KPR Institute of Engineering and Technology

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(Autonomous | Affiliated to Anna University)

POSTGRADUATE PROGRAMMES

CURRICULUM AND SYLLABI

PROGRAMME

M.E. | CAD / CAM

REGULATIONS

2026

CONTROLLED COPY

I. Vision and Mission of the Institute

Vision

To become a premier institute of academic excellence by imparting technical, intellectual and professional skills to students for meeting the diverse needs of industry, society, the nation and the world at large

Mission

- Commitment to offer value-based education and enhancement of practical skills
- Continuous assessment of teaching and learning processes through scholarly activities
- Enriching research and innovation activities in collaboration with industry and institutes of repute
- Ensuring the academic processes to uphold culture, ethics and social responsibilities

II. Vision and Mission of the Department

Vision

To be recognized as a premier centre in the field of mechanical engineering education, research and development to meet the changing needs of industry and society

Mission

The mission of the department is to

- Provide fundamental and skill-based education in mechanical engineering through innovative practices in teaching and learning
- Establish centres of excellence in collaboration with reputed industries, professional bodies and research laboratories
- Promote entrepreneurship with leadership qualities, ethics, and human values for the society at large

III. Program Educational Objectives (PEOs)

The Program Educational Objectives (PEOs) of the CAD/CAM (CAD) represent major accomplishments that the graduates are expected to achieve after two years of graduation.

PEO1: Excel in design, manufacturing, automation and allied engineering sectors

PEO2: Apply advanced CAD/CAM/CAE/AI tools and computational techniques to solve complex engineering problems

PEO3: Pursue research, innovation and higher studies with professional and interpersonal skills

IV. Program Outcomes (POs)

Graduates of the CAD/CAM will be able to

PO1: An ability to independently carry out research /investigation and development work to solve practical problems

PO2: An ability to write and present a substantial technical report/document

PO3: Demonstrate proficiency in CAD and AI tools for engineering design and digital modelling

PO4: Utilize CAM technologies and quality tools for manufacturing, machining, and process optimization

PO5: Engage in lifelong learning and adapt to emerging technologies, including smart manufacturing and digitalization

PO6: Demonstrate professional ethics, societal responsibility, and a commitment to sustainable development in engineering practice

V. PEO / PO Mapping

Following three levels of correlation should be used:

1: Low
2: Medium
3: High

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Particular	PO1	PO2	PO3	PO4	PO5	PO6
PEO 1	3	2	3	3	2	2
PEO 2	3	1	3	3	2	1
PEO 3	3	3	2	1	3	2

VI. Mapping of Course Outcomes (COs) with Program Outcomes (POs)

Sem	Course Title	PO1	PO2	PO3	PO4	PO5	PO6
I	Mathematical Optimization Techniques	✓	✓	✓	-	-	-
	Computer Aided Manufacturing	-	-	✓	✓	✓	-
	Mechatronics and Automation	✓	✓	✓	✓	✓	-
	AI Applications in CAD/CAM	✓	✓	✓	✓	✓	✓
	Research Methodology and IPR	✓	✓	-	-	-	✓
	Geometric Modelling Laboratory	-	✓	✓	✓	✓	-

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CAD/CAM

Regulation 2026

For the students admitted from 2026 onwards

CHOICE BASED CREDIT SYSTEM

CURRICULUM FOR I - IV SEMESTERS

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SEMESTER I

No	Course Code	Title	Category	Type	L	T	P	J	C
1	P26MA106	Mathematical Optimization Techniques	FC	TwL	2	-	2	-	3
2	P26CC101	Computer Aided Manufacturing	PCC	T	3	-	-	-	3
3	P26CC102	Mechatronics and Automation	PCC	TwL	3	-	2	-	4
4	P26CC103	AI Applications in CAD/CAM	PCC	T	3	-	-	-	3
5	P26RMC01	Research Methodology and IPR	RMC	T	3	-	-	-	3
6	P26CC104	Geometric Modelling Laboratory	PCC	L	-	-	4	-	2
7	-	Professional Elective - I	PEC	T	3	-	-	-	3
Total									**21**

T - Theory, **L** - Laboratory, **TwL** - Theory with Laboratory, **TwP** - Theory with Project

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SEMESTER I

		Category: FC				
P26MA106	Mathematical Optimization Techniques	L	T	P	J	C
		2	0	2	0	3

QP PATTERN: B

COURSE OBJECTIVES:

- To introduce basic mathematical concepts needed for optimization
- To teach simple linear programming methods for resource allocation
- To provide basic knowledge of non-linear programming and KKT conditions
- To introduce Monte Carlo simulation

COURSE OUTCOMES:

CO 1:	Explain basic mathematical concepts (gradient, convexity) used in optimization	**Understand**
CO 2:	Formulate and solve simple linear programming problems graphically	**Apply**
CO 3:	Apply Simplex method to solve small linear programming problems	**Apply**
CO 4:	Apply Lagrange multipliers and KKT conditions for simple constrained problems	**Apply**
CO 5:	Develop basic Monte Carlo simulation models using MATLAB	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	3	2	1	-	-	-
CO 2	3	3	2	-	-	-
CO 3	3	3	2	-	-	-
CO 4	3	3	2	-	-	-
CO 5	3	3	3	-	-	-

SYLLABUS:

UNIT I: INTRODUCTION TO OPTIMIZATION **6 + 6**

Optimization – Simple examples – Gradient of a function – Hessian matrix – Convex and concave functions

UNIT II: PROGRAMMING BASICS **6 + 6**

Linear Programming – Formulation of LP problems – Graphical solution – Types of solutions – unique, alternate, unbounded, infeasible

UNIT III: SIMPLEX METHOD FOR MAXIMUM OF 3 VARIABLES **6 + 6**

Introduction to Simplex method – Simplex method for maximum of 3 variables – Big M method – Two-phase method

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UNIT IV: NON-LINEAR PROGRAMMING **6 + 6**

Non-Linear Programming – Equality constraints – Lagrange multiplier method for 2-variables – Inequality constraints – Karush-Kuhn-Tucker (KKT) conditions

UNIT V: SIMULATION MODELLING **6 + 6**

Simulation – Monte Carlo simulation – Types of simulation – static, dynamic, discrete, continuous– Random number generation – Random variate generation

LIST OF EXPERIMENTS

1. Gradient and Convexity Analysis CAD/CAM Application: Convexity check for design optimization • Compute gradient and Hessian of $f(x,y) = x^2 + y^2$ using MATLAB • Plot contour lines, gradient vectors, and check convexity using eigenvalues of Hessian
2. Graphical Solution of Linear Programming CAD/CAM Application: Product mix optimization in manufacturing • Formulate product mix problem (2 products, 2 constraints) and plot constraints • Identify feasible region, find optimal solution graphically, and verify using linprog
3. Simplex Method Implementation CAD/CAM Application: Resource allocation in production planning • Solve small LP (3 variables, 3 constraints) using Simplex method steps • Compare results with MATLAB linprog output
4. Lagrange Multipliers and KKT Conditions CAD/CAM Application: Structural design optimization under constraints • Solve maximize $f(x,y) = xy$ subject to $x + y = 10$ using Lagrange multiplier • Solve inequality constrained problem using KKT conditions and plot feasible region
5. Monte Carlo Simulation CAD/CAM Application: Manufacturing yield estimation and inventory simulation • Implement Monte Carlo simulation to estimate π and generate random variates • Simulate random demand in simple inventory system using discrete event simulation

CONTACT PERIODS:

Lecture: 30 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 60 Periods

TEXTBOOKS:

1. S. S. Rao, "Engineering Optimization: Theory and Practice", 5th Edition, John Wiley & Sons, 2019
2. Hamdy A. Taha, "Operations Research: An Introduction", 10th Edition, Pearson, 2016
3. MATLAB Documentation: "Optimization Toolbox", The MathWorks, 2025

REFERENCES:

1. Kalyanmoy Deb, "Optimization for Engineering Design: Algorithms and Examples", 2nd Edition, PHI Learning, 2012
2. J.K. Sharma, "Operations Research: Theory and Applications", 6th Edition, Macmillan Publishers, 2017
3. Stephen Boyd and Lieven Vandenberghe, "Convex Optimization", Cambridge University Press, 2004
4. Jerry Banks, Discrete-Event System Simulation, 5th Edition, Pearson, 2010

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SEMESTER I

		Category: PCC				
P26CC101	Computer Aided Manufacturing	L	T	P	J	C
		3	0	0	0	3

QP PATTERN: B

COURSE OBJECTIVES:

- To introduce the fundamentals of CAD, CAM, CAE and CIM, geometric tolerancing standards, and CAD/CAM integration through networking and data exchange formats
- To impart knowledge of process planning, CAPP, PLM and ERP systems, and the constructional features and hardware components of CNC machine tools
- To develop skills in CNC part programming using G and M codes, macro programming and CAM software, and to introduce IoT-enabled manufacturing systems in CAM

COURSE OUTCOMES:

CO 1: Explain the fundamentals of CAD, CAM, CAE and CIM, geometric tolerancing standards, and CAD/CAM integration using networking and data exchange formats (IGES, STEP) **Understand**

CO 2: Apply process planning and computer-aided process planning techniques and utilize PLM and ERP systems for product realization **Apply**

CO 3: Illustrate the constructional features of CNC machines including guide ways, drives, axis measuring systems and in-process inspection systems **Understand**

CO 4: Develop CNC part programs for turning and machining centers using G and M codes, compensation methods, canned cycles, macros and CAM software **Apply**

CO 5: Analyze IoT-enabled manufacturing systems for real-time information sensing, cloud-based resource configuration and production scheduling **Analyze**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	-	-	3	-	-	-
CO 2	-	-	3	-	-	-
CO 3	-	-	-	2	-	-
CO 4	-	-	-	3	-	-
CO 5	-	-	-	3	2	-

SYLLABUS:

UNIT I: CAD/CAM INTRODUCTION AND INTEGRATION 9

Introduction to CAD, CAM, CAE, CIM – System configuration for CAM including hardware and software – Evolution of product realization – Historical development – Engineering product specification – Geometric tolerancing: ASME, ISO, and DIN standards – Interpreting geometric specifications – Multiple part features and datum – Introduction to CAD and CAM integration – Networking: techniques, components, interface cards, and network standards – Graphics standards: graphical kernel system – Data exchange formats: IGES and STEP – Integration of CAD and CAM in CNC turning center and machining center

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UNIT II: PROCESS PLANNING AND ENTERPRISE SYSTEMS 9

Process planning – Computer-aided process planning (CAPP) – Product life cycle management (PLM) – Enterprise resource planning (ERP)

UNIT III: CNC MACHINES AND HARDWARE COMPONENTS 9

CNC machine building – Structural details – Guide ways: friction, anti-friction, and other types – Motion conversion elements: screw and nut, recirculating ball screw – Spindle assembly – Torque transmission elements: gears, timing belts, flexible couplings, bearings – Spindle and feed drives – Linear motors: open loop and closed loop control – Axis measuring systems: grating, linear scale, encoder, laser interferometer – Spindle cooling systems – Coolant types: through and shower coolant – Integral spindle with HSK and Big Plus spindle – Double ball screws – Grease lubricating system – Probing for zero offsets and first-off inspection – Tool breakage detecting system – In-process gauging system – ATC and APC

UNIT IV: CNC PROGRAMMING 9

Structure of CNC program – Coordinate system – G and M codes – Cutter radius compensation – Tool nose radius compensation – Tool wear compensation – Canned cycles – Mirroring features – Manual part programming for CNC turning and machining center – Macro programming – CNC programming for wire EDM and abrasive water jet cutting – Bulk and sheet metal forming – Generation of CNC program using CAM software

UNIT V: IOT IN CAM 9

Introduction to IoT in CAM – Overview of IoT-enabled manufacturing systems – Real-time and multi-source manufacturing information sensing – IoT-enabled smart assembly station – Cloud computing-based manufacturing resources configuration – Real-time key production performance analysis – Real-time information-driven production scheduling

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

TEXTBOOKS:

1. Radhakrishnan, P., Subramanyan, S., and Raju, V., CAD/CAM/CIM, 4th Edition, New Age International (P) Ltd., New Delhi, India, 2016
2. Zeid, Ibrahim and Sivasubramanian, R., CAD/CAM: Theory and Practice, 2nd Edition, McGraw Hill Education, New Delhi, India, 2010

REFERENCES:

1. Peter Smid, "CNC Programming Handbook", 3rd Edition, Industrial Press Inc., New York, USA, 2008
2. Mikell P. Groover, Emory W. Zimmers Jr., "CAD/CAM: Computer-Aided Design and Manufacturing", Reprint, PHI Learning Pvt. Ltd., New Delhi, India, 2022
3. Zhuming Bi, Xiaoqin Wang, "Computer Aided Design and Manufacturing", 1st Edition, Wiley-ASME Press, Hoboken, USA, 2020

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SEMESTER I

		Category: PCC				
P26CC102	Mechatronics and Automation	L	T	P	J	C
		3	0	2	0	4

QP PATTERN: B

COURSE OBJECTIVES:

- To introduce the basic elements of mechatronic systems and selection of electrical drives, switching devices, and fluid power actuators
- To understand mathematical modelling of mechanical systems and learn the architecture, programming, and interfacing of the 8051 microcontrollers
- To understand the mechatronics design process and its applications in CNC machines, robotics, and automotive systems

COURSE OUTCOMES:

CO 1: Select appropriate sensors and design suitable signal conditioning circuits for specific mechatronic applications — **Apply**

CO 2: Analyze and choose suitable electrical, hydraulic, pneumatic, or micro/nano actuators based on system requirements — **Analyze**

CO 3: Apply appropriate closed-loop control algorithms (such as PID) to achieve stability and desired responses — **Apply**

CO 4: Apply structural programs for the 8051 microcontroller and successfully interface it with external I/O devices and motors — **Apply**

CO 5: Analyze the architecture of complex mechatronic systems, such as CNC machines and engine management systems — **Analyze**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	1	1	-	-	2	-
CO 2	1	1	2	-	2	-
CO 3	1	1	3	-	2	-
CO 4	1	1	-	3	2	-
CO 5	1	1	-	2	1	-

SYLLABUS:

UNIT I: MECHATRONICS SYSTEMS AND SENSORS — **9 + 6**

Introduction to mechatronics systems – definition, key elements, hardware-software integration. Sensors – static/dynamic characteristics, classification (linear, rotational, force, temperature, proximity, optical, micro/nano), selection criteria. Signal conditioning – amplifiers (inverting, non-inverting, instrumentation), filters. A/D and D/A converters

UNIT II: ACTUATION SYSTEMS AND DRIVES — **9 + 6**

Electrical actuators – DC motors, AC/servo/stepper motor characteristics. Drives and switching devices – AC drives, H-bridge circuits, stepper driving circuits, relays, solenoids. Fluid power actuators – hydraulic and pneumatic systems and control. Micro and nano actuators – types and characteristics

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UNIT III: SYSTEM MODELING AND CONTROL STRATEGIES **9 + 6**

System representation – transfer functions for mechanical systems. System response – time response, stability analysis. Control systems – open-loop vs closed-loop. Controllers – P, PD, PI, PID; control realization via microprocessors, microcontrollers, and PLCs

UNIT IV: MICROCONTROLLERS AND INTERFACING **9 + 6**

8051 microcontroller – architecture, addressing modes, instruction set, programming. Memory and I/O – memory types, I/O devices. Interfacing – stepper and servo motor interfacing. Advanced microcontrollers – architectures and typical applications

UNIT V: MECHATRONICS SYSTEM DESIGN AND APPLICATIONS **9 + 6**

Mechatronics design process – stages, traditional vs mechatronic approach. Applications – CNC machines, serial manipulators. Engine management systems – architecture and elements. Automation – car production/assembly line systems

LIST OF EXPERIMENTS

1. Calibration of the LVDT / proximity sensor and plotting its characteristic curve
2. Design of a signal conditioning circuit (amplifier/filter) for a given sensor output
3. Speed control of DC servo motor using a control trainer kit
4. Direction and speed control of the stepper motor interfaced with a microcontroller
5. Operation of a pneumatic circuit for cylinder reciprocation using solenoid valves
6. Tuning of PID controller parameters for a closed-loop temperature/speed control trainer
7. Interfacing a stepper/servo motor with 8051 microcontroller for position control
8. Ladder logic programming and execution on PLC for a conveyor/traffic light automation application

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** 30 Periods **Project:** - Periods **Total:** 75 Periods

REFERENCES:

1. Biswanath Samanta, "Introduction to Mechatronics: An Integrated Approach", 1st Edition, Springer, Cham, Switzerland, 2023
2. Md. Mizanur Rahman, Farhan Mahbub, Rumana Tasnim, Rezwan Us Saleheen (Eds.), "Mechatronics: Fundamentals and Applications", 1st Edition, Springer, Singapore, 2024
3. Fernando Martell, Irma Y. Sanchez, "Practical Control Engineering for Mechatronics and Automation", 1st Edition, CRC Press (Taylor & Francis), Boca Raton, USA, 2024
4. Ajay Kumar, Parveen Kumar, Aydin Azizi (Eds.), "Advances in Mechatronics Systems: Principles, Elements and Applications", 1st Edition, Springer, Singapore, 2024
5. Aydin Azizi (Ed.), "Control Engineering in Mechatronics", 1st Edition, Springer, Singapore, 2023

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SEMESTER I

		Category: PCC				
P26CC103	AI Applications in CAD/CAM	L	T	P	J	C
		3	0	0	0	3

QP PATTERN: B

COURSE OBJECTIVES:

- Understand the fundamental concepts of Artificial Intelligence and machine learning and their applications in engineering design and manufacturing
- Apply AI techniques in computer-aided design, engineering analysis, and manufacturing processes for improved performance and optimization
- Evaluate AI-driven smart manufacturing systems, including Industry 4.0 technologies such as IoT, digital twins, and predictive maintenance

COURSE OUTCOMES:

CO 1:	Explain the fundamentals of AI and its role in engineering design and manufacturing	**Understand**
CO 2:	Apply AI techniques in computer aided design system	**Apply**
CO 3:	Apply AI assisted engineering in simulations and design optimization	**Apply**
CO 4:	Apply AI in manufacturing process planning and machining operations	**Apply**
CO 5:	Apply AI applications in smart manufacturing and Industry 4.0	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	3	-	1	-	-	-
CO 2	3	-	1	-	-	-
CO 3	3	3	2	1	-	-
CO 4	-	3	-	2	-	2
CO 5	-	3	-	-	1	2

SYLLABUS:

UNIT I: FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE IN ENGINEERING 9

Introduction to Artificial Intelligence – AI in engineering design and manufacturing – Knowledge based systems – Machine learning concepts – Types of learning – Supervised, unsupervised and reinforcement learning – Data driven engineering – Applications of AI in CAD/CAM and smart manufacturing

UNIT II: AI IN COMPUTER AIDED DESIGN 9

Intelligent CAD systems – Knowledge based design – Feature based design – Design automation – AI assisted geometric modeling – Machine learning in design optimization – Parametric and generative design – Case studies in AI based product design

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UNIT III: AI IN COMPUTER AIDED ENGINEERING 9

AI assisted engineering analysis – Surrogate modeling – AI based prediction of stress, deformation and fatigue – Neural networks in finite element analysis – Design optimization using machine learning – AI based topology optimization – Applications in structural and mechanical design

UNIT IV: AI IN COMPUTER AIDED MANUFACTURING 9

AI based process planning – Intelligent tool path generation – Machine learning for machining parameter optimization – AI based tool wear prediction – Smart machining and adaptive control – AI in additive manufacturing – Intelligent manufacturing systems

UNIT V: AI FOR SMART MANUFACTURING AND INDUSTRY 4.0 9

Digital manufacturing systems – Internet of Things (IoT) in manufacturing – Digital twins – Predictive maintenance using AI – Big data in manufacturing – AI enabled smart factories – Future trends in AI driven design and manufacturing

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

REFERENCES:

1. Automation, Production Systems and Computer-Integrated Manufacturing, Groover, Mikell P., Automation, Production Systems and Computer-Integrated Manufacturing. 5th ed. Pearson, 2022
2. Machine Learning: A Probabilistic Perspective, Murphy, Kevin P., Machine Learning: A Probabilistic Perspective. MIT Press, 2012
3. Artificial Intelligence: A Modern Approach, Russell, Stuart J., and Norvig, Peter, Artificial Intelligence: A Modern Approach. 3rd ed. Pearson, 2010
4. CAD/CAM: Theory and Practice, Zeid Ibrahim, CAD/CAM: Theory and Practice. McGraw Hill, 1991

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SEMESTER I

P26RMC01	Research Methodology and IPR (Common to CAD, DS, ES, PCS, PHDCE, PHDIC, PHDME, PHDSH, SE, VL)	Category: RMC				
		L	T	P	J	C
		3	0	0	0	3

QP PATTERN: B

COURSE OBJECTIVES:

- To impart knowledge in problem formulation, analysis and solutions
- To impart skills required for technical paper writing / presentation without violating professional ethics
- To familiarize knowledge on patent drafting and filing patents

COURSE OUTCOMES:

CO 1: Apply the principles of research problem formulation to identify, define, and investigate engineering research problems using appropriate data collection and analysis techniques — **Apply**

CO 2: Analyze research literature, data collection methods, research ethics, and plagiarism issues to identify research gaps and select suitable methodologies — **Analyze**

CO 3: Evaluate the quality of technical reports, research papers, and research proposals by applying standard scientific writing and presentation practice — **Evaluate**

CO 4: Apply the principles and procedures of Intellectual Property Rights (IPR), including patents, patent filing, and international patenting systems, to protect technological innovation — **Apply**

CO 5: Evaluate patent rights, technology transfer mechanisms, patent databases, geographical indications, and emerging developments in Intellectual Property Rights for engineering and research applications — **Evaluate**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	3	-	-	-	-	-
CO 2	3	-	-	-	-	-
CO 3	3	3	-	-	-	-
CO 4	-	3	-	-	-	2
CO 5	-	3	-	-	-	2

SYLLABUS:

UNIT I: RESEARCH PROBLEM FORMULATION 9

Meaning of research problem – Sources of research problem – Criteria characteristics of a good research problem – Errors in selecting a research problem – Scope and objectives of research problem. Approaches of investigation of solutions for research problem – Data collection – Analysis – Interpretation – Necessary instrumentations

UNIT II: LITERATURE REVIEW AND DATA COLLECTION 9

Effective literature studies approaches – Analysis – Plagiarism and research ethics. Method of data collection – Types of data – Primary Data – Scales of measurement – Source and collection of data observation method – Secondary data

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UNIT III: TECHNICAL WRITING / PRESENTATION 9

Effective technical writing: How to write report – Paper – Developing a research proposal – Format of research proposal – Presentation and assessment by a review committee

UNIT IV: INTRODUCTION TO INTELLECTUALPROPERTY RIGHTS 9

Nature of Intellectual Property: Patents – Designs – Trade and Copyright. Process of Patenting and Development – technological research – Innovation – Patenting – Development – International Scenario – International cooperation on Intellectual Property – Procedure for grants of patents – Patenting under PCT

UNIT V: INTELLECTUAL PROPERTYRIGHTS 9

Patent Rights: Scope of Patent Rights – Licensing and transfer of technology – Patent information and databases – Geographical Indications – New Developments in IPR – Administration of Patent System – IPR of Biological Systems – Computer Software etc.

CONTACT PERIODS:

Lecture: 45 Periods **Tutorial:** - Periods **Practical:** - Periods **Project:** - Periods **Total:** 45 Periods

REFERENCES:

1. Cooper, DR and Schindler, P S., "Business Research Methods", 9th edition, Tata McGraw Hill, 2014
2. Robert P.Merges, Peter S, Menell, Mark A.Lemley, "Intellectual Property in New Technological age", Volume I, Clause 8 Publishing,2022
3. Ranjit Kumar, "Research Methodology: A Step by Step Guide for beginners", 3rd edition, Sage Publications,2010

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SEMESTER I

P26CC104	Geometric Modelling Laboratory	Category: PCC				
		L	T	P	J	C
		0	0	4	0	2

QP PATTERN: B

COURSE OBJECTIVES:

- Model 3D view of the given orthographic projections
- Convert 3D part models to 2D drawings
- Assemble the developed product

COURSE OUTCOMES:

CO 1:	Model 3D components using solid and surface modelling techniques	**Apply**
CO 2:	Assemble components with GD&T checks and generate drafting layouts and CAD data exchange format	**Apply**
CO 3:	Design sheet metal, weldment, and casting features with appropriate manufacturing allowances	**Apply**
CO 4:	Design gears and fasteners, and analyze gear train kinematics using motion study	**Apply**

CO - PO MAPPING:

Particular	PO1	PO2	PO3	PO4	PO5	PO6
CO 1	-	-	3	-	-	-
CO 2	-	1	3	-	2	-
CO 3	-	-	3	3	-	-
CO 4	-	-	3	2	-	-

SYLLABUS:

LIST OF EXPERIMENTS

1. Feature manipulation – Copy – Edit – Pattern – Suppress – History operations etc., using Solid Modeling Software
2. Solid modeling using Extrude – Revolve – Sweep etc
3. Surface modeling – Mesh of curves and Free form using Solid Modeling Software
4. Sheet metal Design – creation of thin feature and manipulation
5. Assembly of the developed components – Exploded Views – Interference check – Geometric dimensioning and Tolerances
6. Drafting – Layouts – Standard & Sectional Views – Detailing & Plotting
7. CAD data Exchange formats – IGES – PDES – PARASOLID – DXF and STL
8. Weldment design – Design and creating the chassis of an automobile
9. Casting Design – create casting design with allowances – positioning of runner and riser – Core prints
10. Design of straight – helical gears and analyzing the kinematics of gear train using motion study
11. Usage of standard package for designing fasteners

CONTACT PERIODS:

Lecture: - Periods **Tutorial:** - Periods **Practical:** 60 Periods **Project:** - Periods **Total:** 60 Periods

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REFERENCES:

1. Radhakrishnan P, Subramanian S. and Raju V., "CAD/CAM/CIM", 2nd edition, New Age International (P) Ltd, New Delhi, 2000

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