	DEVELOP ability to work as an individual and as a team member.

	202053	Audit Course - IV Human Behaviour	202053.1	Understand concept of human act and interact
			202053.2	Understand types of human beheviour
TE(MECHANICAL)(2019)				
YEAR	**COURSE CODE**	**COURSE NAME**		**COURSE OUTCOMES**
TE (SEM-V,TERM-I)	**302041**	Numerical and Statistical Methods	302041.1	SOLVE system of equations using direct and iterative numerical methods
			302041.2	ESTIMATE solutions for differential equations using numerical techniques
			302041.3	DEVELOP solution for engineering applications with numerical integration.
			302041.4	DESIGN and CREATE a model using a curve fitting and regression analysis.
			302041.5	APPLY statistical Technique for quantitative data analysis
			302041.6	DEMONSTRATE the data, using the concepts of probability and linear algebra
	302042	Heat and Mass Transfer	302042.1	ANALYZE & APPLY the modes of heat transfer equations for one dimensional
			302042.2	DESIGN a thermal system considering fins, thermal insulation and & Transient
			302042.3	EVALUATE the heat transfer rate in natural and forced convection & validate with
			302042.4	INTERPRET heat transfer by radiation between objects with simple geometries, for
			302042.5	ABILITY to analyze the rate of mass transfer using Fick's Law of Diffusion and understands mass diffusion in different coordinate systems.
			302042.6	DESIGN & ANALYSIS of heat transfer equipments and investigation of its
	302043	Design of Machine Elements	302043.1	DESIGN AND ANALYZE the cotter and knuckle Joints, levers and components
			302043.2	DESIGN shafts, keys and couplings under static loading conditions.
			302043.3	ANALYZE different stresses in power screws and APPLY those in the procedure to
			302043.4	EVALUATE dimensions of machine components under fluctuating loads.
			302043.5	EVALUATE & INTERPRET the stress developed on the different type of welded and
			302043.6	APPLY the design and development procedure for different types of springs.
	302044	Mechatronics	302044.1	DEFINE key elements of mechatronics, principle of sensor and its characteristics.
			302044.2	UTILIZE concept of signal processing and MAKE use of interfacing systems such as
			302044.3	DETERMINE the transfer function by using block diagram reduction technique.
			302044.4	EVALUATE Poles and Zero, frequency domain parameter for mathematical
			302044.5	APPLY the concept of different controller modes to an industrial application.
			302044.6	DEVELOP the ladder programming for industrial application
	302045	Advanced Forming & Joining Processes	302045.1	ANALYSE the effect of friction in metal forming deep drawing and IDENTIFICATION of surface defects and their remedies in deep drawing operations
			302045.2	ASSESS the parameters for special forming operation and SELECT appropriate special forming operation for particular applications
			302045.3	ANALYSE the effect of HAZ on microstructure and mechanical properties of
			302045.4	CLASSIFY various solid state welding process and SELECT suitable welding
			302045.5	CLASSIFY various advanced welding process and SELECT suitable welding

			302045.6	INTERPRET the principles of sustainable manufacturing and its role in
	302046	Digital Manufacturing Laboratory	302046.1	DEVELOP a component using conventional machines, CNC machines and Additive
			302046.2	ANALYZE cutting tool parameters for machining given job.
			302046.3	DEMONSTRATE simulation of manufacturing process using Digital Manufacturing
			302046.4	SELECT and DESIGN jigs and Fixtures for a given component.
			302046.5	DEMONESTRATE different parameters for CNC retrofitting and reconditioning.
	302047	Skill Development	302047.1	APPLY& DEMONSTRATE procedure of assembly & disassembly of various
			302047.2	DESIGN & DEVELOP a working/model of machine parts or any new product.
			302047.3	EVALUATE fault with diagnosis on the machines, machine tools and home
			302047.4	IDENTIFY & DEMONSTRATE the various activities performed in an industry such as maintenance, design of components, material selection.
	302048	Audit Course V Entrepreneurship and IP strategy		
	302049	Artificial Intelligence & Machine Learning	302049.1	DEMONSTRATE fundamentals of artificial intelligence and machine learning
			302049.2	APPLY feature extraction and selection techniques
			302049.3	APPLY machine learning algorithms for classification and regression problems.
			302049.4	DEVISE AND DEVELOP a machine learning model using various steps.
			302049.5	EXPLAIN concepts of reinforced and deep learning.
			302049.6	SIMULATE machine learning model in mechanical engineering problems.
	302050	Computer Aided Engineering	302050.1	DEFINE the use of CAE tools and DESCRIBE the significance of shape functions in
			302051.2	APPLY the various meshing techniques for better evaluation of approximate
			302052.3	APPLY material properties and boundary condition to SOLVE 1-D and 2-D element stiffness matrices to obtain nodal or elemental solution
			302053.4	ANALYZE and APPLY various numerical methods for different types of analysis.
			302054.5	EVALUATE and SOLVE non-linear and dynamic analysis problems by analyzing the results obtained from analytical and computational method.
			302055.6	GENERATE the results in the form of contour plot by the USE of CAE tools.
	302051	Design of Transmission Systems	302051.1	APPLY the principle of Spur & Helical gear design for industrial application and PREPARE a manufacturing drawing with the concepts of GD&T.
			302051.2	EXPLAIN and DESIGN Bevel & Worm gear considering design parameters as per
			302051.3	SELECT&DESIGN Rolling and Sliding Contact Bearings from manufacturer's catalogue for a typical application considering suitable design parameters.
			302051.4	DEFINE and DESIGN various types of Clutches, Brakes, used in automobile
			302051.5	APPLY various concept to DESIGN Machine Tool Gear box, for different

TE (SEM-VI,TERM-II)			302051.6	ELABORATE various modes of operation, degree of hybridization and allied terms associated with hybrid electric vehicles.
	302052	Composite Materials	302052.1	DEFINE & COMPARE composites with traditional materials
			302052.2	IDENTIFY & ESTIMATE different parameters of the Polymer Matrix Composite
			302052.3	CATEGORISE and APPLY Metal Matrix Process from possessions landscape.
			302052.4	DETERMINE volume/weight fraction and strength of Composites.
			302052.5	SELECT appropriate testing and inspection method for composite materials.
			302052.6	SELECT composites materials for various applications
	302053	Measurement Laboratory	302053.1	EVALUATE causes of errors in Vernier calipers, micrometers by performing experiments in standard metrological conditions, noting deviations at actual and by plotting cause and effect diagram, to reduce uncertainty in measurement.
			302053.2	ANALYZE strain measurement parameters by taking modulus of elasticity in consideration to acknowledge its usage in failure detection and force variations.
			302053.3	EXAMINE surface Textures, surface finish using equipment's like Talysurf and analyze surface finish requirements of metrological equipment's like gauges, jaws of vernier calipers, micrometers, magnifying glasses of height gauge and more, to
			302053.4	MEASURE the dimensional accuracy using Comparator and limit gauges and appraise their usage in actual measurement or comparison with standards set to
			302053.5	PERFORM Testing of Flow rate, speed and temperature measurements and their effect on performance in machines and mechanisms like hydraulic or pneumatic trainers, lathe machine etc. to increase repeatability and reproducibility.
			302053.6	COMPILE the information of opportunities of entrepreneurships/business in various sectors of metrology like calibrations, testing, coordinate and laser
	302054	Fluid Power & Control Laboratory	302054.1	DEFINE working principle of components used in hydraulic and pneumatic systems
			302054.2	IDENTIFY & EXPLAIN various applications of hydraulic and pneumatic systems.
			302054.3	SELECT an appropriate component required for hydraulic and pneumatic systems using manufactures' catalogues.
			302054.4	SIMULATE & ANALYSE various hydraulic and pneumatic systems for
			302054.5	DESIGN a hydraulic and pneumatic system for the industrial applications
			302054.6	DESIGN & DEMONESTRATE various IoT, PLC based controlling system using
	302055	Internship/Mini project	302055.1	DEMONSTRATE professional competence through industry internship.
			302055.2	APPLY knowledge gained through internships to complete academic activities in a
			302055.3	CHOOSE appropriate technology and tools to solve given problem.
			302055.4	DEMONSTRATE abilities of a responsible professional and use ethical practices in
			302055.5	DEVELOP network and social circle, and DEVELOPING relationships with industry
			302055.6	ANALYZE various career opportunities and DECIDE career goals.
	302056	Audit Course VI		

BE(MECHANICAL)(2015)				
YEAR	COURSE CODE	COURSE NAME		COURSE OUTCOMES
	402041	Hydraulics and Pneumatics	402041.1	Understand working principle of components used in hydraulic & pneumatic systems.
			402041.2	Identify various applications of hydraulic & pneumatic systems.
			402041.3	Selection of appropriate components required for hydraulic and pneumatic systems.
			402041.4	Analyse hydraulic and pneumatic systems for industrial/mobile applications.
			402041.5	Design a system according to the requirements.
			402041.6	Develop and apply knowledge to various applications.
	402042	CAD CAM Automation	402042.1	Apply homogeneous transformation matrix for geometrical transformations of 2D CAD entities for basic geometric transformations
			402042.2	Use analytical and synthetic curves and surfaces in part modeling
			402042.3	Do real times analysis of simple mechanical elements like beams, trusses, etc. and comment on safety of engineering components using analysis software.
			402042.4	Generate CNC program for Turning / Milling and generate tool path using CAM software
			402042.5	Demonstrate understanding of various rapid manufacturing techniques and develop
			402042.6	Understand the robot systems and their applications in manufacturing industries.
	402043	Dynamics of Machinery	402043.1	Apply balancing technique for static and dynamic balancing of multi cylinder inline
			402043.2	Estimate natural frequency for single DOF undamped & damped free vibratory
			402043.3	Determine response to forced vibrations due to harmonic excitation, base excitation and excitation due to unbalance forces.
			402043.4	Estimate natural frequencies, mode shapes for 2 DOF undamped free longitudinal and torsional vibratory systems.
			402043.5	Describe vibration measuring instruments for industrial / real life applications
			402043.6	Explain noise, its measurement & noise reduction techniques for industry and
	402044 A	Elective-I Finite Element Analysis	402044 A.1	Understand the different techniques used to solve mechanical engineering
			402044 A.2	Derive and use 1-D and 2-D element stiffness matrices and load vectors from various methods
			402044 A.3	Apply mechanics of materials and machine design topics to provide preliminary results used
			402044 A.4	Explain the inner workings of a finite element code for linear stress, displacement, temperature and modal analysis.
			402044 A.5	Use commercial finite element analysis software to solve complex problems in solid

BE(SEM-VII,TERM-I)			402044 A.6	Interpret the results of finite element analyses and make an assessment of the results in terms of modeling (physics assumptions) errors, discretization (mesh density and
	402044 B	Elective-I Computational Fluid Dynamics	402044B.1	Analyse and model fluid flow and heat transfer problems.
			402044B.2	Generate high quality grids and interpret the correctness of numerical results with
			402044B.3	Conceptualize the programming skills.
			402044B.4	Use A CFD tool effictively for Practical problems and research.
			402044B.5	Interpretation of Software solution to physics involved in Fluid flow & Heat
	402044 C	Elective-I Heating, Ventilation, Air Conditioning and Refrigeration Engineering	402044 C.1	Determine the performance parameters of trans-critical & ejector refrigeration
			402044 C.2	Estimate thermal performance of compressor, evaporator, condenser and cooling
			402044 C.3	Describe refrigerant piping design, capacity & safety controls and balancing of
			402044 C.4	Explain importance of indoor and outdoor design conditions, IAQ, ventilation and
			402044 C.5	ventilation and air distribution system. • Estimate heat transmission through building walls using CLTD and decrement factor &time lag methods with energy-efficient and cost-effective measures for building
			402044 C.6	Explain working of types of desiccant, evaporative, thermal storage, radiant cooling, clean room and heat pump air-conditioning systems.
	402045 A	Elective - II Automobile Engineering	402045 A.1	To compare and select the proper automotive system for the vehicle.
			402045 A.2	To analyse the performance of the vehicle.
			402045 A.3	To diagnose the faults of automobile vehicles.
			402045 A.4	To apply the knowledge of EVs, HEVs and solar vehicles
	402045 B	Elective - II Operation Research	402045 B.1	Apply LPP and Decision Theory to solve the problems
			402045 B.2	Apply the concept of transportation models to optimize available resources.
			402045 B.3	Decide optimal strategies in conflicting situations.Implement the project
			402045 B.4	.Minimize the process time Optimize multi stage decision making problems
	402045 C	Elective - II Energy Audit and Management	402045 C.1	Compare energy scenario of India and World.
			402045 C.2	Carry out Energy Audit of the Residence / Institute/ Organization
			402045 C.3	Evaluate the project using financial techniques
			402045 C.4	Identify and evaluate energy conservation opportunities in Thermal Utilities.
			402045 C.5	Identify and evaluate energy conservation opportunities in Electrical Utilities.
			402045 C.6	Identify the feasibility of Cogeneration and WHRUse a CFD tool effectively for
	402050	Project - I	402046.1	Find out the gap between existing mechanical systems and develop new creative
			402046.2	Learn about the literature review
			402046.3	Get the experience to handle various tools, tackles and machines.
			402047.1	Describe the power generation scenario, the layout components of thermal power plant and analyze the improved Rankin cycle, Cogeneration cycle

BE (SEM-VIII,TERM-II)	402047	Energy Engineering	402047.2	Analyze the steam condensers, recognize the an environmental impacts of thermal power plant and method to control the same
			402047.3	Recognize the layout, component details of hydroelectric power plant and nuclear
			402047.4	Realize the details of diesel power plant, gas power plant and analyze gas turbine
			402047.5	Emphasize the fundaments of non-conventional power plants
			402047.6	Describe the different power plant electrical instruments and basic principles of
	402048	Mechanical System Design	402048.1	Understand the difference between component level design and system level design
			402048.2	Design various mechanical systems like pressure vessels, machine tool gear boxes, material handling systems, etc. for the specifications stated/formulated
			402048.3	Learn optimum design principles and apply it to mechanical components
			402048.4	Handle system level projects from concept to product.
	402049 A	Elective-III Tribology	402049 A.1	The course will enable the students to know the importance of Tribology in
			402049 A.2	The course will enable the students to know the basic concepts of Friction, Wear, Lubrications and their measurements
			402049 A.3	This course will help students to know the performance of different types of bearings and analytical analysis thereof
			402049 A.4	This course will help students to apply the principles of surface engineering for different applications of tribology.
	402049 B	Elective-III Industrial Engineering	402049 B.1	Apply the Industrial Engineering concept
			402049 B.2	Understand, analyze and implement different concepts involved in method
			402049 B.3	Design and Develop different aspects of work system and facilities
			402049 B.4	Understand and Apply Industrial safety standards, financial management
			402049 B.5	Undertake project work based on modeling & simulation area.
	402049 C	Elective-III Robotics	402049 C.1	Identify different type of robot configuration with relevant terminology.
			402049 C.2	Design robot with desired motion with suitable trajectory planning.
			402049 C.3	Select suitable sensors, actuators and drives for robotic systems.
			402049 C.4	Understand kinematics in robotic systems
			402049 C.5	Select appropriate robot programming for given application
			402049 C.6	Understand need of IoT, machine learning, simulation in robotics.
	402050 A	Elective-IV Advanced Manufacturing Processes	402050A.1	Classify and analyze special forming processes
			402050A.2	Analyze and identify applicability of advanced joining processes
			402050A.3	Understand and analyze the basic mechanisms of hybrid non-conventional
			402050A.4	Select appropriate micro and nano fabrication techniques for engineering
			402050A.5	Understand and apply various additive manufacturing technology for product
			402050A.6	Understand material characterization techniques to analyze effects of chemical composition, composition variation, crystal structure, etc.
			402050 B.1	Design of solar food drier for domestic purpose referring existing system

	402050 B	Elective-IV Solar and Wind Energy	402050 B.2	Design of parabolic dish solar cooker for domestic purpose referring existing
			402050 B.3	Design of solar photovoltaic system for domestic purpose referring existing
			402050 B.4	Design miniature wind mill for domestic purpose referring existing system
	402050 C	Elective-IV Product Design and Development	402050 C.1	Understand essential factors for product design
			402050 C.2	Design product as per customer needs and satisfaction
			402050 C.3	Understand Processes and concepts during product development
			402050 C.4	Understand methods and processes of Forward and Reverse engineering
			402050 C.5	Carry various design processes as DFA, DFMEA, design for safety
			402050 C.6	Understand the product life cycle and product data management
	402051	Project-II	402051.1	Find out the gap between existing mechanical systems and develop new creative
			402051.2	Learn about the literature review
			402051.3	Get the experience to handle various tools, tackles and machines.

ME(MECHANICAL)

YEAR	COURSE CODE	COURSE NAME		COURSE OUTCOMES
FIRST YEAR (SEM-I,TERM-I)	507101	Advanced Mathematics and Numerical Methods	507101.1	apply and solve Linear Algebraic Equations
			507101.2	understand Linear Regression Analysis methods
			507101.3	Expalin methods of Differentiation & Integration
			507101.4	solve Eigen Values & Eigen Vectors of Matrices
			507101.5	solve Ordinary differential equations
			507101.6	apply and solve Ordinary differential equations
	502102	Advanced Thermodynamics and Combustion Technology	502102.1	Explain the Equation of state and properties of pure substance
			502102.2	Apply the laws of thermodynamics to real life problems
			502102.3	Estimate Exergy Analysis of Thermal Systems
			502102.4	Derive and explain Thermodynamic Property Relations
			502102.5	Describe chemical reaction,phase and chemical equilibrium,gas mixtures concepts to analyse the combustion technology.
			502102.6	Explain Thermodynamics of Biological systems
	502103	Advanced Fluid Mechanics	502103.1	Describe the governing equations integral and differencial relations
			502103.2	explain Navier-Stokes Equations,exact solutions and Analysis of numerical
			502103.3	Describe Elementary Plane-Flow Solutions,Role of viscosity in rotational and irrotational flows, Concept of lift and drag.
			502103.4	Explain Boundary layer equations,Effect of pressure gradient
			502103.5	Understand turbulent flow and explain Various Turbulent Models.
			502103.6	Expain one dimenssional compressible flow,normal shock relations and oblick
			502104.1	understand reserach meaning and types,methods and methodology.

	502104	Research Methodology	502104.2	farmulate Research Problem and understand the Concept & need of research
			502104.3	Apply Mathematical Modelling and prediction of performance
			502104.4	Explain basic instrumentation used in research.
			502104.5	understand and apply statitics in research.
			502104.6	write research report and publish research work.
	502105	Project Management	502105A.1	Explain project and understand planning,budgeting,implementing
			502105A.2	Describe Implementation and performance monitoring. Implementation plan for
			502105A.3	Explain Planning Budget, Procurement Procedures, Construction, Measurement &
		Operation Management	502105B.1	Explain Operating systems models, key decisions, Planning and controlling
			502105B.2	Describe Technology and knowledge management, Quality Management
			502105B.3	Understand Operations - Challenges, Opportunities, Excellence, risk management and sustainability through case studies
		Environmental and Pollution control	502105C.1	Identify Pollution and Environmental Ethics
			502105C.2	Understand Nuclear hazards Environmental impact and economic aspects
			502105C.3	Realize Emission standards and regulations for Automobiles.
FIRST YEAR (SEM-II,TERM-II)	502106	Advanced Heat Transfer	502107.1	Understand modes of heat transfer and laws of heat transfer and apply it to real
			502107.2	solve the transient heat conduction problems
			502107.3	solve the problems related to External Forced Convection
			502107.4	Apply the Principle of Fluid flow and Convective heat transfer
			502107.5	solve the problems related to natural convection
			502107.6	Apply the correlations of boiling and condensation to solve real life problems
			502107.7	Solve the problems of thermal radiation.
	502108	Air Conditioning Technology	502108.1	understand HVAC basics termonology
			502108.2	understand and apply Psychrometry
			502108.3	Realize and analysis importance of thermal comfort.
			502108.4	calculate heating and cooling load
			502108.5	design duct system
			502108.6	design air conditioning system
	502109	Measurements and Controls	502109.1	explain Instrument types and performance characteristics
			502109.2	evaluate Measurement Uncertainty
			502109.3	Measure field quantities
			502109.4	measure derived quantities
			502109.5	understand basics of controller
	502110	Turbomachinery	502110A.1	Analyse the Axial flow Compressors, Centrifugal flow compressors
			502110A.2	analyse Axial flow Turbines and Radial flow Turbines
		Gas Turbine	502110B.1	Understand basics of Compressible flow
			502110B.2	analysis of ideal and real engine

		Selection of Fans, Pumps and blowers	502110C.1	analyse conservation opportunities
			502110C.2	evaluate performance
			502110C.3	Select fans, pumps and blowers
	502112	Seminar-1	502112.1	To use multiple thinking strategies to examine real-world issues and explore creative
			502112.2	To acquire, articulate, create and convey intended meaning using verbal and non-verbal
			502112.3	To learn and integrate, through independent learning in sciences and technologies, with disciplinary specialization and the ability to integrate information across

YEAR	COURSE CODE	COURSE NAME		COURSE OUTCOMES
SECOND YEAR (SEM-III,TERM-I)	602113	Computational Fluid Dynamics	602113.1	understand application of CFD and Basics governing equation
			602113.2	understand Discretization and Essentials of Numerical Methods
			602113.3	use Curvilinear Coordinates and Numerical Grid Generation
			602113.4	Compute Heat-Transfer on a Cartesian-Geometry
			602113.5	Solve Eulers and Navier-Stokes Equations
			602113.6	explain Turbulence Modeling
	602114	Design of Heat Transfer Equipments	602114.1	classify Heat Exchangers
			602114.2	Solve to Determine Exchanger Effectiveness
			602114.3	analyse Heat Exchanger Pressure Drop
			602114.4	understand Heat Transfer Characteristics
			602114.5	understand basics of cooling tower and furnaces
			602114.6	explain thermal devices
	602115	Solar Energy	602115A.1	understand solar cell
			602115A.2	understand environmental impact of photovoltaic
		Waste Heat Recovery and Cogeneration	602115B.1	Understand Waste Heat Recovery
			602115B.2	understand Cogeneration
		Biomass Technology	602115C.1	understand Biomass potential and Use
			602115C.2	understand Environmental impact of biomass
SECOND YEAR (SEM-IV,TERM-II)	602117	Project	602117.1	Find out the gap between existing mechanical systems and develop new creative
			602117.2	Learn about the literature review
			602117.3	Get the experience to handle various tools, tackles and machines.
			602117.4	inculcate research culture

Principal Office

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Parandwadi, Pune

INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT

Approved By AICTE New Delhi, DTE (MS) and Affiliated to Pune University

ACADEMIC YEAR 2021-22

COURSE OUTCOMES

COURSE PATTERN 2019 (SE)				
SE(CIVIL)				
YEAR	COURSE CODE	COURSE NAME	COURSE OUTCOME NO.	COURSE OUTCOMES
	201001	Building Technology and Architectural Planning	201001.1	Identify types of building and basic requirements of building components.
			201001.2	Make use of Architectural Principles and Building byelaws for building construction
			201001.3	Plan effectively various types of Residential Building forms according to their utility,functions with reference to National Building Code.
			201001.4	Plan effectively various types of Public Buildings according to their utility functions withreference to National Building Code
			201001.5	Make use of Principles of Planning in Town Planning, Different Villages and Safety aspects.
			201001.6	Understand different services and safety aspects
	201002	Mechanics of Structures	201002.1	Understand concept of stress-strain and determine different types of stress, strain in determinate,indeterminate homogeneous and composite structures.
			201002.2	Calculate shear force and bending moment in determinate beams for different loading conditionsand illustrate shear force and bending moment diagram.
			201002.3	Explain the concept of shear and bending stresses in beams and demonstrate shear and bending stress distribution diagram.
			201002.4	Use theory of torsion to determine the stresses in circular shaft and understand concept of Principal stresses and strains.
			201002.5	Analyze axially loaded and eccentrically loaded column.
			201002.6	Determine the slopes and deflection of determinate beams and trusses.
			201003.1	Understand the use of Fluid Properties, concept of Fluid statics, basic equation of Hydrostatics, measurement of fluid pressure, buoyancy & floatation and its application for solving practicalproblems.

SE (SEM-III,TERM-I)	201003	Fluid Mechanics	201003.2	Understand the concept of fluid kinematics with reference to Continuity equation and fluiddynamics with reference to Modified Bernoulli's equation and its application to practicalproblems of fluid flow
			201003.3	Understand the concept of Dimensional analysis using Buckingham's π theorem, Similarity &Model Laws and boundary layer theory and apply it for solving practical problems of fluid flow
			201003.4	Understand the concept of laminar and turbulent flow and flow through pipes and its application to determine major and minor losses and analyze pipe network using Hardy Cross method.
			201003.5	Understand the concept of open channel flow, uniform flow and depth-Energy relationships in open channel flow and make the use of Chezy's and Manning's formulae for uniform flowcomputation and design of most economical channel section.
			201003.6	Understand the concept of gradually varied flow in open channel and fluid flow aroundsubmerged objects, compute GVF profile and calculate drag and lift force on fully submergedbody.
	207001	Engineering Mathematics III	207001.1	Solve Higher order linear differential equations and its applications to modelling and analysing Civil engineering problems such as bending of beams, whirling of shafts and mass spring systems.
			207001.2	Solve System of linear equations using direct & iterative numerical techniques and developsolutions for ordinary differential equations using single step & multistep methods applied tohydraulics, geotechnics and structural systems
			207001.3	Apply Statistical methods like correlation, regression and probability theory in data analysis andpredictions in civil engineering.
			207001.4	Perform Vector differentiation &integration, analyze the vector fields and apply to fluid flowproblems.
			207001.5	Solve Partial differential equations such as wave equation, one and two dimensional heat flowequations.
			207009.1	Explain about the basic concepts of engineering geology, various rocks, and minerals both in laband on the fields and their inherent characteristics and their uses in civil engineeringconstructions.
			207009.2	Exploring the importance of mass wasting processes and various tectonic processes that hampers the design of civil engineering projects and its implications on environment and sustainability.

	207009	Engineering Geology	207009.3	Recognize effect of plate tectonics, structural geology and their significance and utility in civilengineering activities.
			207009.4	Incorporate the various methods of survey, to evaluate and interpret geological nature of the rocks present at the foundations of the dams, percolation tanks, tunnels and to infer site / alignment/level free from geological defects
			207009.5	Assess the importance of geological nature of the site, precautions and treatments to improve thesite conditions for dams, reservoirs, and tunnels.
			207009.6	Explain geological hazards and importance of ground water and uses of common buildingstones.
		Audit Course I	201007.1	Describe functioning/working of different types of industries/sectors in Civil Engineering.
			201007.2	Describe drawings and documents required and used in different Civil Engineering works
			201007.3	Understand the importance of Code of Ethics to be practiced by a Civil Engineer and also understand the duties and responsibilities as a Civil Engineer
			201007.4	Understand different health and safety practices on the site
	201008	Geotechnical Engineering	201008.1	Identify and classify the soil based on the index properties and its formation process
			201008.2	Explain permeability and seepage analysis of soil by construction of flow net
			201008.3	Illustrate the effect of compaction on soil and understand the basics of stress distribution.
			201008.4	Express shear strength of soil and its measurement under various drainage conditions.
			201008.5	Evaluate the earth pressure due to backfill on retaining structures by using different theories.
			201008.6	Analysis of stability of slopes for different types of soils.
			201009.1	Define and Explain basics of plane surveying and differentiate the instruments used for it.
			201009.2	Express proficiency in handling surveying equipment and analyse the surveying data from these equipment.

SE (SEM-IV,TERM-II)	201009	Survey	201009.3	Describe different methods of surveying and find relative positions of points on the surface of earth.
			201009.4	Execute curve setting for civil engineering projects such as roads, railways etc.
			201009.5	Articulate advancements in surveying such as space based positioning systems.
			201009.6	Differentiate map and aerial photographs, also interpret aerial photographs.
	201010	Concrete Technology	201010.1	Able to select the various ingredients of concrete and its suitable proportion to achieved desiredstrength.
			201010.2	Able to check the properties of concrete in fresh and hardened state.
			201010.3	Get acquainted to concreting equipments, techniques and different types of special concrete.
			201010.4	Able to predict deteriorations in concrete and get acquainted to various repairing methods and techniques
	201011	Structural Analysis	201011.1	Understand the basic concept of static and kinematic indeterminacy and analysis ofindeterminate beams.
			201011.2	Analyze redundant trusses and able to perform approximate analysis of multi-story multi-bay frames.
			201011.3	Implement application of the slope deflection method to beams and portal frames
			201011.4	Analyze beams and portal frames using moment distribution method.
			201011.5	Determine response of beams and portal frames using structure approach of stiffness matrixmethod.
			201011.6	Apply the concepts of plastic analysis in the analysis of steel structures.
	201012	Project Management	201012.1	Describe project life cycle and the domains of Project Management.
			201012.2	Explainnetworking methods and their applications in planning and management
			201012.3	Categorizethe materials as per their annual usage and IsoCalculateproduction rate ofconstruction equipment
			201012.4	Demonstrates resource allocation techniques and applyit for manpower planning.
			201012.5	Understandeconomical terms and different laws associated with project management

			201012.6	Applythe methods of project selection andrecommendthe best economical project.
	201017	Project Based Learning	201017.1	Identify the community/ practical/ societal needs and convert the idea into a product/ process/ service.
			201017.2	Analyse and design the physical/ mathematical/ ICT model in order to solve identified problem/project.
			201017.3	Create, work in team and applying the solution in practical way to specific problem.

COURSE PATTERN 2019 (TE)

TE(CIVIL)

YEAR	COURSE CODE	COURSE NAME	COURSE OUTCOME NO.	COURSE OUTCOMES
	301001	Hydrology and Water Resource Engineering	301001.1	Understand government organizations, apply & analyzeprecipitation & its abstractions.
			301001.2	Understand, apply & analyzerunoff, runoff hydrographs and gauging of streams.
			301001.3	Understand, apply & analyzefloods, hydrologic routing & Q-GIS software in hydrology.
			301001.4	Understand, apply & analyzereservoir planning, capacity of reservoir & reservoir economics.
			301001.5	Understand water logging & water management, apply & analyze ground water hydrology
			301001.6	Understand irrigation, piped distribution network and canal revenue, apply and analyze crop water requirement.
	301002	Water Supply Engineering	301002.1	Define identify, describe reliabilityof water sources, estimate water requirement for various sectors
			301002.2	Ascertain and interpret water treatment method required to be adopted with respect tosource and raw water characteristics
			301002.3	Design variouscomponents of water treatment plant and distribution system.
			301002.4	Understand and compare contemporary issues and advanced treatment operations and process available in the market, including packaged water treatment plants.
			301002.5	Design elevated service reservoir capacity and understand the rainwater harvesting.

			301002.6	Understand the requirement of water treatment plant for infrastructure and Government scheme.
TE (SEM-V,TERM-I)	301003	Design of Steel Structures	301003.1	Demonstrate knowledge about the types of steel structures, steel code provisionsand design of the adequate steel section subjected to tensile force.
			301003.2	Determine the adequate steel section subjected to compression load and design of built up columns along with lacing and battening.
			301003.3	Design eccentrically loaded column for section strength and column bases for axial load and uniaxial bending.
			301003.4	Design oflaterally restrainedand unrestrainedbeam with and without flange plate using rolled steel section.
			301003.5	Analyzethe industrial truss for dead, live and wind loadand design of gantry girderfor moving load.
			301003.6	Understand the role of components of welded plate girder and design cross section for welded plate girder including stiffeners and its connections.
	301004	Engineering Economics and Financial Management	301004.1	Understand basics of construction economics.
			301004.2	Develop an understanding of financial management in civil engineering projects.
			301004.3	Prepare and analyze the contract account.
			301004.4	Decide on right source of fund for construction projects.
			301004.5	Understand working capital and its estimation for civil engineering projects.
			301004.6	Illustrate the importance of tax planning & understand role of financial regulatory bodies
	301005 c	Elective I: Construction Management	301005 c.1	Understand the overview of construction sector.
			301005c.2	Illustrate construction scheduling, work study and work measurement.
			301005 c.3	Acquaint various labor laws and financial aspects of construction projects.
			301005c.4	Explain elements of risk management and value engineering.
			301005 c.5	tate material and human resource management techniques in construction.
			301005c.6	Understand basics of artificial intelligence techniques in civil engineering.
	301011	Audit Course : Professional Ethics and Etiquettes/Sustainable Energy Systems	301011.1	Understandthebasicperceptionofprofession,professionalethics,various moralissuesandusesofethical theories
			301011.2	Understandvarioussocialissues,industrialstandards,codeoethicsandroleofprofessional ethicsin engineeringfield.
			301011.3	Follow ethics as an engineering professional and adopt good standards andnorms ofengineeringpractice.
			301011.4	Applyethicalprinciplestoresolvesituationsthatariseintheirprofessionallives

COURSE PATTERN 2019 (TE)				
TE(CIVIL)				
TE (SEM-VI,TERM-II)	301012	Waste Water Engineering	301012.1	Recall sanitation infrastructure, quantification and characterization of wastewater, natural purification of streams
			301012.2	Design preliminary and primary unit operations in waste water treatment plant
			301012.3	Understand theory and mechanism of aerobic biological treatment system and to design activated sludge process
			301012.4	Understand and design suspended and attached growth wastewater treatment systems
			301012.5	Explain and apply concept of contaminant removal by anaerobic, tertiary and emerging wastewater treatment systems
			301012.6	Compare various sludge management systems and explain the potential of recycle and reuse of wastewater treatment
	301013	Design of Reinforced Concrete Structures	301013.1	Apply relevant IS provisions to ensure safety and serviceability of structures, understand the design philosophies and behavior of materials: steel & concrete.
			301013.2	Recognize mode of failure as per LSM and evaluate moment of resistance for singly, doubly rectangular, and flanged sections.
			301013.3	Design & detailing of rectangular one way and two-way slab with different boundary conditions
			301013.4	Design & detailing of dog legged and open well staircase
			301013.5	Design & detailing of singly/doubly rectangular/flanged beams for flexure, shear, bond and torsion
			301013.6	Design & detailing of short columns subjected to axial load, uni-axial/bi-axial bending and their footings.
	301014	Remote Sensing and GIS	301014.1	Articulate fundamentals and principles of RS techniques.
			301014.2	Demonstrate the knowledge of remote sensing and sensor characteristics
			301014.3	Distinguish working of various spaces-based positioning systems.
			301014.4	Analyze the RS data and image processing to utilize in civil engineering
			301014.5	Explain fundamentals and applications of RS and GIS
			301014.6	Acquire skills of data processing and its applications using GIS
	301015	Elective II Architecture and	301015.1	Apply the principles of architectural planning and landscaping for improving quality of life
			301015.2	Understand the confronting issues of the area and apply the acts.

		Town Planning	301015.3	Evaluate and defend the proposals.
			301015.4	Appraise the existing condition and to develop the area for betterment.
	3010218	Audit Course- II	301021B.1	Analyze the safety problem with its solution

COURSE PATTERN 2015 (BE)

BE(CIVIL)

YEAR	COURSE CODE	COURSE NAME	COURSE OUTCOME NO.	COURSE OUTCOMES
BE(SEM-VII,TERM-I)	401001	Environmental Engineering – II	401001	Able to characterize sewage and design a sewage collection system.
			401001	Able to describe stream sanitation and design of primary treatment of sewage
			401001	Able to analyze and design secondary (biological) sewage treatment units for STP.
			401001	Able to analyze and design low cost sewage treatment methods
			401001.1	Able to analyze and design anaerobic treatment units
			401001.1	Able to explain different industrial waste water treatment methods
	401002	Transportation Engineering	401 002.1	Able to explain necessity of highway planning,classification of roads and to determine length of different category roads.
			401 002.2	Able to describe traffic characteristics and trafic studies.
			401 002.3	Able to design geometric elements and structural design of rigid and flexible pavement.
			401 002.4	Able to perform test on aggregate, bitumen as per IRC standards and explain the construction procedure of varius types of roads.
			401 002.5	Able to explain airport planning layout, orientation and to calculate basic runway length.
			401 002.6	Able to calculate hydroulic parameters related to bridge,explain types of bridge and their components.
	401003	Structural Design III	401003	Able to describe various systems of prestressing and analyze member strength
			401003	Able to design Prestressed member for flexure and shear
			401003	Able to do load calculations and load transfer phenomenon of structures
			401003	Able to analyze the frame structure for different load combinations
			401003	Able to design and detailing of floor beam in a frame
			401003	Able to design and detailing of different elements of special structures like retaining walls, liquid retaining structures, combined footings and their behavior under load

	401 004 (ELE-I)	Advanced Concrete Technology	401 004.1	Able to describe types of cement and aggregate to be used as a concrete and explain properties of concrete.
			401 004.2	Able to explain special types of concrete and their properties.
			401 004.3	Able to design special types of concrete mix of specified strength and able to describe various nondestructive test.
			401 004.4	Able to know properities of concrete fiber like GFRC, SFRC and SIFCON.
			401 004.5	Able to describe ferrocement analysis and design of prefabricated concrete structural element.
	401 004 (ELE-I)	Systems Approach in Civil Engineering	401 004.1	Able to formulate civil engineering problems in linear programing.
			401 004.2	Able to use concept of opration research for various engineering problems.
			401 004.3	Able to apply dynamic programming for civil engineering.
			401 004.4	Able to use nonlinear programing techniques for solving engineering problems.
			401 004.5	Able to apply game theroy .
	401 005 (ELE-II)	TQM & MIS in Civil Engineering	401 005.1	Explain the concept of quality in construction along with various terms of evolution.
			401 005.2	Application of six sigma in construction industry.
			401 005.3	Understand concept of quality manual and quality circle.
			401 005.4	Application of 5 S technique and zero defect
			401 005.5	Explain importance of MIS in construction
	401007	Dams and Hydraulics Structures	401007	Able to analyses and ,design gravity dam ,earthen dam and check its stability
			401007	Able to explain generalized information regarding dams
			401007	Able to design hydraulic structures
			401007	Able to explain river training methods and design of guide bund
			401007.1	Able to explain hydropower engineering with respect to its components and functions
	401 008	Quantity Surveying, Contracts and Tenders	401 008.1	Able to describe types of estimates and importance of approximate estimates.
			401 008.2	Able to prepare detailed estimate for Civil Engg. Structures.
			401 008.3	Able to choose suitable method of valuation of property and implement it.
			401 008.4	Able to draft suitable specifications to meet expectations of client and prepare rate analysis.
			401 008.5	Able to explain execution of works in PWD and Tendering.
			401 008.6	Able to illustate meaning, validity, conditions and laws of contract.
			401 009.1	Understand meteorological aspects governing the air pollution.

BE (SEM-VIII,TERM-II)	401 009 (ELE-III)	Air Pollution and control	401 009.2	Comprehend sampling and analysis of ambient air.
			401009	Describe and understand causes, sources, effects, measurement methods and control measures of indoor air pollution.
			401 009.4	Understand various processes and equipments used for control of air pollution
			401010	Understand economics of air pollution control and legislations used for air pollution control.
			401 009.6	Comprehend methodology of environmental impact assessment and management and know environmental impacts of various industries.
	401 010 (ELE-IV)	Construction Management	401 010.1	Able to understand concept of construction management by considering , risk management, material management & Human resource management.
			401 010.2	Able to apply the basics of construction scheduling, work study & work measurement.
			401 010.3	Able to understand Labour laws and financial aspects of construction projects Labour laws
			401 010.4	Able to understand the basics of Artificial Intelligence Techniques in construction management.
	401 006	Project	401 006.1	convert an open ended problems statement into a statement of proposed work.
			401 006.2	Decompose problem/task in to subtask and establish a methodology and process by which progress may be evaluated.
			401 006.3	select and apply appropriate methods/models or mathematical simulation of the real world and analyze the data to provide information for decisions.
			401 006.4	perform feasibility analysis and evalutes quality of solutions to select the best one.
			401 006.5	Produce usable documents of record regarding the design process.
			401 006.6	Colaborate with team members to achieve a common goal.
			401 006.7	Enhance awareness and critical self examination of ones own values, and to appriciate the relavance of personal values in the business/work place and develop skills which recignizes and resolves ethical issues while working.

Principal Office

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Parandwadi, Pune

INDIRA COLLEGE OF ENGINEERING AND MANAGEMENT

Approved By AICTE New Delhi, DTE (MS) and Affiliated to Pune University

ACADEMIC YEAR 2021-22

COURSE OUTCOMES

SE(COMPUTER)(2019 Pat.)				
YEAR	COURSE CODE	COURSE NAME	URSE OUTCOME	COURSE OUTCOMES
SE (SEM-III, TERM-I)	210241	Discrete Mathematics	210241.1	Formulate problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly.
			210241.2	Apply appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts.
			210241.3	Design and analyze real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction.
			210241.4	Specify, manipulate and apply equivalence relations; construct and use functions and apply these concepts to solve new problems.
			210241.5	Calculate numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics.
			210241.6	Model and solve computing problem using tree and graph and solve problems using appropriate algorithms.
			210241.7	Analyze the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.
	210242	Fundamentals of Data Structures	210242.1	Design and algorithms to solve the programming problems,identify appropriate algorithmic strategy for specific application, and analyze the time and space complexity.
			210242.2	Discriminate the usage of various structures, Design/Program/Implement the appropriate data structures;use them in implementations of abstract data types and identify the appropriate data structure in approaching the problem solution.
			210242.3	Demonstrate use of sequential data structures- Array and Linked lists to store and process data.
			210242.4	Understand the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application.
			210242.5	Compare and constrast different implementations of data structures(dynamic and static).
			210242.6	Understand, Implement and apply principles of data structures-stack and queue to solve computational problems.
	210243	Object Oriented Programming(OOP)	210243.1	Apply constructs- sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software.
			210243.2	Design object-oriented solutions for small systems involving multiple objects.
			210243.3	Use virtual and pure virtual function and complex programming situations.
			210243.4	Apply object-oriented software principles in problem solving.
			210243.5	Analyze the strengths of object-oriented programming.
			210243.6	Develop the application using object oriented programming language(C++).

210244	Computer Graphics	210244.1	Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics.
		210244.2	Apply mathematics to develop Computer programs for elementary graphic operations.
		210244.3	Illustrate the concepts of windowing and clipping and apply various algorithms to fill and clip polygons.
		210244.4	Understand and apply the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection.
		210244.5	Understand the concepts of color models, lighting, shading models and hidden surface elimination.
		210244.6	Create effective programs using concepts of curves, fractals, animation and gaming.
210245	Digital Electronics & Logic Design	210245.1	Simplify Boolean Expression using K Map
		210245.2	Design and implement Combinational circuits
		210245.3	Design and implement Sequential circuits
		210245.4	Develop Simple real world application using ASM and PLD
		210245.5	Differentiate and choose appropriate logic families IC Packages as per the given design specification
		210245.6	Explain organization and architecture of computer system.
210246	Data Structures Laboratory	210246.1	Use algorithms on various linear data structure using sequential organization to solve real life problems.
		210246.2	Analyze problems to apply suitable searching and sorting algorith to various applications.
		210246.3	Analyze problems to use variants of linked list and solve various real life problems.
		210246.4	Designing and implement data structures and algorithms for solving different kinds of problems.
210247	OOP and Computer Graphics Laboratory	210247.1	Understand and apply the concepts like inheritance, polymorphism, exception handling and generic structures for implementing reusable programming codes.
		210247.2	Analyze the concept of file and apply it while storing and retrieving the data from secondary storages.
		210247.3	Analyze and apply computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts.
		210247.4	Understand the concept of windowing and clipping and apply various algorithms to fill and clip polygons.
		210247.5	Apply logic to implement, curves, fractals, animation and gaming programs.
210248	Digital Electronics Laboratory	210248.1	Understand the working of digital electronic circuits
		210248.2	Apply the knowledge to appropriate IC as per the design specifications
		210248.3	Design and implement Sequential and Combinational digital circuits as per the specifications
210249	Business Communication Skills	210249.1	Express effectively through verbal/oral communications and improve listening skills.
		210249.2	Write precise briefs or reports and technical documents.
		210249.3	Prepare for group discussions / meetings / interviews and presentations.
		210249.4	Explore goal / target setting, self motivation and practicing creative thinking.

			210249.5	Operate effectively in multidisciplinery and heterogeneous teams through the knowledge of team work, interpersonal relationships, conflict management and leadership qualities.
	210250	Humanity and Social Science	210250.1	Aware of the various issues concerning humans and society.
			210250.2	Aware about their responsibilities towards society.
			210250.3	Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes.
			210250.4	Able to understand the nature of the individual and the relationship between self and the community.
			210250.5	Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.
	210251	AC3-I: Green Construction and Design	210251.1	Understand the importance of environment friendly society.
			210252.2	Apply primary measures to reduce carbon emissions from their surroundings.
			210253.3	Learn role of IT solutions in design of green buildings.
			210254.4	Understand the use of software systems to complete statutory compliances involved in the
		AC3-II: Social Awareness and Governance Program	210251.1	Understand social issues and responsibilities as member of society.
			210252.2	Apply social values and ethics in decision making at social or organizational level
			210253.3	Promote obstacles in national integration and role of youth for National Integration
			210254.4	Demonstrate basic features of Indian Constitution.
		AC3-III: Environmental Studies	210251.1	Comprehend the importance of ecosystem and biodiversity
			210252.2	Correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevent
			210253.3	Identify different types of environmental pollution and control measures
			210254.4	Correlate the exploitation and utilization of conventional and non-conventional resources
		AC3-IV: Smart Cities	210251.1	Understand the dynamic behavior of the urban system by going beyond the physical appearance and by focusing on representations, properties and impact factors
			210252.2	Explore the city as the most complex human-made organism with a metabolism that can be modeled in terms of stocks and flows
			210253.3	Knowledge about data-informed approaches for the development of the future city, based on crowd sourcing and sensing
			210254.4	Knowledge about the latest research results in for the development and management of future cities
SE (SEM-IV, TERM-II)	207003	Engineering Mathematics III	207003.1	Solve Linear differential equations, essential in modelling and design of computer-based systems.
			207003.2	Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
			207003.3	Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.

		207003.4	Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
		207003.5	Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
210252	Data Structures and Algorithms	210252.1	Identify and articulate the complexity goals and benefits of a good hashing scheme for real world applications.
		210252.2	Apply non-linear data structures for solving problems of various domain.
		210252.3	Design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language.
		210252.4	Analyaze the algorithmic solutions for resource requirements and optimization.
		210252.5	Use efficient indexing methods and multiway search techniques to store and maintain data.
		210252.6	Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.
210253	Software Engineering	210253.1	Analyze software requirements and formulate design solution for a software.
		210253.2	Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.
		210253.3	Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.
		210253.4	Model and design User interface and component-level.
		210253.5	Identify and handle risk management and software configuration management.
		210253.6	Utilize knowledge of software testing approaches, approaches to verification and validation.
		210253.7	Construct software of high quality – software that is reliable, and that is reasonably easy to understand, modify and maintain efficient, reliable, robust and cost-effective software solutions.
210254	Microprocessor	210254.1	Exhibit skill of assembly language programming for the application
		210254.2	Classify Processor architectures.
		210254.3	Illustrate advanced features of 80386 Microprocessor.
		210254.4	Compare and contrast different processor modes.
		210254.5	Use interrupts mechanism in applications
		210254.6	Differentiate between Microprocessors and Microcontrollers.
		210254.7	Identify and analyze the tools and techniques used to design, implement, and debug microprocessor-based systems.
210255	Principles of Programming Languages	210255.1	Make use of basic principles of programming languages.
		210255.2	Develop a program with Data representation and Computations.
		210255.3	Develop programs using Object Oriented Programming language : Java.
		210255.4	Develop application using inheritance, encapsulation, and polymorphism
		210255.5	Demonstrate Multithreading for robust application development.
		210255.6	Develop a simple program using basic concepts of Functional and Logical programming paradigm.

210256	Data Structures and Algorithms Laboratory	210256.1	Understand the ADT/libraries, hash tables and dictionary to design algorithms for a specific problem.
		210256.2	Choose most appropriate data structures and apply algorithms for graphical solutions of the problems.
		210256.3	Apply and analyze non linear data structures to solve real world complex problems.
		210256.4	Apply and analyze algorithm design techniques for indexing, sorting, multi-way searching, file organization and compression.
		210256.5	Analyze the efficiency of most appropriate data structure for creating efficient
210257	Microprocessor Laboratory	210257.1	Understand and apply various addressing modes and instruction set to implement assembly language programs
		210257.2	Apply logic to implement code conversion
		210257.3	Analyze and apply logic to demonstrate processor mode of operation
210258	Project Based Learning II	210258.1	Identify the real life problem from societal need point of view
		210258.2	Choose and compare alternative approaches to select most feasible one
		210258.3	Analyze and synthesize the identified problem from technological perspective
		210258.4	Design the reliable and scalable solution to meet challenges
		210258.5	Evaluate the solution based on the criteria specified
		210258.6	Inculcate long life learning attitude towards the societal problems
210259	Code of Conduct	210259.1	Understandthe basic perception of profession, professional ethics, various moral and social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
		210259.2	Awareof professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis.
		210259.3	Understandthe impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development
		210259.4	Acquireknowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives
210260	AC4-I: Water Management	210260.1	Understand the global water cycle and its various processes
		210260.2	Understand climate change and their effects on water systems
		210260.3	Understand Drinking treatment and quality of groundwater and surface water
		210260.4	Understand the Physical, chemical, and biological processes involved in water treatment and distribution.
	AC4-II: Intellectual Property Rights and Patents	210260.1	Understand the fundamental legal principles related to confidential information, copyright, patents, designs, trademarks and unfair competition
		210260.2	Identify, apply and assess principles of law relating to each of these areas of intellectual property
		210260.3	Apply the appropriate ownership rules to intellectual property you have been involved in creating

		AC4-III: The Science of Happiness	210260.1	Understand what happiness is and why it matters to you
			210260.2	Learn how to increase your own happiness
			210260.3	Understand of the power of social connections and the science of empathy
			210260.4	Understand what is mindfulness and its real world applications
		AC4-IV: Yoga and Meditation	210260.1	Understand philosophy and religion as well as daily life issues will be challenged and enhanced.
			210260.2	Enhances the immune system.
			210260.3	Intellectual and philosophical understanding of the theory of yoga and basic related Hindu scriptures will be developed.
			210260.4	Powers of concentration, focus, and awareness will be heightened.

TE(COMPUTER)(2019 Pat.)

YEAR	COURSE CODE	COURSE NAME	URSE OUTCOME	COURSE OUTCOMES
TE (SEM-V,TERM-I)	310241	Database Management System	310241.1	Analyze and design Database sysem using ER model
			310241.2	Implement database queries using database language
			310241.3	Normalize the database design using normal forms
			310241.4	Apply transaction management concept in real time situation
			310241.5	Use NOSQL database for processing unstructured data
			310241.6	Differentiate between complex datatypes and analyze the use of appropriate data types
	310242	Theory of Computation	310242.1	To Understand formal language, translation logic, essentials of translation, alphabets, language representation and apply it to design Finite Automata and its variants
			310242.2	To Construct regular expression to present regular language and understand pumping lemma
			310242.3	To Design Context Free Grammars and learn to simplify the grammar
			310242.4	To Construct Pushdown Automaton model for the Context Free Language
			310242.5	To Devise Turing Machine for the different requirements outlined by theoretical computer science
			310242.6	To Analyze different classes of problems, and study concepts of NP completeness
	310243	Systems Programming and Operating System	310243.1	Analyze and synthesize basic System Software and its functionality.
			310243.2	Identify suitable data structures and Design & Implement various System Software
			310243.3	Compare different loading schemes and analyze the performance of linker and loader
			310243.4	Implement and Analyze the performance of process scheduling algorithms
			310243.5	Identify the mechanism to deal with deadlock and concurrency issues
			310243.6	Demonstrate memory organization and memory management policies
	310244	Computer Networks and Security	310244.1	Summarize fundamental concepts of Computer Networks, architectures, protocols and technologies
			310244.2	Illustrate the working and functions of data link layer
			310244.3	Analyze the working of different routing protocols and mechanisms
			310244.4	Implement client-server applications using sockets
			310244.5	Illustrate role of application layer with its protocols, client-server architectures
			310244.6	Comprehend the basics of Network Security

310245	310245(A): Internet of Things and Embedded Systems	310245(A).1	Understand the fundamentals and need of Embedded Systems for the Internet of Things
		310245(A).2	Apply IoT enabling technologies for developing IoT systems
		310245(A).3	Apply design methodology for designing and implementing IoT applications
		310245(A).4	Analyze IoT protocols for making IoT devices communication
		310245(A).5	Design cloud based IoT systems
		310245(A).6	Design and Develop secured IoT applications
	310245(D): Software Project Management	310245(D).1	Comprehend Project Management Concepts
		310245(D).2	Use various tools of Software Project Management
		310245(D).3	Schedule various activities in software projects
		310245(D).4	Track a project and manage changes
		310245(D).5	Apply Agile Project Management
		310245(D).6	Analyse staffing process for team building and decision making in Software Projects and Management
310246	Database Management System Lab	310246.1	Design ER model for given requirements and convert it into database tables
		310246.2	Design schema in appropriate normal form considering actual requirements
		310246.3	Implement SQL queries for given requirement using different SQL concepts
		310246.4	Implement PL/SQL code block for given requirements
		310246.5	Implement NOSQL queries using MONGO DB
		310246.6	Design and Develop application considering actual requirement and using database concepts
310247	Computer Networks and Security Laboratory	310247.1	Analyze the requirements of network types, topology and transmission media
		310247.2	Demonstrate error control, flow control techniques and protocols and analyze them
		310247.3	Demonstrate the subnet formation with IP allocation mechanism and apply various routing algorithms
		310247.4	Develop Client-Server architectures and prototypes
		310247.5	Implement web applications and services using application layer protocols
		310247.6	Use network security services and mechanisms
310248	Laboratory Practice I	310248.1	Implement language translators
		310248.2	Use tools like LEX and YACC
		310248.3	Implement internals and functionalities of Operating System
		310248.4	Design IoT and Embedded Systems based application, Apply Software Project Management tools
		310248.5	Develop smart applications using IoT, Implement software project planning and scheduling
		310248.6	Develop IoT applications based on cloud environment, Analyse staffing in software project
310249	Seminar and Technical Communication	310249.1	Analyze a latesttopic of professional interest
		310249.2	Enhancetechnical writing skills
		310249.3	Identify an engineering problem, analyze it and propose a work plan to solve it
		310249.4	Communicate with professional technical presentation skills
	Audit Course 5-	310250(B).1	Summarize the principles of proper courtesy as they are practiced in the workplace.
		310250(B).2	Apply proper courtesy in different professional situations.

	310250(B)	Professional Ethics and Etiquettes	310250(B).3	Practice and apply appropriate etiquettes in the working environment and day to day life.
			310250(B).4	Build proper practices personal and business communications of Ethics and Etiquettes
TE (SEM-VI,TERM-II)	310251	Data Science and Big Data Analytics	310251.1	Analyze needs and challenges for Data Science Big Data Analytics
			310251.2	Apply statistics for Big Data Analytics
			310251.3	Apply the lifecycle of Big Data analytics to real world problems
			310251.4	Implement Big Data Analytics using Python programming
			310251.5	Implement data visualization using visualization tools in Python programming
			310251.6	Design and implement Big Databases using the Hadoop ecosystem
	310252	Web Technology	310252.1	Implement and analyze behavior of web pages using HTML and CSS
			310252.2	Apply the client side technologies for web development
			310252.3	Analyze the concepts of Servlet and JSP
			310252.4	Analyze the Web services and frameworks
			310252.5	Apply the server side technologies for web development
			310252.6	Create the effective web applications for business functionalities using latest web development platforms
	310253	Artificial Intelligence	310253.1	To Identify and apply suitable Intelligent agents for various AI applications
			310253.2	To Build smart system using different informed search / uninformed search or heuristic approaches
			310253.3	To Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem
			310253.4	To Apply the suitable algorithms to solve AI problems
			310253.5	To Implement ideas underlying modern logical inference systems
			310253.6	To Represent complex problems with expressive yet carefully constrained language of representation
	310254(C)	Cloud Computing	310254(C).1	Understand the different Cloud Computing environment
			310254(C).2	Use appropriate data storage technique on Cloud, based on Cloud application
			310254(C).3	Analyze virtualization technology and install virtualization software
			310254(C).4	Develop and deploy applications on Cloud
			310254(C).5	Apply security in cloud applications
			310254(C).6	Use advance techniques in Cloud Computing
	310255	Internship	310255.1	To demonstrate professional competence through industry internship.
			310255.2	To apply knowledge gained through internships to complete academic activities in a professional manner.
			310255.3	To choose appropriate technology and tools to solve given problem.
			310255.4	To demonstrate abilities of a responsible professional and use ethical practices in day to day life.
			310255.5	To Create network and social circle, and developing relationships with industry people.
			310255.6	To analyze various career opportunities and decide carrier goals
	310256	Data Science and Big Data Analytics Laboratory	310256.1	Apply principles of Data Science for the analysis of real time problems
			310256.2	Implement data representation using statistical methods
			310256.3	Implement and evaluate data analytics algorithms
			310256.4	Perform text preprocessing

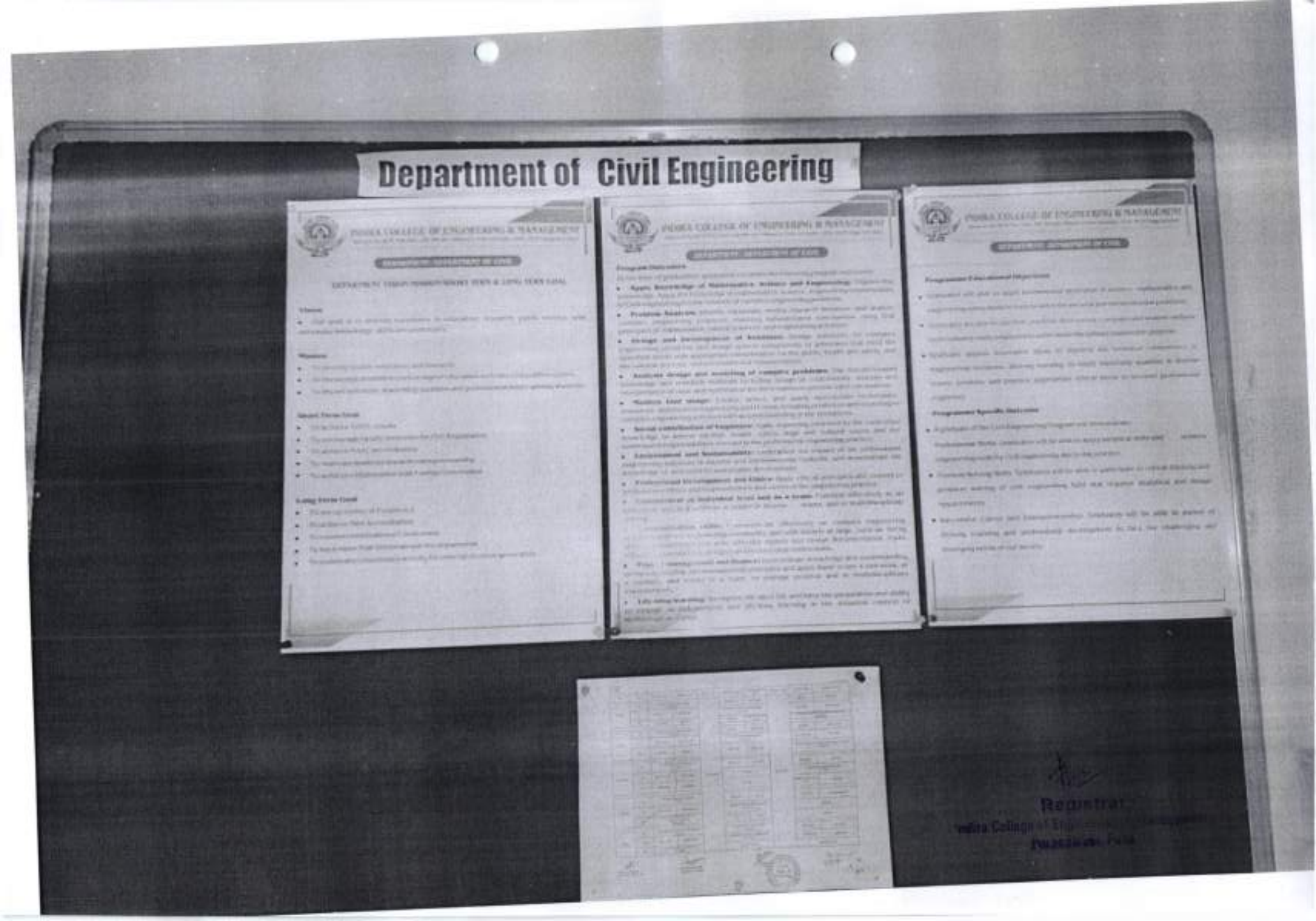
		310256.5	Implement data visualization techniques
		310256.6	Use cutting edge tools and technologies to analyze Big Data
310257	Web Technology Laboratory	310257.1	Understand the importance of website planning and website design issues
		310257.2	Apply the client side and server side technologies for web application development
		310257.3	Analyze the web technology languages, frameworks and services
		310257.4	Create three tier web based applications
310258	Lab Practice II	310258.1	To Design a system using different informed search / uninformed search or heuristic approaches
		310258.2	To Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning
		310258.3	To Design and develop an interactive AI application
310259(A)	Audit Course 6-Digital and Social Media Marketing	310259(A).1	Understand the fundamentals and importance of digital marketing
		310259(A).2	Use the power of social media for business marketing
		310259(A).3	Analyze the effectiveness of digital marketing and social media over traditional
310503	Statistics and Machine Learning(Honours in Data Science)	310503.1	Apply appropriate statistical measure for machine learning applications
		310503.2	Usage of appropriate descriptive statisticsmeasures forstatistical analysis
		310503.3	Usage of appropriate statistics inference for data analysis
		310503.4	Identify types ofsuitable machine learning techniques
		310503.5	Apply regression techniques to machine learning problems
		310503.6	Apply decision tree and Naïve Bayes modelto solve real time applications

BE(COMPUTER)(2015 Pat.)

YEAR	COURSE CODE	COURSE NAME	IRSE OUTCOME	COURSE OUTCOMES
BE(SEM-VII,TERM-I)	410241	High Performance Computing	410241.1	Describe different parallel architectures, inter-connect networks, programming models
			410241.2	Develop an efficient parallel algorithm to solve given problem
			410241.3	Analyze and measure performance of modern parallel computing systems
			410241.4	Build the logic to parallelize the programming task
	410242	Artificial Intelligence and Robotics	410242.1	Identify and apply suitable Intelligent agents for various AI applications
			410242.2	Design smart system using different informed search / uninformed search or heuristic approaches
			410242.3	Identify knowledge associated and represent it by ontological engineering to plan a strategy to solve given problem.
			410242.4	Apply the suitable algorithms to solve AI problems
	410243	Data Analytics	410243.1	Write case studies in Business Analytic and Intelligence using mathematical models
			410243.2	Present a survey on applications for Business Analytic and Intelligence
			410243.3	Provide problem solutions for multi-core or distributed, concurrent/Parallel environments
	lective I-410244(C	Pervasive and Ubiquitous Computing	410444A.1	1.To perform image processing programming
			410444A.2	2.To solve Image Processing problems using multi-core or distributed, concurrent/Parallel environments
	lective I-410244(D	Data Mining and Warehousing	410244D.1	Apply basic, intermediate and advanced techniques to mine the data
			410244D.2	Analyze the output generated by the process of data mining
			410244D.3	Explore the hidden patterns in the data
			410244D.4	Optimize the mining process by choosing best data mining technique

	lective II-410245(I	Software Testing and Quality Assurance	410245(B).1	Describe fundamental concepts in software testing such as manual testing, automation testing and
			410245(B).2	Design and develop project test plan, design test cases, test data, and conduct test operations
			410245(B).3	Apply recent automation tool for various software testing for testing software
			410245(B).4	Apply different approaches of quality management, assurance, and quality standard to software
			410245(B).5	Apply and analyze effectiveness Software Quality Tools
	410246	Laboratory Practice I	410246.1	Practical hands on is the absolute necessity as far as employability of the learner is concerned.
			410246.2	The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses
	410247	Laboratory Practice II	410247.1	Practical hands on is the absolute necessity as far as employability of the learner is concerned
			410247.2	The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses. Enough choice is provided to the learner to choose an elective of one"s interest.
	410248	Project Work Stage I	410248.1	Solve real life problems by applying knowledge.
			410248.2	Analyze alternative approaches, apply and use most appropriate one for feasible solution.
			410248.3	Write precise reports and technical documents in a nutshell.
			410248.4	Participate effectively in multi-disciplinary and heterogeneous teams exhibiting team work, Inter-personal relationships, conflict management and leadership quality.
	410249	410249: Audit Course 5-AC5 – V: Emotional Intelligence	410249.1	Expand your knowledge of emotional patterns in yourself and others
			410249.2	Discover how you can manage your emotions, and positively influence yourself and others
			410249.3	Build more effective relationships with people at work and at home
			410249.4	Positively influence and motivate colleagues, team members, managers
			410249.5	Increase the leadership effectiveness by creating an atmosphere that engages others
BE(SEM-VIII,TERM-II)	410250	Machine Learning	410250.1	Distinguish different learning based applications
			410250.2	To design and model using UML for a given software system
			410250.3	Apply different preprocessing methods to prepare training data set for machine learning.
			410250.4	Design and implement supervised and unsupervised machine learning algorithm.
			410250.5	Implement different learning models
			410250.6	Learn Meta classifiers and deep learning concepts
	410251	Information and Cyber Security	410251.1	Gauge the security protections and limitations provided by today's technology.
			410251.2	Identify information security and cyber security threats.
			410251.3	Analyze threats in order to protect or defend it in cyberspace from cyber-attacks.

		410251.4	Build appropriate security solutions against cyber-attacks.
Elective III-410252(C)	Embedded and Real Time Operating Systems	410252C.1	Recognize and classify embedded and real-time systems
		410252C.2	Explain communication bus protocols used for embedded and real-time systems
		410252C.3	Classify and exemplify scheduling algorithms
		410252C.4	Apply software development process to a given RTOS application
		410252C.5	Design a given RTOS based application
Elective III-410252(D)	Soft Computing and Optimization Algorithms	410252D.1	Apply soft computing methodologies, including artificial neural networks, fuzzy sets, fuzzy logic, fuzzy inference systems and genetic algorithms
		410252D.2	Design and development of certain scientific and commercial application using computational neural network models, fuzzy models, fuzzy clustering applications and genetic algorithms in specified applications
ective IV-410253(	Human Computer Interface	410253B.1	Evaluate the basics of human and computational abilities and limitations.
		410253B.2	Inculcate basic theory, tools and techniques in HCI.
		410253B.3	Apply the fundamental aspects of designing and evaluating interfaces.
		410253B.4	Apply appropriate HCI techniques to design systems that are usable by people
410253(C)	Cloud Computing	410253C.1	To install cloud computing environments.
		410253C.2	To develop any one type of cloud
		410253C.3	To explore future trends of cloud computing
410254	Laboratory Practice III	410254.1	Practical hands on is the absolute necessity as far as employability of the learner is concerned.
		410254.2	The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the core courses
410255	Laboratory Practice IV	410255.1	Practical hands on is the absolute necessity as far as employability of the learner is concerned.
		410255.2	The presented course is solely intended to enhance the competency by undertaking the laboratory assignments of the elective courses. Enough choice is provided to the learner to choose an elective of one"s interest
410256	Project Work Stage II	410455.1	Show evidence of independent investigation
		410455.2	Critically analyze the results and their interpretation.
		410455.3	Report and present the original results in an orderly way and placing the open questions in the right perspective.
		410455.4	Link techniques and results from literature as well as actual research and future research lines with the research.
		410455.5	Appreciate practical implications and constraints of the specialist subject
410257	Audit Course 6 AC6 – I: Business Intelligence	410257.1	Apply the concepts of Business Intelligence in real world applications
		410257.2	Explore and use the data warehousing wherever necessary
		410257.3	Design and manage practical BI systems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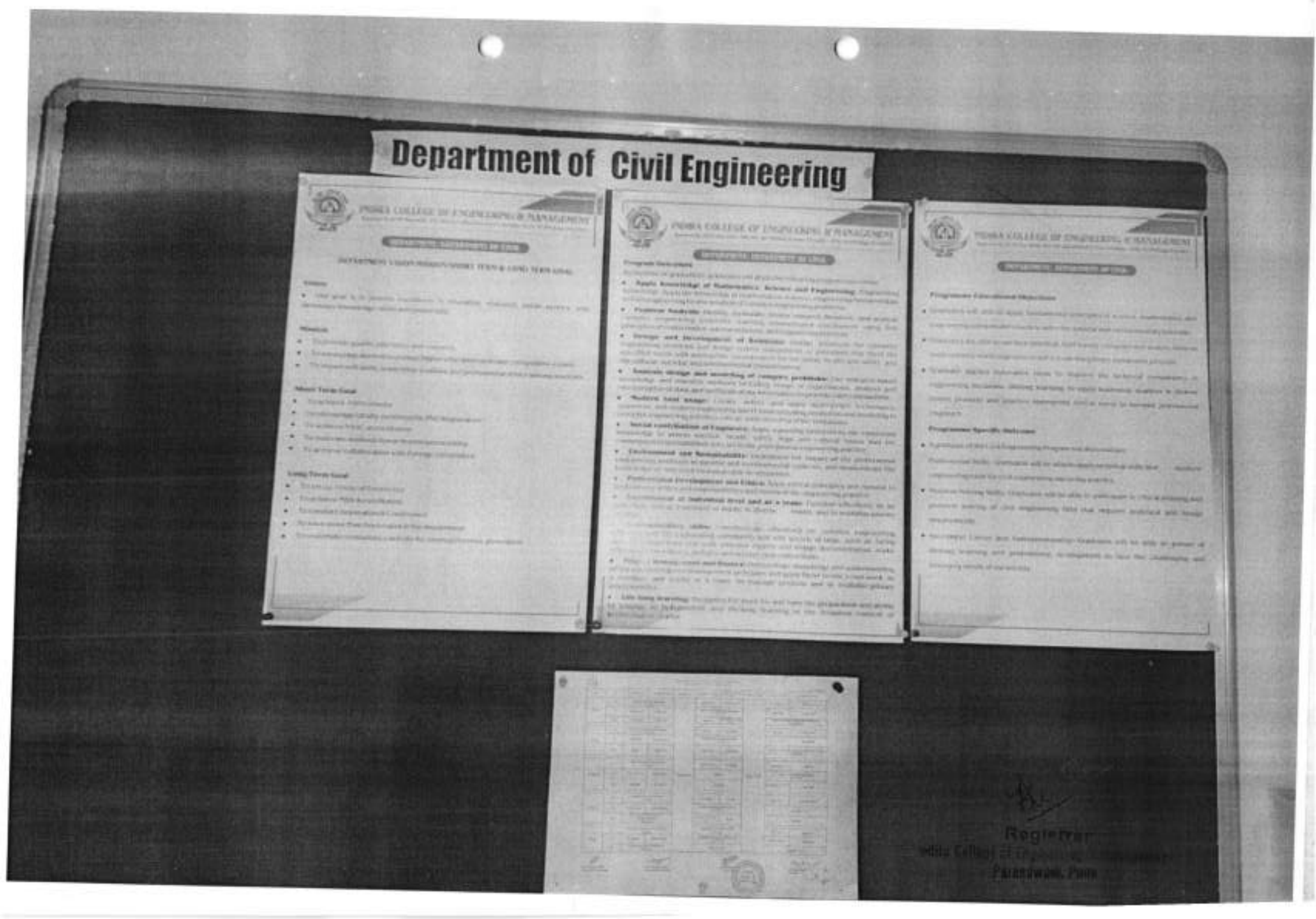
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