SHRI SHANKARACHARYA TECHNICAL CAMPUS, BHILAI

(An Autonomous Institute affiliated to CSVTU, Bhilai)

SCHEME OF TEACHING AND EXAMINATION (EFFECTIVE FROM 2020-2021 BATCH)

M. Tech. (Production Engineering)

3rd Semester

S. No.	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Examination Theory / Practical			Total Marks	Credit L+(T+P)/2
				L	T	P	ESE	CT	TA		
1	Mech. Engg.	ME225301	Industrial Design & Ergonomics	3	1	-	100	20	20	140	4
2	Mech. Engg	ME225302	Elective-III	3	1	-	100	20	20	140	4
3	Mech. Engg.	ME225391	Preliminary Work on Dissertation	-	-	28	100	-	100	300	14
4	Mech. Engg	ME225392	Seminar based on Dissertation	-	-	4	-	-	20	20	2
Total				6	2	32	300	40	160	500	24

L- Lecture T- Tutorial

P- Practical, ESE- End Semester Exam

CT- Class Test TA- Teacher's Assessment

Table-III

PROFESSIONAL ELECTIVE II			
S.No.	Board of Study	Subject Code	Subject
1	Mech. Engg.	ME225321	Flexible Manufacturing System
2	Mech. Engg.	ME225322	Hybrid Manufacturing
3	Mech. Engg.	ME225323	Machine Vision

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M. Tech. (Production Engineering)3rd Semester

Subject Code ME225301	INDUSTRIAL DESIGN AND ERGONOMICS	L = 2	T = 0	P = 0	Credits = 2
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
1. To explain the general principles that governs the interaction of humans in their working environment. 2. To improve improving worker performance and safety. 3. To know about the environmental conditions in the industry. 4. To know about bio thermodynamics and Bioenergetics. 5. To know about the human factors in industrial aspects.	On successful completion of the course, the student will be able to: 1. To explain the general principles that governs the interaction of humans in their working environment 2. To improve improving worker performance and safety. 3. To know about the environmental conditions in the industry. 4. To know about bio thermodynamics and bioenergetics 5. To know about the human factors in industrial aspects

Unit-I **CO1**

Introduction: An approach to industrial design -elements of design structure for industrial design in engineering application in modern manufacturing systems.

Ergonomics and Industrial Design: Introduction -general approach to the man- machine relationship-workstation design-working position.

Unit-II **CO2**

Control and Displays: Shapes and sizes of various controls and displays-multiple, displays and control situations - design of major controls in automobiles, machine tools etc

Ergonomics and Production: ergonomics and product design -ergonomics in automated systems- expert systems for ergonomic design. Anthropometric data and its applications in ergonomic, design- limitations of anthropometric data use of computerized database.

Unit-III **CO3**

Visual Effects of Line and Form: The mechanics of seeing- psychology of seeing general influences of line and form.

Colour: Colour and light -colour and objects- colour and the eye -colour consistency- colour terms-reactions to colour and colour continuation -colour on engineering equipments.

Unit- IV **CO4**

Aesthetic Concepts: Concept of unity- concept of order with variety -concept of purpose style and

environment Aesthetic expressions. Style-components of style- house style, observation style in capital goods, case study.

Unit- V **CO5**

Industrial Design in Practice: General Design -specifying design equipment- rating the importance of industrial design -industrial design in the design process.

Text Books:

S. No.	Title	Authors	Edition	Publisher
1	Industrial Design for Engineers	Mayall W.H.	---	London Hiffee books Ltd. -1988.
2	Applied Ergonomics Hand Book	Brain Shakel (Edited)	---	Butterworth scientific. London -1988.

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	Introduction to Ergonomics	R. C. Bridger	-	McGraw Hill Publications - 1995
2	Human Factor Engineering	Sanders & McCormick	6 th edition	McGraw Hill Publications, 2002.

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"ज्ञानादेव तु कैवल्यम्"

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SCHEME OF TEACHING AND EXAMINATION (EFFECTIVE FROM 2020-2021 BATCH)

M. Tech. (Production Engineering)3rd Semester

Subject Code ME225321	FLEXIBLE MANUFACTURING SYSTEMS	L = 2	T = 0	P = 0	Credits = 2
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
1. To develop the need and better understanding of conventional and non-conventional manufacturing process. 2. To develop skills in fundamental principle of Abrasive jet machining and thermal metal removing process. 3. To expose the students to different processes used in Electro Chemical and Chemical Processes. 4. To developed the skill and knowledge the generation of plasma, electron beam, laser and their machining characteristics. 5. To developed the knowledge of formation of ion beam and this application and various high velocity forming process.	On successful completion of the course, the student will be able to: 1. Apply the concepts of PPC and GT to the development of FMS. 2. Discuss the planning and scheduling methods used in manufacturing systems. 3. Identify various workstations, system support equipment. 4. Identify hardware and software components of FMS. 5. Summarize the concepts of modern manufacturing such as JIT, supply chain management and lean manufacturing etc.

Unit-I **CO1**

Introduction: Introduction to manufacturing system, different type of manufacturing system,volume variety relationship for understanding manufacturing system.

Flexible Manufacturing System: Components of an FMS, types of system, where to apply FMS technology, FMS work stations. Material handling and storage system: Functions of the handling system, FMS layout configuration, Material handling equipment.

Computer control system: Computer function, FMS data file, system reports planning the FMS, analysis method for FMS, application and benefits.

Unit-II **CO2**

Distributed data processing in FMS: DBMS and their applications in CAD/CAM and FMS distributed systems in FMS –Integration of CAD and CAM - Part programming in FMS, tool data base - Clamping devices and fixtures data base.

Conveyors: AGVs – features of industrial robots - robot cell design and control- AS/RS.

Unit-III **CO3**

Group Technology: Part families, part classification and coding. Types of classification and coding system, Machine cell design: The composite part concept, types of cell design. Determining the best machine arrangement, benefits of group technology.

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Chairman (AC)	Chairman (BoS)	Date of Release	Version	

Just In Time and Lean Production: Lean Production and Waste in Manufacturing, just in time production system, automation, work involvement.

Unit- IV **CO4**

Production Planning and control systems: Aggregate Production Planning and the master production schedule, Material Requirements and Planning, capacity planning, shop floor control, inventory control, and extensions of MRP.

Unit- V **CO5**

CMM types: contact and non-contact inspection principles - programming and operation-in cycle gauging.

Text Books:

S. No.	Title	Authors	Edition	Publisher
1	Flexible Manufacturing,	David J. Parrish	-	Butterworth-Heinemann, 1990
2	Automation Production systems, Computer Integrated Manufacturing	Mikell P Groover	-	Prentice Hall, 1987

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	The design and operation of FMS	Paul Ranky	-	IFS publication, 1983.

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SCHEME OF TEACHING AND EXAMINATION (EFFECTIVE FROM 2020-2021 BATCH)

M. Tech. (Production Engineering)3rd Semester

Subject Code ME225322	HYBRID MANUFACTURING	L = 2	T = 0	P = 0	Credits = 2
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
1. Learn what Advanced/Additive manufacturing (AM) is and understand why it has become one of the most important technology trends in decades for product development and innovation. 2. Demonstrate comprehensive knowledge of the broad range of AM processes, devices, capabilities and materials that are available. 3. Understand the various software tools, processes and techniques that enable advanced/additive manufacturing and personal fabrication. 4. Learn how to create physical objects that satisfy product development/prototyping requirements, using advanced/additive manufacturing devices and processes. 5. Articulate the various tradeoffs that must be made in selecting advanced/additive manufacturing processes, devices and materials to suit particular product requirements.	On successful completion of the course, the student will be able to: 1. Understand the working principle and process parameters of AM processes 2. Explore the applications of AM processes in various fields 3. Select the suitable material and process for fabricating a given product 4. Apply the knowledge in Material science in Additive Manufacturing components 5. Design and develop a product for AM Process.

Unit-I **CO1**

Hybrid Machining Processes: Introduction, Needs of Hybridization of the machining process, Challenges and feasibility of process.

Unit-II **CO2**

Chemical and Electro-chemical Type Material Removal Processes: Principle, working advantages, disadvantages and applications of Electrochemical, Chemical machining, Economy aspects of ECM, Electro-chemical deburring and honing.

Mechanical and Thermal interaction, Electrical Hybrid Machining Processes(ECDM, ECAM) , Electrical Discharge Machining with Ultrasonic Assistance (EDMUS)

Unit-III **CO3**

Abrasive Hybrid Machining (AHM) Processes, Abrasive Electrochemical Machining processes, Electrochemical assistance of Ultrasonic Machining (USMEC), Abrasive Electrical Discharge Grinding

Unit- IV **CO4**

Laser Assisted Micromachining: Laser-assisted etching (LAE), Electrochemical Micromaching with Laser Assistance (ECML),

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Unit- V **CO5**

Methods of Metal Deposition: Thermal Spray Coating: Vapor Deposition Chemical Vapor Deposition

Text Books:

S. No.	Title	Authors	Edition	Publisher
1	Advance Machining Processes	V.K. Jain	-	New Age
2	Modern Machining Processes	P.C. Pandey	-	New Age
3	Manufacturing Processes	Kalpak Jian	-	Tata McGraw-Hill International

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	Manufacturing Science	Amitabh Gosh and A.K. Mallik,	1985	Affiliated East-West Press Pvt. Ltd.
2	Manufacturing Processes	Degarmo	-	-

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M. Tech. (Production Engineering)3rd Semester

Subject Code ME225323	MACHINE VISION	L = 2	T = 0	P = 0	Credits = 2
Evaluation Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	20	140	3 Hours

Course Objective	Course Outcomes
1. To know about the principles and applications of vision system in modern manufacturing environment. 2. To learn about the algorithms in vision 3. To know about the recognition of object. 4. To be familiar about the applications regarding vision. 5. To know about the components used for vision.	On successful completion of the course, the student will be able to: 1. Knowledge or gadgets of vision systems. 2. Ability to understand the image capturing and processing techniques. 3. Ability to apply the vision system in other machines. 4. Knowledge for recognizing the objects. 5. Knowledge in application of vision and image processing in robot operations.

Unit-I **CO1**

Image capture and digitization; Image transforms; Digital Fourier transform; Fast Fourier transform; Other transforms; Convolution.

Unit-II **CO2**

Image enhancement; Spatial methods; Frequency domain methods; Image restoration.

Unit-III **CO3**

Geometric transformation; Image compression; error free and lossy compression; Edge detection; Hough transform; Region based segmentation; image feature / region representation and descriptors; Morphological operators.

Unit- IV **CO4**

Feature based matching; Baye's classification; Low level vision; Introduction to stereopsis, Shape from shading.

Unit- V **CO5**

Optical flow; Rule based picture segmentation; development and evaluation of image algorithms.

Text Books:

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1	Image Processing, Analysis and Machine Vision	Milan Sanka, Vaclav Hlavac and Roger Boyle	-	Vikas Publishing
2	Digital Image Processing	Kenneth & Castleman	-	Prentice Hall India

Reference Books:

S. No.	Title	Authors	Edition	Publisher
1	Digital Image Processing	Conzalez RC & P Wint	-	Addision Wesley
2	Digital Image Processing & Analysis	Chandra and Mazumdar	-	Prentice Hall India