

Basaveshwar Engineering College, Bagalkote
Department of Industrial and Production Engineering
Scheme of Teaching and Evaluation
(THE STUDENTS ADMITTED TO FIRST YEAR IN THE ACADEMIC YEARS 2022-23 AND 2023 - 24)

VII Semester

[illegible]

Course Code : 22UHS711C			RESEARCH METHODOLOGY AND IPR	Semester : VII/VIII
L:T:P : 03:0:0				Course Type : AEC
Hours/Sem.	Teaching : 42Hrs.			CIE Marks : 50
	Learning (TW+SL) : 42Hrs.			SEE Marks : 50
	Exam : 06Hrs.			Total Marks : 100
	Total Hrs. : 90Hrs.			Credits : 03
Professional Competency:				
Ability to apply research methodology and reflective thinking in engineering sciences, while effectively utilizing modern tools to protect intellectual creations through appropriate forms of IPR, and demonstrating the skills required to qualify as a patent agent at national and international levels.				
Course Outcomes:				
After completion of the course, student will be able to:				
CO1: Integrate research methodology in engineering sciences in relevant trades.				
CO2: Exhibit reflective thinking in problem solving exercises.				
CO3: Identify criteria to fit one’s own intellectual work in particular form of IPRs				
CO4: Develop skill of making search using modern tools and techniques and also student is able to become patent agent by cracking patent agent exam				
UNIT-I				10 Hrs.
Introduction to Engineering Research				
Fundamentals of Research: Meaning, objectives, and motivation in engineering research.				
Types of Engineering Research: Basic, applied, and translational research; identifying and solving Worthwhile problems.				
Research Ethics: Ethics in engineering research and practice, types of research misconduct, and ethical issues in authorship...				
UNIT-II				10 Hrs.
Literature Review and Citations				
Technical Reading & Analysis: Methods for reviewing literature, analyzing prior art, and synthesizing new and existing knowledge.				
Bibliographic Databases: Web of Science, Google, Google Scholar, effective search strategies.				
Conceptualizing Research: Critical and creative reading, taking notes, reading mathematical models, algorithms, and datasheets.				
Citations & Acknowledgments: Attribution, citation styles, impact of keywords, citing datasets, and knowledge dissemination.				
UNIT-III				10Hrs.
Fundamentals of Intellectual Property Rights and Patents				
Introduction to Intellectual Property Rights (IPR):Concept, nature, and significance of Intellectual Property.				
Types of Intellectual Property: Patents, Copyrights, Trademarks, Industrial Designs, Geographical Indications, Trade Secrets, and Plant Varieties.				
Role of IPR in innovation: research, entrepreneurship, and economic development. International IPR Framework: Overview of WIPO, WTO, TRIPS Agreement, Paris Convention, and Berne Convention.				
Patents: Meaning, objectives, and characteristics of patents. Patentable and non-patentable inventions.				
Criteria for patentability: Novelty, Inventive Step, and Industrial Applicability.				
Patent search: Importance and databases (InPASS, PATENTSCOPE, Google Patents).				
Patent filing procedure in India: Provisional and Complete Specifications. Patent examination, publication, opposition, grant, renewal, and infringement.				
UNIT-IV				10 Hrs.
Copyrights, Trademarks, Industrial Designs and IPR Management				
Copyrights: Meaning, subject matter, ownership, duration, and infringement, Copyright issues in the digital environment and academic research.				
Trademarks and Industrial Designs: Concept and importance of trademarks. Registration process, infringement, and remedies. Industrial Designs: Registration, protection, and significance.				
Geographical Indications and Trade Secrets: Concept, registration, and protection of Geographical Indications. Trade				

secrets and confidential information.

IPR Management and Commercialization: Technology Transfer and Licensing. Patent valuation and commercialization. Intellectual Property in Start-ups and Academic Institutions.

Case Studies on Patents. Case study of Curcuma (Turmeric) Patent, Case study of Neem Patent, Case study of Basmati patent. **IP Organizations In India. Schemes and Programmes.**

Text Books:

1. Dr. Nejakar Santosh M, Dr. Bendigeri Harish (2023-24) "Research Methodology and Intellectual Property Rights", ISBN 978-93-5987-928-4

Reference Books:

1. Thiel David V. "Research Methods for Engineers" Cambridge University Press,
2. Acharya N.K Intellectual Property Rights . 6th Edition, Asia Law House.
3. P. Naryan, (2007). "Intellectual Property Law", 3rd Ed, Eastern Law House,
4. Dr. Myneni S.R.,(2019) "Law of Intellectual Property", 9th edition, Asia law House,.
5. Dr. Reddy G.B, (2020) "Intellectual Property Rights and Law", Reprint edition, Gogia Law Agency. Hydrabad,.
6. N.R. Subbaram. S. Viswanathan, (2008). "Hand book Indian Patent Law and, Practice" Printers and publishers Pvt,Ltd,
7. Cornish, "Intellectual Property Rights", Universal publications

Web Links and Video Lectures:

- 1.https://mooc.utm.my/courses/researchmethodologyforen?utm_source=chatgpt.com
- 2.https://arxiv.org/abs/physics/0601009?utm_source=chatgpt.com
- 3.https://scholar.google.com/?utm_source=chatgpt.com
- 4.https://www.webofscience.com/?utm_source=chatgpt.com
- 5.https://www.wipo.int/en/web/wipo-academy/programs/ip-elearning?utm_source=chatgpt.com
- 6.https://ipindia.gov.in/?utm_source=chatgpt.com
- 7.https://patentscope.wipo.int/?utm_source=chatgpt.com
- 8.https://patents.google.com/?utm_source=chatgpt.com
- 9.https://nptel.ac.in/courses/109106148?utm_source=chatgpt.com

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)										
	1	2	3	4	5	6	7	8	9	10	11
CO1	-	2 WK2&7	2 WK3&8	3 WK4	2 WK5	1 WK7	2 WK8	3 WK9	-	1 WK10	2 WK11
CO2	-	3 WK2&7	2 WK3&8	3WK4	-	2 WK7	2 WK8	2 WK9	-	-	2 WK11
CO3	-	-	-	-	2 WK5	3 WK7	2 WK8	3 WK9	-	1 WK10	3 WK11
CO4	-	-	-	2 WK4	3 WK5	2 WK7	-	1 WK9	-	1 WK10	-

Course Code :		22UIP702C	SUPPLY CHAIN MANAGEMENT	Semester :	VII
L: T:P :		3: 0 :0		Course Type :	Theory
Hours/Sem.	Teaching	: 42 Hrs.		CIE Marks	: 50
	Learning (TW+SL)	: 42 Hrs.		SEE Marks	: 50
	Exam	: 06 Hrs.		Total Marks	: 100
	Total Hrs.	: 90 Hrs.		Credits	: 03

Professional Competency:

Ability to analyze, design, coordinate, and improve supply chain networks and logistics systems for achieving operational efficiency, strategic competitiveness, and sustainable business performance for integrated supply chains

Course Outcomes:

After completion of the course students will be able to

- CO1.** Apply supply chain concepts, performance metrics, and strategic fit principles to evaluate the effectiveness of supply chain operations in manufacturing and service organizations.
- CO2.** Analyze the impact of supply chain drivers, distribution networks, and coordination mechanisms on organizational performance and customer responsiveness.
- CO3.** Apply quantitative and qualitative approaches for designing supply chain networks, transportation systems, and global supply chain structures.
- CO4.** Analyze the role of information technology, sustainability practices, and risk management in improving supply chain efficiency and competitiveness.

UNIT-I					10 Hrs.
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Chapter 1: UNDERSTANDING THE SUPPLY CHAIN

What Is a Supply Chain? Historical Perspective, The Objective of a Supply Chain, The Importance of Supply Chain Decisions, Decision Phases in a Supply Chain, Process Views of a Supply Chain, Examples of Supply Chains

Chapter 2: SUPPLY CHAIN PERFORMANCE: ACHIEVING STRATEGIC FIT AND SCOPE

Competitive and Supply Chain Strategies, Achieving Strategic Fit, Expanding Strategic Scope, Challenges to Achieving and Maintaining Strategic Fit, Achieving and Maintaining Strategic Fit in Emerging: Retail Markets: The Indian Scenario, The Experience, Adaptation

► CASE STUDY: The Demise of Blockbuster

► CASE STUDY: Rise and Fall of Subhiksha

UNIT-II					10 Hrs.
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Chapter 3: SUPPLY CHAIN DRIVERS AND METRICS

Impellers of Supply Chain, Financial Measures of Performance, Drivers of Supply Chain Performance, Framework for Structuring Drivers, Facilities, Inventory, Transportation, Information, Sourcing, Pricing, Infrastructure, International Logistics,

► CASE STUDY: Seven-Eleven Japan Co.

► CASE STUDY: Financial Statements for Walmart Stores Inc. and Macy's Inc.

Chapter 4: DESIGNING DISTRIBUTION NETWORKS AND APPLICATIONS TO ONLINE SALES

The Role of Distribution in the Supply Chain, Factors Influencing Distribution Network Design, Design Options for a Distribution Network, Online Sales and the Distribution Network, Indian Agricultural Produce Distribution Channels: Ripe for Major Transformation, Indian FMCG Sector-distribution Channels, Indian Commodities Distribution Channels, Distribution Networks in Practice,

► CASE STUDY: Blue Nile and Diamond Retailing

UNIT-III					10 Hrs.
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Chapter 5: NETWORK DESIGN IN THE SUPPLY CHAIN

The Role of Network Design in the Supply Chain, Factors Influencing Network Design Decisions, Framework for Network Design Decisions, Models for Facility Location and Capacity Allocation, Jaipur Rugs-networking Tradition with Modernity, Making Network Design Decisions in Practice, The Impact of Uncertainty on Network Design,

► CASE STUDY: Managing Growth at SportStuff.com

► CASE STUDY: Designing the Production Network at Cool Wipes

Chapter 6: DESIGNING GLOBAL SUPPLY CHAIN NETWORKS

The Impact of Globalization on Supply Chain Networks, The Offshoring Decision: Total Cost, Risk Management in Global Supply Chains

Chapter 7: COORDINATION IN A SUPPLY CHAIN

Lack of Supply Chain Coordination and the Bullwhip Effect, The Effect on Performance of Lack of Coordination, Obstacles to Coordination in a Supply Chain, Managerial Levers to Achieve Coordination, Continuous Replenishment and Vendor-Managed Inventories, Collaborative Planning, Forecasting, and Replenishment, Collaborative Planning,

Forecasting, and Replenishment—Indian Experiences, Achieving Coordination in Practice	
UNIT–IV	12 Hrs.
Chapter 8: TRANSPORTATION IN A SUPPLY CHAIN	
The Role of Transportation in a Supply Chain, Modes of Transportation and Their Performance Characteristics, Transportation Infrastructure and Policies, Design Options for a Transportation Network, Mumbai Dabbawallas: A Highly Responsive Distribution Network, Trade-Offs in Transportation Design, Tailored Transportation, The Role of IT in Transportation, Making Transportation Decisions in Practice,	
▶ CASE STUDY: Designing the Distribution Network for Michael’s Hardware	
▶ CASE STUDY: The Future of Same-Day Delivery: Same as the Past?	
▶ CASE STUDY: Selecting Transportation Modes for China Imports	
Chapter 9: SUSTAINABILITY AND THE SUPPLY CHAIN	
The Role of Sustainability in a Supply Chain, The Tragedy of the Commons, Key Pillars of Sustainability, Sustainability and Supply Chain Drivers, closed-Loop Supply Chains, The Pricing of Sustainability,	
▶ CASE STUDY: Sustainable Supply Chains—Indian Efforts 559	
▶ CASE STUDY: HUL—A Sustainable Supply Chain 559	
▶ CASE STUDY: Future of Supply Chains 560	
Chapter10: A INFORMATION TECHNOLOGY IN A SUPPLY CHAIN	
The Role of IT in a Supply Chain, The Supply Chain IT Framework, Customer Relationship Management, Internal Supply Chain Management, Supplier Relationship Management, The Transaction Management Foundation, The Future of IT in the Supply Chain, Risk Management in IT, Supply Chain IT in Practice	
Text Books:	
1. Supply Chain Management–Strategy, Planning & Operation. Sunil Chopra, Peter Meindl, and Dharam Vir Kalra, Pearson Education Asia, ISBN: 978-93-325-4823-7, eISBN: 978-93-325-8267-5, Sixth Edition.	
Reference Books:	
1. Supply Chain Redesign–Transforming Supply Chains into Integrated Value Systems. Robert B Handfield, Ernest L Nichols, Jr., Pearson Education Inc, 3rd Edition (3rdImpreesion), 2007, ISBN: 81-317-0401-7	
2. Modelling the Supply Chain -Jeremy F Shapiro, Duxbury, Thomson Learning, 2002, ISBN 0-534-37363	
3. Designing & Managing the Supply Chain. David Simchi Levi, Philip Kaminsky& Edith Simchi Levi; McGraw Hill	
Weblinks and Video Lectures (E-Resources):	
• Supply Chain Analytics by Prof. Rajat Agrawal (IIT Roorkee):	
Link: https://nptel.ac.in/courses/110107114	
• Supply Chain Management by Prof. Janat Shah (IIM Udaipur):	
Link: https://nptel.ac.in/courses/110108056	
• https://www.linkedin.com/pulse/amuls-supply-chain-management-strategy-amit-srivastava-q41dc/	
• https://bookboon.com/en/supply-chain-management-ebook	
• https://www.youtube.com/watch?v=Lpp9bHtPAN0	
• https://www.youtube.com/watch?v=Tb2zZ8AKftY	
• https://www.youtube.com/watch?v=j8cAITW_FC8	

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3 (WK1, WK2)	2 (WK3)	-	-	-	-	-	-	-	-	2 (WK4)	2	2	-
CO2	2 (WK1)	3 (WK2, WK3)	-	2 (WK4)	-	-	-	-	-	-	2 (WK5)	3	3	-
CO3	2 (WK1, WK2)	3 (WK3)	3 (WK5)	2 (WK4)	1 (WK6)	-	-	-	-	-	2 (WK5)	2	3	-
CO4	2 (WK1)	2 (WK3)	-	2 (WK4)	3 (WK6)	2 (WK7)	3 (WK7)	-	-	-	2 (WK5)	3	2	-

Course Code		:	22UIP704P	PROJECT	Semester	:	VII
L: T:P		:	0:0 :9		Course Type	:	Project
Hours/Sem.	Teaching (Contact hours)	:	0 Hrs.		CIE Marks	:	50
	Learning (TW+SL)	:	294 Hrs.		SEE Marks	:	50
	Exam	:	6 Hrs.		Total Marks	:	100
	Total Hrs.	:	300 Hrs.		Credits	:	12

Professional Competency:

Develop the ability to identify, investigate, design, implement, validate, and communicate innovative solutions to complex Industrial and Production Engineering problems by integrating engineering knowledge, modern tools, research methodologies, sustainability principles, teamwork, and project management practices.

Course Outcomes:

After completion of the course, the student will be able to:

- CO1. Apply engineering principles, research methodologies, and modern engineering tools to identify, formulate, and plan the solution of a complex Industrial and Production Engineering problem.
- CO2. Analyze, model, design, and implement an engineering solution using appropriate analytical, computational, experimental, and optimization techniques.
- CO3. Evaluate and validate the developed solution considering technical performance, economic feasibility, sustainability, societal impact, environmental aspects, and ethical responsibilities.
- CO4. Demonstrate professional competence through effective project management, teamwork, technical documentation, presentation, communication, and lifelong learning during project execution.

252 Hrs.

Number of students per batch: Maximum4

Evaluation

Evaluation : 15 Marks

Review : 15 Marks

Guide : 20 Marks

Evaluations will be done by a department committee consisting of

- HOD or his Nominee
- Guide
- Project Coordinator

SEE:

Students have to submit project diary.

The evaluation of the SEE will be based on write-up (10marks) +Demo (15marks) +Presentation (15marks) and Viva- Voce(10marks)

Evaluation Committee

- HOD or his nominee
- External Examiner
- Project Coordinator

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3(WK2, WK3)	3(WK3, WK4)	2(WK4)	2(WK4)	3(WK6)	–	–	–	–	1	2(WK6)	3	3	2
CO2	2(WK3)	3(WK4)	3(WK4, WK5)	3(WK4, WK5)	3(WK6)	1	1	–	1	1	2(WK6)	3	3	3
CO3	2(WK4)	2(WK5)	2(WK5)	3(WK5)	2(WK6)	3(WK7)	3(WK7)	2(WK8)	1	2	3(WK5, WK6)	3	3	3
CO4	1	1	1	1	2(WK6)	1	1	2(WK8)	3(WK8)	3(WK8)	3(WK8)	3	3	2

Scheme of evaluation for Project

RUBRICS FOR PROJECT VII/VIII SEMESTER

SEMESTER VII/VIII

Rubrics for	Phase	Period (Duration)	Rubric #	Marks	Evaluation by
CIE	Evaluation-I	Before first one and half month in VII/VIII semester of BE Program	R1	15	Committee consisting of HOD/Nominee + Project Coordinator/Nominee of Project Coordinator + Guide(s)
	Evaluation-II	Before 15 days from the last working day of VII/VIII semester of BE Program	R2	15	
	Evaluation by guide	In the last week of working days of VII/VIII semester	R3	20	Guide(s)
SEE	Semester End Examination	During SEE of VII/VIII semester of BE Program	R4	50	Committee consisting of HOD/Nominee + External Examiner

The evaluation criteria may vary *marginally* (maximum of 5%) from the perspective of different disciplines but the structure/stages of evaluation and allotted marks for each stage of evaluation in 7th or 8th semesters must be same for all the branches across the institute.

R1. Synopsis presentation (Before the end of the first one and half months in the VII/VIII semester of the BE Program): **Total Marks of 15**

Evaluation Criteria	Score/Marks			Total Marks	Evaluation By
	Poor (Needs Improvement) (1)	Average (Acceptable) (2)	Very good (Proficient) (3)		
Motivation And Rationale behind the project	- Less motivated and has less desire to achieve a goal, accomplish a task, or work - Need for the process /product that offers viable solutions to accomplish a work towards expectations in a challenging and interesting area is not good	- Moderately motivated and has some interest to achieve a goal, accomplish a task, or work - Need for the process /product that offers viable solutions to accomplish work towards expectations in a challenging and interesting area is okay and acceptable	- Highly motivated and desirous to achieve a goal, accomplish a task, or work - Need for the process /product that offers viable solutions to accomplish work towards expectations in a challenging and interesting area is good	15	Committee consisting of HOD/Nominee +Project Coordinator + Guide(s) Each will be evaluated for 15 marks and the average of all three is the marks awarded
Literature review	Less than 3 technical papers are reviewed and less relevant	Three to five technical papers are reviewed and moderately relevant	More than 5 technical papers from reputed journals are made and reviews are quite relevant to the project work		

Objectives, Project plan	Only some objectives of the proposed work are well defined and ill-defined project plan	Incomplete justification to the objectives proposed and moderately defined project plan	Good justification to the objectives and well-defined project plan		
Proposed methodology	Division of project work into modules but improper selection of design approaches and design methodology and not properly justified	Division of project work into modules with proper selection of design approaches and design methodology but not properly justified	Division of project work into modules and good selection of design approaches, appropriate design methodology with proper justification		
Presentation	- Contents of presentations are not appropriate and not well arranged - Very less eye contact and unclear voice	- Contents of presentations are appropriate but not well arranged - Eye contact with few people and unclear voice	- Contents of presentations are appropriate and well arranged - Satisfactory demonstration, clear voice with good spoken language and good non-verbal communication		

R2. Project Complete presentation (Before 15 days of the end of the Last month in the VII/VIII semester of the BE Program): Total Marks of 15

Evaluation Criteria	Score/Marks			Total Marks	Evaluation By
	Poor (Needs Improvement) (1)	Average (Acceptable) (2)	Very good (Proficient) (3)		
Involvement in the work and ability to work in a team	Less involved in the work	Would have involved still more	Sincerely involved in the work and very hard working and has good interest	15	Committee consisting of HOD/Nominee +Project Coordinator + Guide(s) Each will be evaluated for 15 marks and the average of all three is the marks awarded
Incorporation of Suggestions made in the previous review	Some changes are made as per modifications suggested during previous evaluation	All major changes are made as per modifications suggested during previous evaluation	Changes are made as per modifications suggested during previous evaluation and good justification		
Results and Discussion	- Results are not presented properly, Project work is not summarized and concluded - Future extensions in the project are not	- Results presented are not much satisfactory, Project work summary and conclusion not very appropriate - Future extensions in the project are not	Results are presented in good manner, Project work summary and conclusion not very appropriate		

	specified	specified	Future extensions in the project are specified		
Demonstration/ Conclusion	Modules are not in proper working form that further leads to failure of integrated system, Contents of presentations are not appropriate and not well delivered	Modules are working well in isolation and properly demonstrated, Modules of project are not properly integrated, Contents of presentations are appropriate but not well delivered	Each module working well and properly demonstrated, Integration of all modules done and system working is very satisfactory		
Presentation	- Contents of presentations are not appropriate and not well arranged - Very less eye contact and unclear voice	- Contents of presentations are appropriate but not well arranged - Eye contact with few people and unclear voice	- Contents of presentations are appropriate and well arranged - Satisfactory demonstration, clear voice with good spoken language and good eye contact		

R3: Evaluation by the guide (In the last week of working days of VII semester): Total Marks of 20

Evaluation Criteria	Score/Marks				Total Marks	Evaluated by
	Needs improvement (Poor) (2)	Acceptable (Average) (3)	Satisfactory (Good) (4)	Proficient (Excellent) (5)		
Technical Knowledge gained through project work	Poor knowledge and no awareness related to project	Lacks sufficient knowledge and Awareness	Fair knowledge and awareness related to the project	Extensive knowledge and awareness related to the project	20	Guide(s)
Regularity and Attendance	Irregular and inconsistent in work	Reports to the guide but lacks Consistency	Reports to the guide very often but not very consistent	Reports to the guide regularly and consistent in work		
Incorporation of Suggestions made periodically	Major changes are not made as per modifications suggested	Few changes are made as per modifications suggested	Changes are made as per modifications suggested	Changes are made as per modifications suggested and innovations are added		
Organization and structure of Project Report	Project report not prepared according to the specified format, References and citations	Project report is according to the specified format but some mistakes, Insufficient	Project report is according to the specified format, References and citations are	Project report is according to the specified format, References and citations are appropriate and well mentioned		

	are not appropriate	references and citations	appropriate but not mentioned well			
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R4: SEE Evaluation for Project Phase (During SEE of VII/VIII semester of BE Program):
Total Marks of 50

Evaluation Criteria	Score				Total Marks	Evaluation By
	Needs improvement (Poor) (4)	Acceptable (Average) (6)	Satisfactory (Good) (8)	Proficient (Excellent) (10)		
Presentation	Contents of presentations are not appropriate and not well delivered, Poor eye contact with audience and unclear voice	Contents of presentations are appropriate but not well delivered, Eye contact with only few people and unclear voice	Contents of presentations are appropriate and well delivered, Clear voice with good spoken language but less eye contact with audience	Contents of presentations are appropriate and well delivered, Proper eye contact with audience and clear voice with good spoken language	50	Internal Examiner + External Examiner Each will evaluate for 50 marks and average of two will be taken
Designs and implementation	Proper design methodology is not followed resulting into poor design, No modern tools are used to implement, Work contributes very less to the world	Proper design methodology is followed, Design lacks, very less modern tools are used to implement, the work contributes to the world in little way	Proper design methodology is followed, Design is done but not perfect, few modern tools are used to implement, the work contributes to the world in some way	Proper design methodology is followed, Design is perfect, Modern tools are used to implement, the work contributes to the world in greater way		
Results and Demonstration	- Some of the defined objectives are achieved - Modules are not in proper working form that further leads to failure of integrated system	- All defined objectives are achieved - Modules are working well in isolation and properly demonstrated - Modules of project are not properly integrated	- All defined objectives are achieved and working well and demonstrated - Integration of all modules done and system working is not very satisfactory	- All defined objectives are achieved and evident from the results - Each module working well and properly demonstrated - All modules of project are well integrated and system		

				working is accurate		
Project report	- Project report not prepared according to the specified format - References and citations are not appropriate	- Project report is according to the specified format with mistakes - In-sufficient references and citations	- Project report is according to the specified format - References and citations not mentioned well	- Project report is according to the specified format - References and citations are appropriate and well mentioned		
Viva - Voce	Answered 25% of questions related to design, implementation and applications of project work	Answered 50% of questions related to design, implementation and applications of project work	Answered 75% of the questions related to design, implementation and applications of project work	Answered more than 90% of the questions related to design, implementation and applications of project work		

Basaveshwar Engineering College, Bagalkote
Department of Industrial and Production Engineering

Scheme of Teaching and Evaluation
(THE STUDENTS ADMITTED TO FIRST YEAR IN THE ACADEMIC YEARS 2022-23 AND 2023 - 24)

VIII Semester

Sl. No.	Course Category	Course Code	Course Title	Teaching-Learning Scheme				Examination Duration (Hrs./Sem.)		Total Hours	Examination Scheme and Evaluation			Credits (C) =Total Hours/30
				L Hrs./Week (Hrs./Sem.)	T Hrs./Week (Hrs./Sem.)	P Hrs./Week (Hrs./Sem.)	Term Work (TW) and Self Learning (SL) (TW+SL) Hrs./Sem.	CIE	SEE		CIE Marks	SEE Marks	Total Marks	
1		22UIPXXO	MOOCs	3 (42)	0	0	90	03	03	90	50	50	100	3
2		22UIPXXO	MOOCs	3 (42)	0	0	90	03	03	90	50	50	100	3
3		22UIP801I	Internship	20 Contact hours per week			0	03	03	300	50	50	100	10
			Total										Total	16

CH=Contact Hrs

Course Code :		22UIP801I	INTERNSHIP	Semester :	VIII
L: T:12 :		0:0 :0		Course Type :	Internship
Hours/Sem.	Teaching :	0 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	294 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	300 Hrs.		Credits :	10

Professional Competency:

Develop professional competency to apply Industrial and Production Engineering knowledge, modern engineering tools, and research methodologies for solving real-world industrial and research problems through experiential learning in industries, research institutes, IITs, IIITs, IIMs, and National Laboratories, while demonstrating professionalism, teamwork, communication, ethics, sustainability, project management, and lifelong learning.

Evaluation Scheme

1. Continuous Internal Evaluation	:	50 Marks
2. Semester End Evaluation	:	50 Marks
Total	:	100 Marks

Note: Both CIE and SEE are conducted for 100 marks then reduced to 50 marks.

Assessment of Continuous Internal Evaluation (CIE)

Assessment of CIE for 100 marks shall be awarded by a committee consisting of the Head of the concerned department and two faculty members of the department, one of whom shall be the guide in case of single discipline and guides in case of interdisciplinary. Participation of external guide/s, if any, is desirable. The CIE marks awarded for the interns shall be based on the rubrics.

1. Continuous Internal Evaluation (CIE) -50 marks

Evaluation Criteria	Maximum Score
Regularity in maintenance of the diary	10
Quality of Work	10
Adequacy & quality of information recorded	10
Ability to Learn	10
Initiative and Creativity	10
Thought process and recording techniques used	10
Drawings, sketches and data recorded.	10
Dependability	10
Organizational Fit	10
Response to Mentor	10
Total	100

Assessment of Semester End Evaluation (SEE)

Assessment of SEE for 100 marks shall be awarded as per the rubrics by a committee consisting of the Head of the concerned department and two faculty members of the department, one of whom shall be the guide in case of single discipline and guides in case of interdisciplinary.

1. Semester End Evaluation (SEE) -50 marks

Evaluation Criteria	Maximum Score
Diary	25
Report	50
Presentation skill & Viva Voce	25
Total	100

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3(WK2, WK3)	2(WK3)	1	2(WK4)	3(WK6)	–	–	–	–	1	2(WK6)	3	3	2
CO2	2(WK3)	3(WK4)	2(WK4)	3(WK4, WK5)	3(WK6)	1	1	–	1	1	2(WK6)	3	3	3
CO3	2(WK4)	2(WK5)	2(WK5)	3(WK5)	2(WK6)	3(WK7)	3(WK7)	2(WK8)	1	2	3(WK5, WK6)	3	3	3
CO4	1	1	1	1	2(WK6)	1	1	2(WK8)	3(WK8)	3(WK8)	3(WK8)	3	3	2

DEPARTMENT ELECTIVES

Sl. No.	Subject Code	Department Electives
1.	22UIP001E	Materials Management
2.	22UIP002E	Industrial Robotics
3.	22UIP003E	Management Information System
4.	22UIP004E	Marketing Management
5.	22UIP005E	Automation In Manufacturing
6.	22UIP006E	Project Management
7.	22UIP007E	Non-Conventional Machining Processes
8.	22UIP008E	Supply Chain Management
9.	22UIP009E	Total Quality Management
10.	22UIP010E	Just In Time Manufacturing
11.	22UIP011E	Design of Experiments
12.	22UIP012E	Engineering Economy
13.	22UIP013E	Value Engineering
14.	22UIP014E	Enterprise Resource Planning
15.	22UIP015E	Business Process Reengineering and Bench Marking

Course Code :		22UIP001E	MATERIALS MANAGEMENT	Semester :	--
L:T:P :		3: 0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Students will develop the professional competency to plan, analyze, and manage organizational materials systems by integrating corporate policy with materials management functions, and by applying classification, codification, purchasing, warehousing, and inventory management principles to ensure cost-effective availability, efficient flow, and optimal utilization of materials across the supply chain.

Course Outcomes:

After completion of the course students will be able to

- CO1.** Demonstrate an understanding of the role of materials management as it integrates with corporate policy, and analyze materials through ABC classification.
- CO2.** Acquire foundational knowledge of codification and standardization practices.
- CO3.** Analyze and apply various purchasing policies and procedures within the purchasing function.
- CO4.** Apply and integrate warehousing and stores management skills to enhance overall supply chain performance.
- CO5.** Demonstrate proficiency in inventory management principles and apply them effectively within an organizational context.

UNIT-I

11 Hrs.

Integrated Materials Management: Importance, Need for integrated concept, Definition and scope, Advantages. Advantages of Integrated Materials Management Concept

Corporate Policy and Materials Management: General corporate policy, Scope, make or buy, Quality requirements, Quantity requirements.

Materials Research-Need and Importance, Definition and Scope, Organization for Materials Research, Techniques and Reporting

ABC Analysis: What is ABC Analysis- Advantages of ABC Analysis, Mechanics of ABC Analysis, Purpose of ABC Analysis, Objective of ABC Analysis, Limitations of ABC Analysis.

UNIT-II

11 Hrs.

Codification and Standardization: Nature of Codification, Process of codification, Kodak System, Brisch System, Advantages of Codification, Need for Standardization, Standardization in India, Importance of Standardization, Definition of Simplification, Benefits of Standardization.

Purchasing Management: Creative Purchasing, Purchase Systems, Price Forecasting, Buying Seasonal Commodities, Purchasing Under Uncertainty, Purchasing of Capital Equipment, International Purchasing, Import Substitution: Prospects and Retrospect, Public Buying Insurance Buying

UNIT-III

10 Hrs.

Warehousing and Stores Management: Stores Management, Stores Systems and Procedures, Incoming Materials Control, Stores Accounting and Stock Verification, Obsolete, Surplus and Scrap Management, Value Analysis, Material Handling, Transportation and Traffic Management.

UNIT-IV

10 Hrs.

Inventory Management: Definition, Inventory planning for independent demand items, Types of inventories, Inventory costs, Inventory control for deterministic demand items, Inventory control systems, Selective control of inventory, other issues in inventory planning and control

Text Books:

- Gopal Krishna. P. and M. Sundaresan. Materials Management: An Integrated Approach, Prentice-Hall of India Private limited, New Delhi, 2007, ISBN –978-81-203-0027-9.
- Operations Management Theory and Practice- B. Mahadevan, 3rd Edition, Pearson ISBN 978-96-325-4109-2

Reference Books:

- Datta. A K. Materials Management, Procedures, Text and Cases. Prentice-Hall of India Private limited, New Delhi, 2000.
- Materials Management Chitale
- Materials Management by Arnold
- Handbook of Materials Management by Gopalkrishnan

Weblinks and Video Lectures (E-Resources):

- <https://www.youtube.com/watch?v=E7JlYl8RcBM&list=PLJdQgRDfPMeBLIHYf8oNuXJ7daeMj8JGx>
- https://www.youtube.com/watch?v=XP_zi6GbU_Q
- <https://www.youtube.com/watch?v=ZlwnhjHl3vA&t=7s>
- <https://www.youtube.com/watch?v=oSoU4msV2ss>
- <https://www.youtube.com/watch?v=iaD-pyE03lc>

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	-	-	1 (WK5)	-	-	2 (WK1, WK5. WK7)	2 (WK9)	2	2	2	-	2	2	2
CO2	-	-	-	-	-		2 (WK9)	-	-	3	-	2	1	1
CO3	-	-	-	-	-	2 (WK5. WK7)	2 (WK9)	2	2	2	-	1	2	1
CO4	-	-	-	-	-	2 (WK5. WK7)	-	-	2	2	-	2	1	2
CO5	2 (WK1, WK2, and WK4)	-	3 (WK5)	-	3 (WK2, WK6)	2 (WK1, WK5. WK7)	-	-	3	-	-	2	2	2

Course Code :		22UIP002E	INDUSTRIAL ROBOTICS	Semester :	--
L: T:P :		3:0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Develop the ability to analyze, model, program, and control robotic systems by applying principles of robot kinematics, dynamics, trajectory planning, drive systems, and sensor integration for industrial automation applications.

Course Outcomes:

After completion of the course student will be able to

- CO1. Understand the fundamentals of industrial robotics, including classifications, drive systems, and end-effectors.
- CO2. Analyze robot motion using direct and inverse kinematics, rotation matrices, and homogeneous
- CO3. transformations.
- CO4. Apply dynamic modeling and trajectory planning to robotic systems using Lagrangian formulation.
- CO5. Demonstrate programming techniques and sensor integration in industrial robotic systems.

UNIT-I

11 Hrs.

Introduction: Automation and robotics, brief history of robotics, social and economic aspects of robots, advantages and disadvantages of using robots in industries. Overview of robots - present and future applications.

Classification and Structure of Robotic System: Classifications, geometrical configuration, wrist and its motions end effectors and its types, links and joints.

Robot drive system: Hydraulic, electric and pneumatic drive system, resolution, accuracy and repeatability, advantages and disadvantages of drive systems.

UNIT - II

11 Hrs.

Robot Motion Analysis: Kinematics – Introduction, direct and inverse kinematics, rotation matrix, composite rotation matrix, rotation matrix about an arbitrary axis, Euler angles representation, homogeneous transformations, links, joints and their parameters, D-H representation. Geometrical approach to direct and inverse kinematics.

UNIT - III

10 Hrs.

Robot Arm Dynamics: LaGrange Euler formulations-joint velocities, kinetic energy potential energy and motion equations of a robot manipulator.

Trajectory Planning: Introduction, general considerations on trajectory planning, joint interpolated trajectories, 4-3-4-trajectory example.

UNIT - IV

10 Hrs.

Robot Programming: Introduction, manual teaching, lead through teaching, programming languages, programming with graphics, storing and operating. Task programs.

Sensors: State and external state sensors, tactile sensors, non-tactile sensors, proximity sensing, range sensing, and force-torque sensors.

Text books:

1. M. P. Groover "Industrial Robotics", PHI, New Delhi:
2. Yoram Koren, "Robotics for Engineers" TATA McGraw Hill Intl. Book Co., New Delhi

Reference Books:

1. Richard Paul., "Robot manipulators, mathematics, programming and control" MIT Press
2. Fu. Gonzales and Lee "Robotics", TATA McGraw Hill. Int Edition, New Delhi
3. Robert J. Schilling, "Fundamentals of Robotics" Prentice-Hall International
4. Richard D Klafter "Robotic Engineering". PHI New Delhi.

Weblinks and Video Lectures (E-Resources):

https://www.youtube.com/watch?v=L3APegLIE8A&list=PLXDsvE7qtfNf_N99hJZbdTEM001mOii6_&index=1
https://www.youtube.com/watch?v=4Jss1ByWw2Q&list=PLXDsvE7qtfNf_N99hJZbdTEM001mOii6_&index=3
https://www.youtube.com/watch?v=gnfodUuaES4&list=PLXDsvE7qtfNf_N99hJZbdTEM001mOii6_&index=5
<https://www.youtube.com/watch?v=seMKVkJIY&list=PLCEGN3cLEboBpr14mUy2LnQeMY4IKQNjA>
<https://www.youtube.com/watch?v=QIFbrmJTib4>

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3 (WK1)	2 (WK1)	2 (WK2)	1 (WK2)	2 (WK5)	2 (WK1,WK5, WK7)	1 (WK9)	1	1	1	1	3	2	2
CO2	3 (WK2)	3 (WK2)	3 (WK2)	2 (WK2)	3 (WK5)	1 (WK9)	1	1	1	1	2	3	3	2
CO3	3 (WK2, WK3)	3 (WK2)	3 (WK2)	3 (WK2)	3 (WK5)	2 (WK5, WK7)	1 (WK9)	2	2	2	2	3	3	3
CO4	2 (WK5)	2 (WK5)	3 (WK5)	2 (WK5)	3 (WK6)	2 (WK5, WK7)	2 (WK9)	2	2	2	3	3	3	3

Course Code :		22UIP003E	MANAGEMENT INFORMATION SYSTEMS	Semester :	--
L: T:P :		3:0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03
Professional Competency:					
Develop the ability to apply information systems and information technology concepts to support business operations, strategic decision-making, enterprise integration, and e-commerce solutions for improving organizational performance and competitiveness.					
Course Outcomes:					
After completion of the course student will be able to					
CO1. Explain the role and components of Information Systems and evaluate their significance in business environments.					
CO2. Apply knowledge of information technologies such as hardware, software, networks, and the internet to business systems.					
CO3. Analyze enterprise and functional business systems, including ERP, CRM, and SCM, for organizational efficiency					
CO4. Apply system development approaches and e-commerce concepts in solving business-related problems					
UNIT-I					11 Hrs.
Foundation Concepts:					
Information Systems (IS) in Business: What is Information System? Fundamental role of IS in business, trends in Information systems, role of e-business in business, types of information systems. Managerial challenges of Information technology. System concepts: Foundation, Components of Information systems, Information system resources, Information system activities					
Competing with Information Technology - Fundamentals of Strategic Advantage: competitive strategy concepts, strategic uses of Information technology. Building a customer –focused business, The value chain and strategic IS.					
Using Information Technology for Strategic Advantage: Strategic uses of IT, re-engineering business processes, becoming an agile company, creating a virtual company, building a knowledge creating company.					
UNIT – II					11 Hrs.
Review of Information Technologies:					
Computer Systems- End user and Enterprise Computing: Types of computer systems,					
Computer Peripherals, Input, Output and Storage Technologies: Peripherals, Input technologies, Output technologies, Storage devices					
Computer Software: Application Software: End user applications: Application software, System Software, other system management programs.					
Telecommunications and Networks: Networking the enterprise, Trends in telecommunications, business value of Telecommunication networks, the Internet revolution business use of Internet, business value of Internet, role of intranets and extranets. Telecommunications and Networks					
UNIT - III					10 Hrs.
Technical Telecommunications alternatives: Telecommunication alternatives, A telecommunications network model, types of telecommunication networks, telecommunications media, Wireless technologies, telecommunications processors, telecommunications software, network topologies.					
Business Applications: Electronic Business Systems: Cross-functional enterprise applications, Enterprise application integration, transaction processing systems, Functional Business Systems- Marketing systems, manufacturing systems, Human recourse systems, Accounting systems, Financial management systems.					
Enterprise Business Systems: Customer Relationship management, Enterprise resource planning, Supply chain management.					
UNIT - IV					10 Hrs.
Electronic Commerce systems: electronic commerce fundamentals, scope of e-commerce, essential e-commerce processes, electronic payment processes. Developing Business Systems: IS development, the systems approach, the system development cycle. Prototyping.					
Case Discussions: Covering the chapters listed above (Minimum Six cases to be discussed covering entire syllabus)					
Text Books:					
1. James. A O'Brien, George M Marakas “ <i>Management information systems</i> ” The McGraw Hill publishing companies. Special Indian Edition, Seventh edition ISBN-13:978-0-07-0620032 ISBN-10:0-07-062003-2					

Reference Books:

1. Laudon & Laudon, "Management Information Systems" PHI ISBN 8 J -203- J 282-]. 1998 edn.
2. W.S. Jawadekar "Management Information System" TMH 2002 Edn, ISBN- 0 - 07 -044575-3
3. Gordon B Davis, Margrethe H. Olson "Management information systems" Tata McGraw Hill
4. S. Sadogopan "Management Information Systems" .PHI 1998Edn. ISBN 81-203- 180-9

Weblinks and Video Lectures (E-Resources):

- https://nptel.ac.in/courses/110105148?utm_source=chatgpt.com
- https://ocw.mit.edu/courses/15-561-information-technology-essentials-spring-2005/resources/lecture13/?utm_source=chatgpt.com
- https://ocw.mit.edu/courses/15-561-information-technology-essentials-spring-2005/resources/lecture13/?utm_source=chatgpt.com

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Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	2 (WK1)	2 (WK1)	-	-	1 (WK5)	1 (WK1, WK5, WK7)	-	-	-	-	1 (WK9)	1	2	-
CO2	3 (WK2)	2 (WK2)	-	-	2 (WK5)	-	-	-	-	-	1 (WK9)	-	-	-
CO3	2 (WK2)	3 (WK2)	-	-	2 (WK5)	2 (WK5, WK7)	-	-	-	2	2 (WK9)	2	2	-
CO4	2 (WK2)	2 (WK2)	2 (WK5)	3 (WK5)	2 (WK6)	1 (WK5, WK7)	-	-	2	2	2 (WK9)	1	1	-

Course Code		:	22UIP004E	MARKETING MANAGEMENT	Semester	:	--
L: T:P		:	3: 0 :0		Course Type	:	Elective
Hours/Sem.	Teaching	:	42 Hrs.		CIE Marks	:	50
	Learning (TW+SL)	:	42 Hrs.		SEE Marks	:	50
	Exam	:	6 Hrs.		Total Marks	:	100
	Total Hrs.	:	90 Hrs.		Credits	:	03

Professional Competency:

Students will develop the professional competency to systematically analyze markets and customers, and to design, evaluate, and implement integrated marketing strategies that create and deliver customer value in dynamic business environments.

Course Outcomes:

After completion of the course student will be able to

- CO1.** Apply core marketing concepts and frameworks to real-world business scenarios to define customer value and market orientation.
- CO2.** Analyze consumer and organizational buying behavior using psychological and behavioral models to identify influencing factors and decision processes.
- CO3.** Analyze segmentation, targeting, and positioning (STP) strategies to develop effective marketing plans for various consumer and business markets.
- CO4.** Evaluate integrated marketing mix strategies (product, price, place, and promotion) for effectiveness in different market environments, including services, retail, and digital contexts.

UNIT-I

11 Hrs.

Defining marketing for the new realities: The value of marketing, the Scope of Marketing, Core marketing concepts, the new marketing realities, and Company Orientation towards the marketplace.

Collecting Information: Components of modern marketing information system, Internal records, marketing intelligence, Analyzing the macro environment

Conducting Marketing Research: The scope of Marketing research, The Marketing research process, the Seven Characteristics of good marketing research

UNIT-II

11 Hrs.

Analyzing Consumer Markets: What influences consumer behavior? Key psychological processes, the buying decision process: Five stage model, Behavioral Decision Theory and Behavioral Economics

Identifying Market Segments and Targets: Basis for segmenting consumer markets, how should business markets be segmented? Market targeting, Effective segmentation criteria.

Analyzing Business Markets: What is organizational buying? Participants in the business buying process, the purchasing/procurement process, Stages in the buying process, Developing Effective-business-to- business marketing programs, Managing business-to-business customer relationships, and Institutional and Government markets.

UNIT-III

10 Hrs.

Setting Product Strategy: Product characteristics and classifications, Differentiation, Environmental issues Product and brand relationships, Packaging, Labelling, warranties, and guarantees

Designing and Managing services: The nature of services, the realities of the new service, Achieving excellence in services marketing

Managing retailing, Wholesaling, and Logistics: Retailing, private labels, wholesaling, market logistics

UNIT-IV

10 Hrs.

Developing Pricing strategies and programs: Understanding pricing, setting the price, Adapting the price, Initiating and responding to price changes

Designing and Managing Integrated marketing communications: The role of marketing communications, Marketing communications mix, How do marketing communications work, developing effective communications, Selecting the marketing communications mix, Developing and managing an advertising programme

Text Books:

- Philip Kotler, Kevin Lane Keller "Marketing Management" 15th edition, Pearson India Education Services Pvt. Ltd. ISBN 978-93-325-5718-5.
- Philip Kotler, Kevin Lane Keller, Abraham Koshy and Mithileshwar Jha "Marketing Management: A South Asian Perspective". 13th Edition, 2012, Pearson Prentice – Hall of India private limited, ISBN-978-81-317-1683-0

Reference Books:

- Philip Kotler "Principles of Marketing", Prentice - Hall.
- Michael R Czinkota, Marketing Management, 2nd Edition. Vikas Publishing House, ISBN 981-240-366-3
- William J Stannon, "Fundamentals of Marketing", McGraw Hill

4. R.S.S. Pillia and Mrs. Bagavathi "Marketing" S. Chand & Co. Ltd
5. S.A Sherlaker, "Marketing Management", 13th Edition.
6. Rajagopal, Marketing Management Text & Cases, Vikas Publishing House.

Weblinks and Video Lectures (E-Resources):

MOOC Course: <https://www.edx.org/course/marketing-management-iimb-mk102x#!>

NPTEL Course: <http://nptel.ac.in/courses/110104068/3>

<https://www.youtube.com/watch?v=65MQnEMf-ul&t=175s>

<https://www.youtube.com/watch?v=OUxmwxA66Ss>

https://www.youtube.com/watch?v=rG2Ui_BKpBY&list=PLgMDNELGJ1CZF8bYMr8YZ7JFD7WD8M46k

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Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	2 (WK1, WK2, and WK4)	3 (WK1, WK2, WK3, and WK4)		-	1 (WK2, WK6)	-	-	-	-	2	-	2	1	1
CO2	-	3 (WK2, WK3, and WK4)	-	2 (WK8)	-	-	-	-	-	-	-	1	3	2
CO3	-	3 (WK1, WK2, WK3, and WK4)	2 (WK5)	-	-	-	2 (WK9)	-	-	-	-	1	1	1
CO4	-	-	3 (WK5)	-	-	-	2 (WK9)	-	-	3	-	2		2

Course Code :		22UIP005E	AUTOMATION IN MANUFACTURING	Semester :	--
L: T:P :		3:0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Apply automation principles, flow line analysis, material handling systems, and PLC-based control to design and improve efficient, reliable, and integrated manufacturing systems.

Course Outcomes:

After completion of the course student will be able to

CO1. Understand the fundamentals, need, and challenge of automation in manufacturing systems.

CO2. Analyze production concepts, mathematical models, and automation strategies related to machining and production flow.

CO3. Evaluate and design automated flow lines and assembly systems using balancing and parts feeding analysis.

CO4. Apply concepts of material handling, automated storage systems, and PLC programming in integrated manufacturing environments.

UNIT - I

10 Hrs.

Introduction: Definition of automation, reasons for automating arguments for and against automation

Reasons for Automation: strategies of automation, Detroit type of automation flow lines, transfer mechanisms, work part transfer- different methods, problems. Automation for machining operations, design & fabrication considerations, machining center.

UNIT - II

10Hrs.

Production Concepts and Mathematical Models: Manufacturing lead time, components of operating time, capacity utilization and availability, work in process, comments on the production concepts, automation strategies

UNIT - III

10 Hrs.

Analysis of automated flow lines: Analysis of transfer lines without storage with storage buffers-single stage, double stage, multistage with problems, automated assembly systems-design for automated assembly, parts feeding devices, analysis of multi-station assembly machine, analysis of single-stage assembly machines, assembly systems and line balancing of automated assembly systems.

UNIT - IV

12 Hrs.

Automated material handling and storage: material handling function, types of material handling equipment, analysis of material handling systems, design of systems, conveyor systems, Automated Guided Vehicle Systems, Automated Storage/Retrieval Systems. Caroused storage systems, work in process storage, interfacing, handling & storage with manufacturing.

Programming logic control: Introduction, basic structure, input-output processing, programming- logic functions. Latching, sequencing, mnemonics timers, internal relay & counters shift resistor, master & jump controls, data handling, selection of a PLC

Text Books:

1. Mikell P. Groover, *Automation, Production Systems, and Computer-Integrated Manufacturing*, 3rd ed., PHI, New Delhi, 2008.
2. W. Bolton, *Mechatronics*, 3rd ed., Pearson Education.
3. Mikell P. Groover and Emory W. Zimmers, *CAD/CAM*, PHI, New Delhi, 2001.

Reference Books:

1. Pressman and Williams, *Numerical Control and Computer-Aided Manufacturing*.
2. Tiesschieuchang and Richard A. Wysk, *An Introduction to Automated Process Planning System*.
3. Supplementary course notes on automated manufacturing systems, flow line analysis, and PLC-based automation.

Weblinks and Video Lectures (E-Resources):

1. Automation in manufacturing overview: https://archive.nptel.ac.in/content/syllabus_pdf/112103293.pdf
2. Automation in production systems: https://archive.nptel.ac.in/content/syllabus_pdf/110105155.pdf
3. PLC and industrial automation lecture notes: https://intranet.cb.amrita.edu/sites/default/files/OL803_Industrial_Automation_and_Control.pdf

4. Automated flow lines and material handling: <https://www.gvpce.ac.in/MECHANICAL/R-2020/syllabus/20ME1169.pdf>
5. Automation in manufacturing course material: [https://files.mlrit.ac.in/curriculum/MECH/Mech-MLR18/3-2/AUTOMATION-IN-MANUFACTURING-\(OE2\).pdf](https://files.mlrit.ac.in/curriculum/MECH/Mech-MLR18/3-2/AUTOMATION-IN-MANUFACTURING-(OE2).pdf)

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	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3 (WK1, WK2)	2 (WK1, WK2)	1 (WK2)	-	-	-	-	-	-	1 (WK10)	1 (WK11)	2	1	1
CO2	2 (WK3, WK5)	3 (WK3, WK5)	2 (WK3, WK5)	1 (WK5)	1 (WK5)	-	-	-	-	1 (WK10)	1 (WK11)	2	2	1
CO3	2 (WK4, WK6)	2 (WK4, WK6)	2 (WK4, WK6)	3 (WK4, WK6)	2 (WK6)	-	-	-	-	1 (WK10)	1 (WK11)	2	2	2
CO4	2 (WK7)	2 (WK7)	1 (WK7)	-	1 (WK7)	-	-	-	1 (WK9)	2 (WK10)	1 (WK11)	2	1	3

Course Code		:	22UIP006E	PROJECT MANAGEMENT	Semester	:	--
L: T:P		:	3:0 :0		Course Type	:	Elective
Hours/Sem.	Teaching	:	42 Hrs.		CIE Marks	:	50
	Learning (TW+SL)	:	42 Hrs.		SEE Marks	:	50
	Exam	:	06 Hrs.		Total Marks	:	100
	Total Hrs.	:	90 Hrs.		Credits	:	03

Professional Competency:

Plan, execute, and control engineering and industrial projects by applying project management principles, tools, and leadership practices to deliver results within scope, time, budget, and quality constraints.

Course Outcomes:

After completion of the course student will be able to

- CO1. Explain the principles, phases, and functions of project management across its lifecycle.
- CO2. Apply techniques for project scheduling, budgeting, and resource optimization.
- CO3. Identify and manage risks, stakeholders, and quality for project success.
- CO4. Demonstrate leadership, teamwork, and effective communication using project management tools.

UNIT - I

10 Hrs.

Concepts of project management - Concepts of a project, categories of projects, phases of project life cycle, roles and responsibility of project leader, tools and techniques for project management. **Project planning and estimating** - Capital expenditures: Importance and difficulties, phases of capital budgeting, levels of decision making, facets of project analysis, feasibility study: A schematic diagram, objectives of capital Budgeting. Preparation of cost estimation, evaluation of the project profitability.

UNIT- II

10 Hrs.

Generation and screening of project ideas - Generation of ideas, monitoring the environment, corporate appraisal, scouting for project ideas, preliminary screening, project rating index, sources of positive net present value, on being an entrepreneur, organizing and staffing the project team: skills / abilities required for project manager, authorities and responsibilities of project manager, project organization and types accountability in project, controls, tendering and selection of contractors.

UNIT - III

12 Hrs.

Tools and techniques of project management: Bar (GANTT) chart, bar chart for combined activities, logic diagrams and networks, project evaluation and review techniques (PERT), planning, computerized project management. **Project scheduling:** Project implementation scheduling, effective time management, different scheduling techniques, resources allocation method. PLM concepts.

UNIT- IV

12 Hrs.

Co-ordination and control: Project direction communication in a project, MIS project co-ordination, project control requirement for better control of project or role of MIS in project control, performance, control, schedule control, cost control. **Performance measures in project management:** Performance indicators, performance improvement for the CM and DM companies for better project management, project management and environment and Practitioners. **Project management institute:** Importance of the same for the Industry and **Case studies on project management:** Case studies covering project planning, scheduling, use of tools and techniques, performance measurement.

Text Books:

1. Harold Kerzner, *Project Management: A Systems Approach to Planning, Scheduling, and Controlling*, 4th Edition, 2002.
2. Chaudhry S., *Project Execution Plan: Plan for Project Execution Interaction*, 2002.
3. Bhavesh M. Patel, *Project Management*, Vikas Publishing House, 2002.

Reference Books:

1. Benington Lawrence, *Project Management*, McGraw Hill, 1970.
2. Weist and Levy, *A Management Guide to PERT and CPM*, Eastern Economy of PH, 2002
3. L. S. Srinath, *PERT and CPM*, Affiliated East West Press Pvt. Ltd., 2002.
4. Moder Joseph and Philips Cerel R., *Project Management with PERT and CPM*, 2nd Edition, Van Nostrand Reinhold, 1976.
5. Angus, *Planning, Performing and Controlling Project*, Pearson Education, 3rd Edition, 2001.
6. James P. Lawis, *Project Planning, Scheduling and Control*, Meo Publishing Company, 2001.

Weblinks and Video Lectures (E-Resources):

1. Project management lectures: https://www.youtube.com/results?search_query=project+management+lecture
2. PERT and CPM lectures: https://www.youtube.com/results?search_query=PERT+CPM+lecture

3. Project scheduling and Gantt chart:
https://www.youtube.com/results?search_query=project+scheduling+Gantt+chart+lecture
4. MIS in project management:
https://www.youtube.com/results?search_query=MIS+in+project+management+lecture
5. Project management case studies:
https://www.youtube.com/results?search_query=project+management+case+study+lecture

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3 (WK1, WK2)	3 (WK1, WK2)	2 (WK2)	2 (WK2)	1 (WK2)	-	-	-	-	1 (WK10)	1 (WK11)	2	2	1
CO2	2 (WK3, WK9)	2 (WK3, WK9)	3 (WK3, WK9)	2 (WK3, WK9)	1 (WK9)	-	-	-	1 (WK9)	1 (WK10)	1 (WK11)	2	2	2
CO3	2 (WK4, WK5)	3 (WK4, WK5)	2 (WK4, WK5)	2 (WK4, WK5)	3 (WK4, WK5)	-	-	-	-	1 (WK10)	1 (WK11)	2	3	2
CO4	2 (WK6, WK7)	2 (WK6, WK7)	1 (WK6)	2 (WK6, WK7)	2 (WK6)	2 (WK7)	1 (WK7)	1 (WK8)	1 (WK9)	2 (WK10)	2 (WK11)	2	1	2

Course Code :		22UIP007E	NON-CONVENTIONAL MACHINING PROCESSES	Semester :	--
L: T:P :		3:0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Develop the ability to analyze, select, and apply non-traditional machining processes to manufacture complex engineering components by evaluating process principles, machining parameters, material removal mechanisms, and performance characteristics.

Course Outcomes:

After completion of the course student will be able to

- CO1.** Introduce and classify non-traditional machining processes, understand mechanical energy machining processes in context to mechanics of metal removal process, principles, advantages, disadvantages and application.
- CO2.** Explain electrochemical and chemical advance machining processes like electro chemical machining and design the tool for ECM process.
- CO3.** Explain thermoelectric advanced machining processes in context to working principal, process parameters, advantages, disadvantages and applications of electric discharge machining.
- CO4.** Identify the principles, processes and applications of electron, laser and plasma arc machining processes.

UNIT - I

12 Hrs.

Introduction to NCMP- Need for non-traditional machining methods, classification of modern machining processes, considerations in process selection, materials and applications. **Ultrasonic machining** - Elements of the process, mechanics of metal removal process parameters, economic considerations, working principles, equipment used, process parameters, metal removal rate, applications and limitations, recent developments. **Abrasive jet machining, Water jet machining and Abrasive water jet machining** - Basic principles, equipment, process variables, mechanics of metal removal, metal removal rate, application and limitations.

UNIT - II

09 Hrs.

Electro chemical machining and chemical machining processes - Fundamentals of electro chemical machining, electrochemical grinding, electro chemical honing and deburring process, metal removal rate, tool design, surface finish and accuracy, economic aspects, simple problems for estimation of metal removal rate, fundamentals of chemical machining, advantages, disadvantages and applications.

UNIT - III

09 Hrs.

Electric discharge machining- General Principle and applications of electric discharge machining, electric discharge, grinding and electric discharge wire cutting processes - Power circuits for electric discharge machining, mechanics of metal removal, process parameters, selection of tool electrode and dielectric fluids, methods of surface finish and machining accuracy, characteristics of spark eroded surface and machine tool selection, wire electric discharge machining, principle and applications.

UNIT - IV

12 Hrs.

Electron beam, laser beam and plasma arc machining processes- Generation and control of electron beam for machining, theory of electron beam machining, comparison of thermal and non-thermal processes - general principle and application of laser beam machining - thermal features, cutting speed and accuracy of cut, application of plasma for machining, metal removal mechanism, process parameters, accuracy and surface finish and other applications of plasma in manufacturing industries.

Text Books:

1. Pandey P.C. and Shan H.S, 1980, Modern Machining Processes, Tata McGraw-Hill, New Delhi.
2. Vijay K. Jain, 2002, Advanced Machining Processes, Allied Publishers Pvt. Ltd., New Delhi, ISBN 81-7764-294-4.

Reference Books:

1. Benedict. G.F. 1987, Nontraditional Manufacturing Processes, Marcel Dekker Inc., New York.
2. McGeough, 1988, Advanced Methods of Machining, Chapman and Hall, London.

Weblinks and Video Lectures (E-Resources):

https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_me202
<https://www.youtube.com/watch?v=PaYInS9axxw>
<https://www.youtube.com/watch?v=PaYInS9axxw&list=PLzCSUZGIUJkaSyCzPiQMWynGyxmC8hrpl>
<https://www.youtube.com/watch?v=tTnXn498F90&list=PLWv6RLxuaVQwMg6kFEoeMEGTWNnr7Jmr>
<https://www.youtube.com/watch?v=cxU1zUOpGLk&list=PLtpJfjyaifnmCI-JcNxs6uQgv3b2WYKzS>

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3 (WK1, WK2, WK3)	2 (WK2, WK3, WK4)	-	-	1 (WK5)	-	-	-	-	-	-	1		1
CO2	3 (WK1, WK2, WK3)	3 (WK2, WK3, WK4)	2 (WK5)	2 (WK4)	2 (WK5, WK6)	-	-	-	-	-	-	-	1	1
CO3	3 (WK1, WK2, WK3)	3 (WK2, WK3, WK4)	2 (WK5)	2 (WK4)	2 (WK5, WK6)	-	-	-	-	-	-	-	-	1
CO4	2 (WK1, WK2)	3 (WK2, WK3, WK4)	2 (WK5)	2 (WK4)	2 (WK5, WK6)	-	1 (WK7)	-	-	-	-	-	-	1

Course Code :		22UIP008E	SUPPLY CHAIN MANAGEMENT	Semester :	--
L: T:P :		3: 0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Ability to analyze, design, coordinate, and improve supply chain networks and logistics systems for achieving operational efficiency, strategic competitiveness, and sustainable business performance for integrated supply chains

Course Outcomes:

After completion of the course students will be able to

- CO1. Apply supply chain concepts, performance metrics, and strategic fit principles to evaluate the effectiveness of supply chain operations in manufacturing and service organizations.
- CO2. Analyze the impact of supply chain drivers, distribution networks, and coordination mechanisms on organizational performance and customer responsiveness.
- CO3. Apply quantitative and qualitative approaches for designing supply chain networks, transportation systems, and global supply chain structures.
- CO4. Analyze the role of information technology, sustainability practices, and risk management in improving supply chain efficiency and competitiveness.

UNIT-I

10 Hrs.

Chapter 1: UNDERSTANDING THE SUPPLY CHAIN

What Is a Supply Chain? Historical Perspective, The Objective of a Supply Chain, The Importance of Supply Chain Decisions, Decision Phases in a Supply Chain, Process Views of a Supply Chain, Examples of Supply Chains

Chapter 2: SUPPLY CHAIN PERFORMANCE: ACHIEVING STRATEGIC FIT AND SCOPE

Competitive and Supply Chain Strategies, Achieving Strategic Fit, Expanding Strategic Scope, Challenges to Achieving and Maintaining Strategic Fit, Achieving and Maintaining Strategic Fit in Emerging: Retail Markets: The Indian Scenario, The Experience, Adaptation

► CASE STUDY: The Demise of Blockbuster

► CASE STUDY: Rise and Fall of Subhiksha

UNIT-II

10 Hrs.

Chapter 3: SUPPLY CHAIN DRIVERS AND METRICS

Impellers of Supply Chain, Financial Measures of Performance, Drivers of Supply Chain Performance, Framework for Structuring Drivers, Facilities, Inventory, Transportation, Information, Sourcing, Pricing, Infrastructure, International Logistics,

► CASE STUDY: Seven-Eleven Japan Co.

► CASE STUDY: Financial Statements for Walmart Stores Inc. and Macy's Inc.

Chapter 4: DESIGNING DISTRIBUTION NETWORKS AND APPLICATIONS TO ONLINE SALES

The Role of Distribution in the Supply Chain, Factors Influencing Distribution Network Design, Design Options for a Distribution Network, Online Sales and the Distribution Network, Indian Agricultural Produce Distribution Channels: Ripe for Major Transformation, Indian FMCG Sector-distribution Channels, Indian Commodities Distribution Channels, Distribution Networks in Practice,

► CASE STUDY: Blue Nile and Diamond Retailing

UNIT-III

10 Hrs.

Chapter 5: NETWORK DESIGN IN THE SUPPLY CHAIN

The Role of Network Design in the Supply Chain, Factors Influencing Network Design Decisions, Framework for Network Design Decisions, Models for Facility Location and Capacity Allocation, Jaipur Rugs—networking Tradition with Modernity, Making Network Design Decisions in Practice, The Impact of Uncertainty on Network Design,

► CASE STUDY: Managing Growth at SportStuff.com

► CASE STUDY: Designing the Production Network at Cool Wipes

Chapter 6: DESIGNING GLOBAL SUPPLY CHAIN NETWORKS

The Impact of Globalization on Supply Chain Networks, The Offshoring Decision: Total Cost, Risk Management in Global Supply Chains

Chapter 7: COORDINATION IN A SUPPLY CHAIN

Lack of Supply Chain Coordination and the Bullwhip Effect, The Effect on Performance of Lack of Coordination, Obstacles to Coordination in a Supply Chain, Managerial Levers to Achieve Coordination, Continuous Replenishment and Vendor-Managed Inventories, Collaborative Planning, Forecasting, and Replenishment, Collaborative Planning, Forecasting, and Replenishment—Indian Experiences, Achieving Coordination in Practice

UNIT-IV		12 Hrs.
Chapter 8: TRANSPORTATION IN A SUPPLY CHAIN		
The Role of Transportation in a Supply Chain, Modes of Transportation and Their Performance Characteristics, Transportation Infrastructure and Policies, Design Options for a Transportation Network, Mumbai Dabbawallas: A Highly Responsive Distribution Network, Trade-Offs in Transportation Design, Tailored Transportation, The Role of IT in Transportation, Making Transportation Decisions in Practice,		
▶ CASE STUDY: Designing the Distribution Network for Michael’s Hardware		
▶ CASE STUDY: The Future of Same-Day Delivery: Same as the Past?		
▶ CASE STUDY: Selecting Transportation Modes for China Imports		
Chapter 9: SUSTAINABILITY AND THE SUPPLY CHAIN		
The Role of Sustainability in a Supply Chain, The Tragedy of the Commons, Key Pillars of Sustainability, Sustainability and Supply Chain Drivers, closed-Loop Supply Chains, The Pricing of Sustainability,		
▶ CASE STUDY: Sustainable Supply Chains—Indian Efforts 559		
▶ CASE STUDY: HUL—A Sustainable Supply Chain 559		
▶ CASE STUDY: Future of Supply Chains 560		
Chapter10: A INFORMATION TECHNOLOGY IN A SUPPLY CHAIN		
The Role of IT in a Supply Chain, The Supply Chain IT Framework, Customer Relationship Management, Internal Supply Chain Management, Supplier Relationship Management, The Transaction Management Foundation, The Future of IT in the Supply Chain, Risk Management in IT, Supply Chain IT in Practice		
Text Books:		
1. Supply Chain Management–Strategy, Planning & Operation. Sunil Chopra, Peter Meindl, and Dharam Vir Kalra, Pearson Education Asia, ISBN: 978-93-325-4823-7, eISBN: 978-93-325-8267-5, Sixth Edition.		
Reference Books:		
1. Supply Chain Redesign–Transforming Supply Chains into Integrated Value Systems. Robert B Handfield, Ernest L Nichols, Jr., Pearson Education Inc, 3rd Edition (3rd Impression), 2007, ISBN: 81-317-0401-7		
2. Modelling the Supply Chain -Jeremy F Shapiro, Duxbury, Thomson Learning, 2002, ISBN 0-534-37363		
3. Designing & Managing the Supply Chain. David Simchi Levi, Philip Kaminsky& Edith Simchi Levi; McGraw Hill		
Weblinks and Video Lectures (E-Resources):		
https://onlinecourses.swayam2.ac.in/e-learning/preview/imb26_mg52		
https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_mg112		
https://www.youtube.com/watch?v=Lpp9bHtPAN0		
https://www.youtube.com/watch?v=NEWYaget310		
https://www.youtube.com/watch?v=i8cAITW_FC8&t=3324s		

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)										Program Specific Outcomes (PSOs)			
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3 (WK1, WK2)	2 (WK3)	-	-	-	-	-	-	-	-	2 (WK4)	2	2	-
CO2	2 (WK1)	3 (WK2, WK3)	-	2 (WK4)	-	-	-	-	-	-	2 (WK5)	3	3	-
CO3	2 (WK1, WK2)	3 (WK3)	3 (WK5)	2 (WK4)	1 (WK6)	-	-	-	-	-	2 (WK5)	2	3	-
CO4	2 (WK1)	2 (WK3)	-	2 (WK4)	3 (WK6)	2 (WK7)	3 (WK7)	-	-	-	2 (WK5)	3	2	-

Course Code :		22UIP009E	TOTAL QUALITY MANAGEMENT	Semester :	--
L:T:P :		3: 0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03
Professional Competency:					
The professional competency that students will gain is the ability to design, analyze, and guide organization-wide quality improvement and strategic alignment efforts by incorporating the Total Quality Management principles, continuous improvement approaches (reactive and proactive), teamworking practices and total participation, and Hoshin Kanri-based policy implementation to logically improve the process performance, customer satisfaction, and long-term organizational excellence.					
Course Outcomes:					
After completion of the course student will be able to:					
CO1. Apply the principles of TQM and contributions of quality pioneers like Deming, Juran, and Ishikawa to quality improvement initiatives					
CO2. Analyze quality improvement techniques such as reactive and proactive improvement methods, and the seven QC tools for process diagnosis and control.					
CO3. Apply teamwork principles and total participation concepts in implementing continuous improvement programs within an organization.					
CO4. Analyze the phases and strategic impact of Hoshin Kanri (Hoshin Management) for aligning organizational vision, planning, and control systems.					
UNIT-I					11 Hrs.
Review of Total Quality Management: History of TQM quality, Walter Shewhart’s concept of variation and control system, Contribution of Quality Gurus - Deming's approach, Juran's quality trilogy, Crosby and quality treatment, Imai's Kaizen. Ishikawa's companywide quality control, and Feigenbaum’s theory of TQC					
Evolution of Quality Concepts and Methods: Quality concepts. Development of four fitnesses, evolution of methodology, evolution of company integration, quality of conformance versus quality of design, from deviations to weaknesses to opportunities. Future fitnesses					
Four revolutions in Management thinking: Customer focus, Continuous Improvement, Total Participation, and Societal Networking. Focus On Customers: Change in work concept, market-in, and Customers.					
UNIT-II					10 Hrs.
Continuous Improvement:					
Improvement as problem problem-solving process: Management by process, WV model of continuous improvement, process control, process control and process improvement, process versus creativity.					
Reactive Improvement: Identifying the problem, standard steps and tools, seven steps - case study, and seven QC tools. Management diagnosis of seven steps reactive improvement. General guidelines for managers diagnosing a QI story. Case study for diagnosis of the seven steps					
UNIT-III					11 Hrs.
Proactive Improvement: Introduction to proactive improvement, standard steps for proactive improvement, semantics, example customer visitation. Applying proactive improvement to develop new products - three stages and nine steps					
Total Participation: Teamwork skills, dual function of work, teams and team work, principles for activating teamwork, creativity in team processes. Initiation strategies; CEO involvement. Example: strategies for TQM introduction. Infrastructure for mobilization. Goal setting (Vision/Mission), organization setting, training and Education, promotional activities, diffusion of success stones, awards and incentives monitoring and diagnosis. Phase-in, orientation phase, alignment phase, evolution of parallel organization.					
UNIT-IV					10 Hrs.
Hoshin Management: Definition, phases in hoshin management - strategic planning(proactive), hoshin deployment, controlling with metrics(control), check and act (reactive). Hoshin management versus management by objective, hoshin management and conventional business planning, an alternative hoshin deployment system, hoshin management as "Systems Engineering" for alignment					
Text Books:					
1. N. Logothetis, "Managing for Total Quality", Prentice Hall of India, New Delhi. (Chapter I - partly)					
2. Shoji Shiba, David Walden “Four Practical Revolutions in Management: Systems for creating unique organizational Capability”, 2001, Productivity Press, ISBN 1-56327-217-2					
3.					

Reference Books:

1. Roger C. Swanson, "The Quality Improvement Hand Book", Publisher Vanity Books International, New Delhi.
2. William. C. Johnson and Richard J. Chavla, "Encyclopedia of Total Quality Management", New Delhi.

Weblinks and Video Lectures (E-Resources):

<https://www.youtube.com/watch?v=vtcYE63GzRo>

https://www.youtube.com/watch?v=VrvYQckhz_8

<https://www.youtube.com/watch?v=VD6tXadibk0>

<https://www.youtube.com/watch?v=42UgAS-U1-o>

<https://www.youtube.com/watch?v=cTwwMK1AnDU>

<https://www.youtube.com/watch?v=Krpm-df5B9c>

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	1 (WK1, WK2, and WK4)	2 (WK1, WK3, and WK4)	2		-		-	1	-		-	2	2	
CO2	2 (WK1, WK2, and WK4)	3 (WK1, WK2, WK3, and WK4)	-	2 (WK8)	-	-	-	1	-		-	2	3	1
CO3	-	2 (WK1, WK2, WK3, and WK4)	-		-	-	-	1	3	2	1 (WK8)	2	2	1
CO4	-	2 (WK1, WK3, and WK4)	2 (WK5)		-	-	-	1	1	3	-	2	2	1

Course Code :		22UIP010E	JUST IN TIME MANUFACTURING	Semester :	--
L: T:P :		3:0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Apply Just-in-Time principles, Toyota Production System concepts, and supply chain coordination tools to reduce waste, improve flow, enhance responsiveness, and optimize manufacturing performance.

Course Outcomes:

After completion of the course student will be able to

- CO1. Explain the principles and components of Just in Time (JIT) and Toyota Production Systems.
- CO2. Analyze and compare JIT systems with conventional manufacturing systems in terms of layout, workforce, and control.
- CO3. Evaluate the implementation frameworks, risks, and challenges in deploying JIT in real-world scenarios.
- CO4. Apply JIT concepts to supply chain and purchasing management to improve system responsiveness and efficiency.

UNIT-I

10 Hrs.

JIT-An Introduction: Spread of JIT movement, the New Production System Research Association of Japan, some definitions of JIT, core Japanese practices of JIT, creating continuous manufacture, enabling JIT to occur, basic element of JIT, benefits of JIT.

Modern Production System: Key feature of Toyota's Production System, basic framework of Toyota Production System. **KANBAN SYSTEM** – other types of kanban's, kanban rules, adapting to fluctuations in demand through kanban, whirligig, determining the number of kanban's in Toyota Production System, detailed kanban system example, supplier kanban and the sequence schedule for use by suppliers

UNIT - II

10 Hrs.

Design, Development and Management of JIT Manufacturing Systems: Plant configurations and flow analysis for JIT manufacturing, comparison of JIT's "demand pull" system with conventional "push type", planning and control systems, quality management system for JIT, product design for JIT, human resource management in JIT, flexible workforce system at Toyota, creation and maintenance of teams for JIT, union organization and conduct of industrial relations in JIT, interface of JIT with advanced manufacturing technology, assessing performance in JIT manufacturing systems, product costing information systems in JIT manufacturing, an example of overhead allocation in JIT, potential for developing countries, potential for small manufacturing.

UNIT - III

11 Hrs.

Framework for Implementation of JIT: Implementation risk, risks Due to inappropriate understanding of JIT, risks due to technical, operational and people problems, risks associated with kanban system, some important activities to be performed during implementation, steps in implementation, project work approach to implementation, conclusion.

UNIT - IV

11 Hrs.

Supply Management for JIT: JIT purchasing-the Japanese way, some studies in JIT purchasing, experience of implementation organizations, surveys of JIT purchasing, buyer-seller relationship in JIT purchasing, quality certification of suppliers in JIT purchasing, some problems in implementation of JIT purchasing, reduction of freight costs in JIT purchasing, monitoring supplier performance for JIT purchasing, audit in JIT purchasing, implementation of JIT to international sourcing, frequency of shipments, inventory policy, supplier reaction capability, quality, communication sole sourcing, delivery performance and supplier flexibility, conclusion.

Text Books:

1. M. G. Korgaonker, *Just in Time Manufacturing*, Macmillan India Ltd., 1992.
2. Richard J. Schonberger, *Japanese Manufacturing Techniques*, The Free Press, Macmillan Pub. Co., Inc., New York, 1988.

Reference Books:

1. Taiichi Ohno, *Toyota Production System: Beyond Large-Scale Production*.
2. James P. Womack, Daniel T. Jones, and Daniel Roos, *The Machine That Changed the World*.
3. Yasuhiro Monden, *Toyota Production System: An Integrated Approach to Just-In-Time*.

Weblinks and Video Lectures (E-Resources):

1. JIT manufacturing overview: <https://www.ifm.eng.cam.ac.uk/research/dstools/jit-just-in-time-manufacturing/>
2. JIT and Toyota Production System:

https://www.youtube.com/results?search_query=just+in+time+manufacturing+lecture

3. Toyota Production System basics:

https://www.youtube.com/results?search_query=toyota+production+system+lecture

4. Kanban system explained: https://www.youtube.com/results?search_query=kanban+system+lecture

5. JIT purchasing and supplier management:

https://www.youtube.com/results?search_query=jit+purchasing+and+supply+chain+lecture

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Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3 (WK1, WK2)	2 (WK1, WK2)	1 (WK2)	-	-	-	-	-	-	1 (WK10)	1 (WK11)	2	1	2
CO2	2 (WK3, WK5)	3 (WK3, WK5)	2 (WK3, WK5)	1 (WK5)	1 (WK5)	-	-	-	-	1 (WK10)	1 (WK11)	2	2	1
CO3	2 (WK4, WK6)	2 (WK4, WK6)	2 (WK4, WK6)	3 (WK4, WK6)	2 (WK6)	-	-	-	-	1 (WK10)	1 (WK11)	2	2	2
CO4	2 (WK7)	2 (WK7)	1 (WK7)	-	1 (WK7)	-	-	-	1 (WK9)	2 (WK10)	1 (WK11)	2	1	3

Course Code :		22UIP011E	DESIGN OF EXPERIMENTS	Semester :	--
L: T:P :		3:0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Develop the ability to design, conduct, analyze, and optimize engineering experiments using statistical Design of Experiments (DoE), factorial designs, Taguchi methods, and signal-to-noise ratio analysis to improve product quality and process performance.

Course Outcomes:

After completion of the course student will be able to

- CO1. Apply the fundamental principles of Design of Experiments (DoE), statistical concepts, randomization, replication, blocking, and experimental design techniques for engineering applications.
- CO2. Analyze full and fractional factorial experiments to determine the effects of process variables and their interactions for engineering problem-solving.
- CO3. Apply Taguchi orthogonal arrays and robust design methodology to design, conduct, and optimize engineering experiments.
- CO4. Analyze experimental results using Signal-to-Noise (S/N) ratios and interpret the performance of engineering systems for quality improvement.

UNIT-I

10 Hrs.

Strategy of Experimentation, Typical applications of Experimental design, Basic Principles, Guidelines for Designing Experiments. Definition and scope of DoE. Importance in engineering and quality improvement, Basic statistical concepts review:

- Population and sample
- Mean, variance, standard deviation
- Normal distribution

Concept of variation and control Randomization, replication, and blocking. Types of experimental designs

UNIT-II

10 Hrs.

Factorial Experimentation-Two Levels: Full Factorial Designs: Experimentation as a learning process. Traditional scientific experiments. Two-factor design, Three-factor design. Replicating experiments. Factor interactions. Normal plots of estimated effects. Mechanical plating experiment. Four-factor design.

Fractional Factorial Experimentation-Two Levels: Fractional Factorial Designs: Blocking two-level designs. Other useful two-level designs

UNIT-III

12 Hrs.

Experiment Design Using Taguchi's Orthogonal Arrays: Types of Orthogonal Arrays, selection of standard orthogonal arrays, Linear graphs and Interaction assignment, Dummy level Technique, Compound factor method, Modification of linear graphs. Illustration through Numerical examples.

Steps In Robust Design-Case study discussion. Noise factors and testing conditions. Quality characteristics and objective functions. Control factors and their levels. Matrix experiment and data analysis plan. Conducting the matrix experiment, data analysis, verification experiment and future plan.

UNIT-IV

10 Hrs.

Signal-To-Noise Ratio: Evaluation of sensitivity to noise. Signal to Noise ratios for static problems: Smaller-the-better type, Nominal-the -better-type, Larger-the-better type. Signal to Noise ratios for Dynamic problems. Illustration through Numerical examples. designs for factors at three and four levels

Text Books:

1. Robert H. Lochner and Joseph E. Matar, 'Designing for Quality - an Introduction Best of Taghuchi and Western Methods or Statistical Experimental Design', Chapman and Hall, Madras.
2. Madhav S. Phadke, "Quality Engineering Using Robust Design", Prentice Hall PTR, Englewood Cliffs, New Jersey 07632.

Reference Books:

1. D.C. Montgomery, 'Design and Analysis of Experiments', 5th Edition.
2. Philip J. Ross, "Taguchi Techniques for Quality Engineering".
3. Mannuals of SYSTAT and DOE PC IV

Weblinks and Video Lectures (E-Resources):

Coursera course on Design of Experiments

https://www.youtube.com/watch?v=pTAUa6qXV6E&list=PLIfM0IEfH5PVUhY_etTBhmm31m7r8c6Ea

<https://www.youtube.com/watch?v=ZoaUu6iRE64>

<https://www.youtube.com/watch?v=IEUTRrhoHNc&list=PLPjSqITyvDeWS9Lxp4jreGJ7eNsxHxJA8>

https://www.youtube.com/watch?v=zu4ZVso0HTo&list=PL5ND7pZq8F23NO_RejjQ0NwJe8V4wB-PZ

<https://www.youtube.com/watch?v=HPsSK-8Uz3o&list=PLHm5EVKgoDDQmH4q19yWJWSxrPYS0B56V>

<https://www.youtube.com/watch?v=dcNku8oWpLM&list=PL3HnRmbJODOgk92M25QFOLfr7o5aXeklk>

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes	Programme Outcomes (POs)											Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	1	2	3
CO1	3 (WK1, WK2, WK3)	2 (WK2, WK3, WK4)		1 (WK4)	2 (WK5)							3	2	1
CO2	2 (WK1, WK2)	3 (WK2, WK3, WK4)	2 (WK5)	3 (WK4)	2 (WK5)							3	3	1
CO3	2 (WK1, WK2)	3 (WK2, WK3, WK4)	3 (WK5)	2 (WK4)	3 (WK5, WK6)							3	3	
CO4	2 (WK1, WK2)	3 (WK2, WK3, WK4)	2 (WK5)	3 (WK4)	3 (WK5, WK6)		1 (WK7)				1 (WK7)	3	3	

Course Code		:	22UIP012E	ENGINEERING ECONOMY	Semester	:	--
L: T:P		:	3:0 :0		Course Type	:	Elective
Hours/Sem.	Teaching	:	42 Hrs.		CIE Marks	:	50
	Learning (TW+SL)	:	42 Hrs.		SEE Marks	:	50
	Exam	:	06 Hrs.		Total Marks	:	100
	Total Hrs.	:	90 Hrs.		Credits	:	03

Professional Competency:

Develop the ability to apply engineering economic principles and cost analysis techniques to evaluate alternatives, perform depreciation and replacement analyses, and estimate costs for effective engineering decision-making.

Course Outcomes:

After completion of the course student will be able to

- CO1.** Apply the concepts of interest and interest factors to analyze the time value of money in engineering problems.
- CO2.** Analyze and compare economic alternatives using Present Worth and Equivalent Annual Worth methods.
- CO3.** Apply depreciation and replacement analysis techniques for engineering asset management.
- CO4.** Analyze and estimate the cost of engineering products using standard costing and mensuration methods.

UNIT-I

12 Hrs.

Introduction: engineering decision – makers, engineering and economics, problem solving, intuition and analysis, tactics and strategy with an example.

Interest and Interest Factors: Interest rate, simple interest compound interest, interest formulae, time value equivalence exercises, problems and discussion

Present Worth Comparison: Conditions for present worth comparisons, rule 72, and basic present worth comparisons, present worth equivalence, net present worth, assets with equal and unequal lives, comparison of assets assume to have infinite lives, exercises and problems.

UNIT-II

10 Hrs.

Equivalent Annual Worth Comparisons: Situations for equivalent annual worth comparison, net annual worth of a single project, comparison of net annual worth's, definitions of asset life, comparison of assets with equal and unequal lives, exercises and problems.

Depreciation: Introduction, Reasons for Depreciation, Various methods of depreciation, Numerical Problems on all the methods of Depreciation.

UNIT-III

10 Hrs.

Replacement Analysis: Introduction, Reasons for Replacements - Deterioration, obsolescence, inadequacy, replacement criteria problems, Replacements of assets considering and ignoring time value of money. Group Replacements. Numerical Problems on the above types of Replacement Problems.

UNIT-IV

10 Hrs.

Estimating and Costing: components of costs such as direct material cost, direct labour cost, Fixed, over –heads, factory costs, administrative – over heads, first cost, selling price, calculation of the total cost of various components, mensuration, estimation of simple components.

Text Books:

1. Riggs J.L. (2002) Engineering economy McGraw Hill
2. Paul Degarmo (2001), Engineering economy Macmillan Pub, Co.

Reference Books:

1. NVR. Naidu, KM Babu (2006). Engineering Economy, New Age International Pvt. Ltd.
2. O.P Khanna (2000), Industrial Engineering and Management Dhanpat Rai and Sons
3. Theusen G. (2000) Engineering Economy. PHI.

Weblinks and Video Lectures (E-Resources):

- <https://www.youtube.com/watch?v=9yj6CtMUyYU>
- <https://www.investopedia.com/terms/c/compoundinterest.asp>
- <https://www.youtube.com/watch?v=ZSoLPCHsknA>
- <https://www.youtube.com/watch?v=r0aDjTLxy5c>
- <https://www.youtube.com/watch?v=r0aDjTLxy5c>

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CO1	3 (WK1, WK2, WK3)	2 (WK2, WK3, WK4)	–	1 (WK4)	2 (WK5)	–	–	–	–	–	–	2	2	–
CO2	2 (WK1, WK2)	3 (WK2, WK3, WK4)	2 (WK5)	3 (WK4)	2 (WK5)	–	–	–	–	–	–	3	3	–
CO3	2 (WK1, WK2)	3 (WK2, WK3, WK4)	3 (WK5)	2 (WK4)	3 (WK5, WK6)	–	–	–	–	–	–	3	3	2
CO4	2 (WK1, WK2)	3 (WK2, WK3, WK4)	2 (WK5)	3 (WK4)	3 (WK5, WK6)	–	1 (WK7)	–	–	–	1 (WK7)	3	3	2

Course Code :		22UIP013E	VALUE ENGINEERING	Semester :	--
L: T:P :		3:0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Develop the ability to apply value analysis and value engineering techniques to identify unnecessary costs, improve product and process functions, and enhance value, quality, and organizational performance across engineering and management applications

Course Outcomes:

After completion of the course student will be able to

- CO1. Apply value engineering principles and techniques such as function analysis and cost evaluation to identify unnecessary costs in simple engineering products.
- CO2. Use the value engineering job plan systematically to solve industrial problems through creative and structured phases.
- CO3. Analyze different types of values (use, esteem, cost, exchange) and their impact on product design and cost reduction through detailed case studies.
- CO4. Compare and contrast traditional cost reduction techniques with value analysis in terms of methodology, applications, and outcomes across functional areas like design, purchasing, quality, and management.

UNIT-I

12 Hrs.

INTRODUCTION TO VALUE ANALYSIS: Definition of Value, Value Analysis, Value Engineering, Value management, Value Analysis versus Value Engineering, Value Analysis versus Traditional cost reduction techniques, uses, Applications, advantages and limitations of Value analysis. Symptoms to apply value analysis, Coaching of Champion concept.

TYPE OF VALUES: Reasons for unnecessary cost of product, Peeling cost Onion concept, unsuspected areas responsible for higher cost, Value Analysis Zone, attractive features of value analysis. Meaning of Value, types of value & their effect in cost reduction. Value analysis procedure by simulation. Detailed case studies of simple products

FUNCTIONAL COST AND ITS EVALUATION: Meaning of Function and Functional cost, Rules for functional definition, Types of functions, primary and secondary functions using verb and Noun, Function evaluation process, Methods of function evaluation. Evaluation of function by comparison, Evaluation of Interacting functions, Evaluation of function from available data, matrix technique, MISS technique, Numerical evaluation of functional **relationships and case studies.**

UNIT-II

10 Hrs.

PROBLEM SETTING & SOLVING SYSTEM: A problem solvable stated is half solved, Steps in problem setting system, Identification, Separation and Grouping of functions. Case studies.

PROBLEM SETTING & SOLVING SYSTEM: Goods system contains everything the task requires. Various steps in problem solving, case studies.

VALUE ENGINEERING JOB PLAN: Meaning and Importance of Value Engineering Job plan. Phases of job plan proposed by different value engineering experts, Information phase, Analysis phase, Creative phase, Judgment phase, Development planning phase, and case studies. Cost reduction programs, criteria for cost reduction program, Value analysis change proposal.

UNIT-III

10 Hrs.

VALUE ENGINEERING TECHNIQUES: Result Accelerators or New Value Engineering Techniques, Listing, Role of techniques in Value Engineering, Details with Case examples for each of the Techniques.

ADVANCED VALUE ANALYSIS TECHNIQUES: Functional analysis system technique and case studies, Value analysis of Management practice (VAMP), steps involved in VAMP, application of VAMP to Government, University, College, Hospitals, School Problems etc., (service type problems).

TOTAL VALUE ENGINEERING: Concepts, need, Methodology and benefits.

UNIT-IV

10 Hrs.

APPLICATION OF VALUE ANALYSIS: Application of Value analysis in the field of Accounting, Appearance Design, Cost reduction, Engineering, manufacturing, Management, Purchasing, Quality Control, Sales, marketing, Material Management Etc., Comparison of approach of Value analysis & other management techniques.

Text Books:

1. Lawrence D. Miles, Techniques of Value Analysis and Engineering, 2nd Edn.

2. M.S. Vittal, Systems Consultancy Services, Value engineering for Cost Reduction and Product, Edn, 1991.

Reference Books:

1. Edward D Heller Value Management, Value Engineering and Cost Reduction, , Addison Wesley Publishing Company, 1991
2. Warren J Ridge, Value Analysis for Better Management, , American Management Association Edn, 1969.
3. G. Jagannathan, Getting More at Less Cost (The Value Engineering Way), Tata Mcgraw Hill Pub.Comp. Edn,1995.
4. Arther E Mudge “Value Engineering, , McGraw Hill Book Comp. Edn, 1981

Weblinks and Video Lectures (E-Resources):

- <https://www.youtube.com/watch?v=L-TfAfip1ME>
- <https://www.youtube.com/watch?v=mJoaZ4Gewyl>
- <http://www.simplynotes.in/e-notes/mbabba/productivity-management/value-analysis/>
- <https://www.youtube.com/watch?v=mJoaZ4Gewyl>
- <https://www.value-eng.org/page/AboutVM>

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CO1	3(WK1, WK2, WK3)	2(WK2, WK3, WK4)	1(WK5)	–	2(WK5)	–	–	–	–	–	–	2	2	–
CO2	2(WK1, WK2)	3(WK2, WK3, WK4)	2(WK5)	2(WK4)	2(WK5, WK6)	–	–	–	–	–	1(WK6)	3	3	–
CO3	2(WK1, WK2)	3(WK2, WK3, WK4)	2(WK5)	3(WK4)	2(WK5, WK6)	–	–	–	–	–	1(WK6)	3	3	2
CO4	2(WK1, WK2)	3(WK2, WK3, WK4)	2(WK5)	2(WK4)	2(WK5, WK6)	–	1 (WK7)	1 (WK7)	–	–	2(WK6, WK7)	3	3	2

Course Code :		22UIP014E	ENTERPRISE RESOURCE PLANNING	Semester :	--
L: T:P :		3:0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Develop the ability to understand, implement, and manage Enterprise Resource Planning (ERP) systems by integrating business processes, manufacturing operations, and organizational resources to improve efficiency, decision-making, and enterprise performance.

Course Outcomes:

After completion of the course student will be able to

- CO1.** Explain the evolution, scope, and need for ERP in modern enterprises and evaluate the reasons for ERP success or failure.
- CO2.** Analyze ERP modules and manufacturing-related ERP functions including MRP, BOM, and PDM systems.
- CO3.** Analyze the benefits of ERP implementation in terms of organizational performance and decision-making.
- CO4.** Describe and apply the ERP implementation life cycle phases, stakeholders' roles, and critical success factors.

UNIT-I

12 Hrs.

INTRODUCTION TO ERP: Introduction, Evolution of ERP, what is ERP, Reasons for the growth of the ERP market, The advantages of ERP, why do Man ERP Implementations Fail? Why are ERP packages being used now?

ENTERPRISE – AN OVERVIEW: Introduction, Integrated Management Information, Business modelling, Integrated Data Model

ERP AND RELATED TECHNOLOGIES: Introduction, Business Process Reengineering, Management Information System, Decision Support System, Executive Information Systems, Data Warehousing, Data Mining, On-line Analytical Processing, Supply Chain Management

UNIT-II

10 Hrs.

ERP- MANUFACTURING PERSPECTIVE: Introduction, ERP. CAD/CAM, Materials Requirements Planning, Bill of Material, Closed Loop MRP. Manufacturing Resource Planning, Distribution Requirements Planning

KANBAN: JIT and Kanban, Product Data Management, Benefits of PDM, Make-to-order, and Make-to Stock, assemble to order, Engineer to order, Configure-to order.

ERP MODULES: Introduction, Finance, Plant Maintenance, Quality Management, Materials Management.

UNIT-III

10 Hrs.

BENEFITS OF ERP: Introduction, Reduction of Lead time, On-time shipment, Reduction in Cycle Time, Improved Resource Utilisation, Better Customer Satisfaction, Improved Supplier Performance, Increased Flexibility, Reduced Quality Costs, Improved Information Accuracy and Decision – making capability.

ERP PACKAGES: Overview of ERP Software Introduction, SAP AG, Baan Company, Oracle Corporation, PeopleSoft, JD Edwards World Solutions Company, System Software Associates, Inc. QAD.

UNIT-IV

12 Hrs.

ERP Implementation Life Cycle: Pre-Evaluations Screening, Package Evaluation, Project Planning Phase, Gap Analysis, Reengineering, Configuration, Implementation of Team Training, Testing, Going Live, end user Training, Post Implementation

VENDOR, CONSULTANTS AND USERS: Introduction, In-house implementation – Pros and Cons, Vendors, Consultants, End-users. **ERP- Case studies**

Text Books:

1. Alexis Leon (1999), "Enterprise Resource Planning," Tata McGraw Hill Publishing Company Ltd.

Reference Books:

1. Vinod Kumar Garg and Venkitakrishnan "Enterprise Resource Planning Concept and Practice", Prentice Hall, India 2nd Edition.
2. Thomas Volloman, et.al. "Manufacturing Planning & Controls"

Weblinks and Video Lectures (E-Resources):

- <https://www.projectmanager.com/guides/resource-management>
- <https://www.youtube.com/watch?v=igssKXYS23A>
- https://www.youtube.com/watch?v=1N9WbIP9S_g
- https://www.youtube.com/watch?v=1N9WbIP9S_g&list=RDCMUcObs0kLlrDjX2LLSybqNaEA&index=1
- <https://www.youtube.com/watch?v=ssg6DTVfTSY>

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CO2	2 (WK1, WK2, WK3)	3 (WK2, WK3, WK4)	2 (WK5)	2 (WK4)	3 (WK5, WK6)		–	–		–	1 (WK6)	3	3	–
CO3	2 (WK1, WK2)	3 (WK2, WK3, WK4)	2 (WK5)	3 (WK4)	3 (WK5, WK6)		–	–		–	2 (WK6)	3	3	2
CO4	2 (WK1, WK2)	3 (WK2, WK3, WK4)	3 (WK5)	2 (WK4)	3 (WK5, WK6)		1 (WK7)	1 (WK7)	1	1	2 (WK6, WK7)	3	3	2

Course Code :		22UIP015E	BUSINESS PROCESS REENGINEERING AND BENCHMARKING	Semester :	--
L: T:P :		3:0 :0		Course Type :	Elective
Hours/Sem.	Teaching :	42 Hrs.		CIE Marks :	50
	Learning (TW+SL) :	42 Hrs.		SEE Marks :	50
	Exam :	06 Hrs.		Total Marks :	100
	Total Hrs. :	90 Hrs.		Credits :	03

Professional Competency:

Develop the ability to apply business process reengineering and benchmarking techniques to analyze, redesign, and improve organizational processes for enhanced efficiency, competitiveness, and continuous performance improvement.

Course Outcomes:

After completion of the course student will be able to

CO1.Apply the fundamental principles of Business Process Reengineering (BPR) and understand the role of 3Cs (Customer, Competition, and Change) in process transformation.

CO2.Analyze the roles and responsibilities of BPR teams, and evaluate real-world case studies to identify effective process redesign practices.

CO3.Apply benchmarking methods to identify performance gaps and set process improvement targets in alignment with organizational goals.

CO4.Analyze collected benchmarking data to derive actionable insights and recommend best practices for business process improvement.

UNIT-I

10 Hrs.

Definition of reengineering, importance of 3Cs – customers take charge, competition intensifies, and change becomes constant.

Detailed definition of reengineering – fundamental rethinking, radical redesign, and dramatic improvement

Rethinking business process, new world of work, and enabling role of information technology

UNIT-II

10 Hrs.

Reengineering leader, process owner, reengineering team, steering committee, and reengineering czar.

Reengineering opportunities: Choosing the processes to reengineer and understanding processes.

Experience of process redesign – redesign session. Discussion on Reengineering Case Studies

UNIT-III

10 Hrs.

Benchmarking: Definition, mission and objectives, managing benchmarking process, training and code of conduct, future scope and benchmarking process

What to benchmark: Concept of step zero, priorities, business processes – linking to goals etc.,

investigation, documentation, performance measures, improving business processes.

Whom to benchmark: Developing candidate list, systematic search, refining the initial list

UNIT-IV

10 Hrs.

Data Collection and Analyzing the Performance Gap: Data collection plan, research - internal, public domain sources, outside experts etc. original research, site visits, and code of conduct

Analyzing the gap: Tools, displaying data, deciding and combining best work practices, validation, recommendations etc.

Discussion on Benchmarking Case studies

Text Books:

1. Michael Hammer and James Champy, "Reengineering the Corporation – A Manifesto for Business Revolution", Nicholas Brealey Publishing London. ISBN 1 85 7880 560
2. Robert C. Camp, "Business Process Benchmarking- Finding and implementing Best Practices", Vision Books New Delhi. ISBN 81-7094-275-6

Reference Books *

1. Robert C. Camp "Benchmarking: The Search for Industry Best Practices that lead to Superior Performance" ASQC Quality Press, ISBN 978-1-56327-352-0
2. Raymond L Manganelli, Mark M. Klein "The Reengineering Handbook: A step-by-step guide to business transformation" American Management Association, ISBN 0-8144-0236-4
3. Chang Meng Khoong "Reengineering in Action: The Quest for World-Class Excellence, Imperial College Press, ISBN 978-81-7596-787-8
4. Bjorn Anderson and Per-Gaute Pettersen, "The Benchmarking Handbook: Step-by-step instructions", Chapman and Hall, ISBN: 04120735202

Weblinks and Video Lectures (E-Resources):

<https://www.youtube.com/watch?v=M28W5EKiwCs&list=PLNQKQTBvVeQyZ56LdwEDvXKJnTSwT6gEp>
<https://www.youtube.com/watch?v=v-jAf7L2Uak>
<https://www.youtube.com/watch?v=LtSiTpb7mS0>
<https://www.youtube.com/watch?v=WEIHeGOEDPE>
<https://www.youtube.com/watch?v=R15QBniQuZA>
<https://www.youtube.com/watch?v=AkGwJSIkpfY>
<https://www.youtube.com/watch?v=sfWi2EmM1QA>
<https://www.youtube.com/watch?v=sgy0ka4vh-M>

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CO2	2 (WK1, WK2)	3 (WK2, WK3, WK4)	2 (WK5)	3 (WK4)	2 (WK5, WK6)		–	–	1	1	1 (WK6)	3	3	–
CO3	2 (WK1, WK2)	3 (WK2, WK3, WK4)	3 (WK5)	2 (WK4)	3 (WK5, WK6)		–	–		1	2 (WK6)	3	3	2
CO4	2 (WK1, WK2)	3 (WK2, WK3, WK4)	2 (WK5)	3 (WK4)	3 (WK5, WK6)		1 (WK7)	1 (WK7)	1	1	2 (WK6, WK7)	3	3	2