GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Diploma Engineering				Branch	Mechanical Engineering		
Semester	V/VI				Version	1.0.0.0		
Effective from Academic Year		2020-21			Effective for the batch Admitted in			July 2018
Subject code	1ME2606		Subject Name		Advance Manufacturing Systems			
Teaching scheme					Examination scheme (Marks)			
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50

Pre-requisites:

Course Learning Outcomes:
The course content should be taught and implemented with an aim to develop different skills leading to the achievement of the following competencies and course learning outcomes: CO1.Operate the CNC machine. CO2. Use of CAPP. CO 3.Operate the cellular manufacturing systems CO 4.Operate the FMS, Operate the CIM. CO 5.Manage just in time system and parallel engineering.

Course Content				
Name of UNIT	Unit Content	Unit Learning Outcomes	Marks	Hrs
UNIT – 1 (Advanced Manufacturing Systems)	1.1 AMS in industries. 1.2 Evolution of transformation and manufacturing systems. 1.3 Components, working and features of Computer Numerical Control (CNC) machine.	1a.Explain the working of CNC machines. 1b. Explain different stages of development in manufacturing industries	05	04
UNIT – 2 (Group Technology**)**	2.1Group technology - concept, need, scope, and benefits, codification systems, types, importance, part families, part classification and coding systems. 2.2Group technology Layout -concept, need, importance, comparison with conventional layout with examples/case study, benefits. 2.3Computer Aided Process Planning (CAPP) – conventional process planning and examples, CAPP-concept, types, features, methods and importance.	2a.Describe different types of coding system in group technology 2b. Sort different parts into different groups and give code. 2c. Distinguish Group technology layout with conventional layout	10	08

UNIT – 3 (Cellular Manufacturing**)**	3.1Cellular Manufacturing- concept, definition, application and benefits. 3.2. Part family and cell formation. 3.3. Composite component and key machine concepts. 3.4. Cell layout and design: Job and tool movement within cell. 3.5. Types of cell: manual and automatic cell, assembly cell, comparison of cell and Flexible Manufacturing Cell (FMC). 3.6. Common troubles and remedies in sensor operations.	3a. Explain cellular manufacturing 3b. Design cell layout on part family 3c. Explain the parts and group of machines 3d. Implement the group technology benefit into production facilities. 3e. Describe different types of cell.	15	08
UNIT – 4 (Flexible Manufacturing System**)**	4.1 Flexible Manufacturing Unit (FMU), turn mill centres, multiple centres, advanced machining centres, etc. 4.2 Transfer line- concept, meaning, features and examples. 4.3 Flexible Manufacturing System (FMS) -concept, meaning and benefits, major elements and their role. 4.4 FMS: layout concept, types and their benefits. 4.5 Automated Guided Vehicles (AGV) inFMS- concept, definition, types, functions. 4.6 Signal flow diagram, line balancing, Automated Storage and Retrieval System (AS/RS), case examples of FMS for specific components/group of components. 4.7 Flexible assembly system (FAS)	4a. Explain various approaches of FMS. 4b. Identify different elements of FMS 4c. Describe the advanced material handling system and storage system in FMS. 4d. Explain concept of transfer line	20	12
UNIT – 5 (JIT and Computer Integrated Manufacturing)	5.1 JIT concept, need and reasons to include this concept in AMS. 5.2 Unnecessary elements in conventional manufacturing system with reference to JIT. 5.3 JIT implementation requirement. 5.4 Concurrent engineering. 5.5 Concept, terminology, definitions and objective in Concurrent engineering. 5.6 CIM: concept, need, definition, block diagram and explanations, importance and features of each terms involved. 5.7 Computer Aided Inspection-concept, types, working and application examples and benefits. 5.8 Coordinate Measuring Machine	5a.Explain challenges and steps for implementation of JIT. 5b. Explain importance of concurrent engineering 5c. Distinguish between conventional engineering and concurrent engineering. 5d. Basics of CIM & identify steps of implementing of CIM. 5e. Compare different software packages and their capabilities. 5f. Explain protocols used in CIM	10	13

	(CMM) - its working and applications. 5.9 Protocols in CIM- their features, functions and applications.			
		Total	60	45

List of Practical		
No.	Unit	Name of Practical
1	II	Identify the type of layouts used in selected industries and identify the faults in that layout and suggest improvements.
2	II	Identify the different part features and develop part v/s machine matrix to formulate part families. (Exercise performs in a group of students.)
3	II	Generate part coding using any data processing software. (Use data collected in experiment number 2.)
4	II	Select an industrial component which have multiple operations and develop a process plan for that component (04 parts with more than 5 different operations).
5	III and IV	Identify the appropriate FMS layout for different type of manufacturing industries. (Such as Automobile, tool, machinery, aerospace industries etc.)
6	IV	Simulate planning of AGV and AS/RS for a appropriate company.
7	V	Quantify advantages of JIT and concurrent engineering industries considering various factors.
8	V	Select an industry and Identify steps and implementation strategies for CIM.
9	V	Generate material requirement planning for appropriate product available in Workshop-floor.

List of Instruments/Equipment/TrainerBoard	
1	CAD laboratory
2	Robotic Kit

Link of Text Books			
No	Title of Books	Authors	Publication
1	Automation. Production and Computer integrated Manufacturing	Groover. Mikell P	PHI Learning. New Delhi (2013)
2	Flexible Manufacturing System	Shivanand H.K., Benal M.M.. Koti V.	New age publisher. New Delhi
3	Computer Integrated Manufacturing	Vajpayee S.K.	PHI Learning. New Delhi (2013)
4	Computer Integrated	Bedworth, Wolfe and Anderson	McGraw Hill New Delhi

List of Reference Books			
No	Title of Reference Books	Authors	Publication
1	Computer aided manufacturing	Rao.P : Tewari.N and Kundra, T.K	TMH Publication New Delhi
2	CAD/CAM/FOF. Vol LIL and III	Juneja. Pnjara and Sagar	TMH Publication New Delhi
3	Computer integrated manufacturing	Rolig James A.; Kraebber Henrv W.	Pearson Publication New Delhi

Link of Learning Web Resource	
1	www. egyankosh. ac. in
2	nptel.ac.iii/
3	www.haascnc .com
4	daifiikuwebb.com
5	hrtp://www.autodesk.in/
6	www.ptc.com

7	www .ma sterc am. com
8	www. mrabindia.com

PO & CO Mapping							
Sr.No.	**Name of PO**	**Description**	Co1	Co2	Co3	Co4	Co5
1	PO 1	Proficiently applies concepts, theories and techniques of the relevant natural, physical sciences and knowledge in mathematics.	**SLI**	**SUB**	**MED**	**SLI**	**MED**
2	PO 2	Use basic principles of statics, dynamics, fluid mechanics, and engineering materials, strength of materials engineering standards and manufacturing processes to aid in the design, characterization, and analysis and troubleshooting of mechanical system.	**SLI**	**SUB**	**SUB**	**SUB**	**SUB**
3	PO 3	Apply their engineering knowledge, critical thinking and problem solving skills in professional engineering practice or in non engineering fields, such as law, medicine or business.	**MED**	**MED**	**MED**	**MED**	**MED**
4	PO 4	Continue their intellectual development, through, for example, graduate education or professional development courses.	**SLI**	**MED**	**MED**	**SLI**	**MED**
5	PO 5	Use of appropriate computer languages, modern tool and application software that pertain to Mechanical engineering technology systems.	**SLI**	**SLI**	**SLI**	**MED**	**MED**
6	PO 6	Ability to identify problems, conducts experiments, gather data, analyze data and produce results.	**SLI**	**MED**	**MED**	**MED**	**SUB**
7	PO 7	Retain the intellectual curiosity that motivates lifelong learning and allows for a flexible response to the rapidly evolving challenges of the 21st century	**NONE**	**MED**	**MED**	**MED**	**SUB**
8	PO 8	Design a system component or process to meet desired need within realistic constraints, such as economic, environmental and social.	**MED**	**MED**	**MED**	**MED**	**SUB**
9	PO 9	Values the need for, and demonstrates, ethical conduct and professional accountability.	**NONE**	**NONE**	**NONE**	**NONE**	**NONE**
10	PO 10	Demonstrates effective communication to professional and wider audiences.	**SLI**	**SLI**	**SLI**	**SLI**	**SLI**
11	PO 11	Appreciates entrepreneurial approaches to engineering practice.	**SLI**	**SLI**	**MED**	**MED**	**SUB**
12	PO 12	Apply commitment to quality, timeliness, and continuous improvement.	**SLI**	**SLI**	**MED**	**MED**	**MED**