RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/3

Branch	Mechanical Engineering	Semester	V

Course Code	503	Course Name	Manufacturing Techniques and Systems

Course Outcome 1	**Prepare a given job using given conventional machine tools**	Teach Hrs	Marks
Learning Outcome 11	Describe construction and working of a given conventional machine tool using neat sketches	10	10
Contents	Conventional Machining Methods: Introduction, classification of Conventional Machining, Lathe machine: Definition, Parts, and Types, Operations, specifications and applications. Working Principle of Milling Machine, Types of Milling Machines, Milling Cutters and Milling Operations and application. Drilling Machine: Definition, Parts, operations, Specification and Applications. Working principle of Boring machine, Types of Boring machine. Grinding Machine: Introduction, Working principle. Shaper Machine: Definition, parts, Working principle, Operation and applications.		
Method of Assessment	Paper pen Test (Part of Progressive Test-I)		
Learning Outcome 12	Prepare a job as per given specification with safety precautions using given conventional machine tools.	12	10
Contents	Demonstration of preparation of jobs on conventional machine tools.		
Method of Assessment	Laboratory test by observation (Part of end semester practical exam)		
Course Outcome 2	**Prepare a given job using given unconventional machine tools**.		
Learning Outcome 21	Describe construction and working of a given unconventional machine tool using neat sketches..	10	20
Contents	Unconventional Machining Methods: Limitations of conventional machining and advantages of Unconventional Machining, Working Principle, Operating Parameters and Applications of Unconventional Machining Methods-Electro Chemical Machining, Electric Discharge Machining, Electron beam Machining, Ultra Sonic Machining, Abrasive Jet Machining, LASER Beam Machining, Plasma Arc Machining, Water jet machining		
Method of Assessment	Theory exam (Part of end semester exam)		
Learning Outcome 22	Prepare a job as per given specification with safety precautions using given unconventional machine tools.	12	10
Contents	Demonstration of preparation of jobs on unconventional machine tools.		
Method of Assessment	Laboratory test by observation (Part of end semester practical exam)		
Course Outcome 3	**Write a part program for a given component.**	Teach Hrs	Marks
Learning Outcome 31	Describe NC controls and its classifications	08	5
	Numerical control, Computer Numerical control, Direct Numerical Control and part programming, applications and operations of machine tool., Classification of NC system,		

Contents			
Method of Assessment	Paper pen Test (Part of Progressive Test-II)		
Learning Outcome 32	Explain working of NC, CNC, DNC and adaptive control using block diagrams	08	15
Contents	Numerical control, Component of NC systems, Applications of NC machine tool, Advantages and Disadvantages, Operation of NC m/c tool system, Basic length unit, NC co-ordinates system, Motion control in NC, Classification of NC controls – CNC - operation, application and advantages ,DNC – components, functions and advantages and ACO and ACC adoptive control.		
Method of Assessment	Theory exam (Part of end semester exam)		
Learning Outcome 33	Write a Part program using codes for preparatory and miscellaneous functions for a given component	06	10
Contents	Part programming-program format, steps in CAPP, Code for preparatory and miscellaneous functions (G and M code), preparation of small part program, NC word, CANNED Cycle.		
Method of Assessment	Assignment(Part of term work)		
Learning Outcome 34	Run a given part program on a simulator or a CNC machine tool .	08	10
Contents	Demonstration of execution of a part program on a Simulation Software/CNC Machine tool.		
Method of Assessment	Laboratory test by observation(Part of lab work)		
Course Outcome 4	**Explain the Flexible Manufacturing Systems, Robotics, CIM, Manufacturing, Artificial Intelligence and Machine Learning**..	Teach Hrs	Marks
Learning Outcome 41	Describe FMS, Robotics using suitable diagrams	08	10
Contents	Flexible Manufacturing Systems: Elements, Limitations, Feature & Characteristics, New development. Robotics: Introduction to robotics, Law of robotics, Elements of Robot system, Industrial and Non Industrial applications, selection criteria of Robot.		
Method of Assessment	Theory exam (Part of end semester exam)		
Learning Outcome 42	Describe CIM, JITM and Lean manufacturing.	06	05
Contents	Computer Integrated Manufacturing: Concepts, Elements, benefits and basic requirement. Just In Time Manufacturing: concepts, elements, Push vs Pull system, Kanban concept, lean manufacturing.		
Method of Assessment	Theory exam (Part of end semester exam)		
Learning Outcome 43	Explain Artificial Intelligence and Machine Learning concepts.	04	05
Contents	Artificial Intelligence and Machine Learning: Introduction of Artificial Intelligence (AI), Vertical AI, Horizontal AI. Introduction of Machine Learning, Types of Machine Learning, Difference between Artificial Intelligence and Machine Learning		

Method of Assessment	Paper pen Test (Part of Progressive Test-II)		
Course Outcome 5	**Explain a given Additive manufacturing method**	Teach Hrs	Marks
Learning Outcome 51	Describe a given Additive manufacturing method using diagrams.	08	20
Contents	Introduction, Advantages, Limitations, Classifications, History of 3DP,Need of 3D printing, 3DP technology steps, 3D printing application fields, Additive v/s subtractive Manufacturing processes, Examples of 3D Printing, Construction, Working and Applications of -Fused Deposition Modeling (FDM), Stereo lithography (STL), Selective Laser Sintering (SLS), Multi Jet Fusion (MJF),Laminated object Manufacturing(LOM). Additive Manufacturing/3D printing Equipments: Process Equipment-Design and process parameters, Governing Bonding Mechanism, Process Design.		
Method of Assessment	Theory exam (Part of end semester exam)		
Learning Outcome 52	Prepare a STL file using given software for a given CAD model of a component.	10	10
Contents	Additive manufacturing process steps		
Method of Assessment	Laboratory test by observation (Part of Lab work)		
Learning Outcome 53	Prepare a given job using 3D printing machine or simulator.	10	10
Contents	Demonstration of preparation of a job using 3D printing machine /simulator		
Method of Assessment	Laboratory test by observation (Part of end semester practical exam)		

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	*0*	*2*	**5**	**0**	**3**	*1*	*1*	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Prepare a given job using given conventional machine tools**.
LO Description	Describe construction and working of a given conventional machine tool using neat sketches.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	**Conventional Machining Methods:** Introduction, classification of Conventional Machining, Lathe machine: Definition, Parts, and Types, Operations, specifications and applications. Working Principle of Milling Machine, Types of Milling Machines, Milling Cutters and Milling Operations and application. Drilling Machine: Definition, Parts, operations, Specification and Applications. Working principle of Boring machine, Types of Boring machine. Grinding Machine: Introduction, Working principle. Shaper Machine: Definition, parts, Working principle, Operation and applications.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	10	NIL	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	Student will be asked to describe construction and working of a given conventional machine tool with neat sketch.	10	Test paper + Rating scale	Internal
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)					
Part of progressive test-I					

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	***0***	***2***	**5**	**0**	**3**	***1***	***2***	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Prepare a given job using given conventional machine tools**.
LO Description	Prepare a job as per given specification with safety precautions using given conventional machine tools.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Demonstration of preparation of jobs on conventional machine tools	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	2	10	Handouts, chalk board, PPT, text book, charts, video film and Conventional machines and lab manual.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by observation	Student will be asked to prepare a job of given specifications along with safety precautions using a given conventional machine tool	10	Conventional Machines and Work Piece on Shop Floor/Observation schedule/check-list	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of end semester practical exam

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	***0***	***2***	**5**	**0**	**3**	***2***	***1***	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Prepare a given job using given unconventional machine tools**.
LO Description	Describe construction and working of a given unconventional machine tool using neat sketches.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	**Unconventional Machining Methods:** Limitations of conventional machining and advantages of Unconventional Machining, Working Principle, Operating Parameters and Applications of Unconventional Machining Methods-Electro Chemical Machining, Electric Discharge Machining, Electron beam Machining, Ultra Sonic Machining, Abrasive Jet Machining, Laser Beam Machining, Plasma Arc Machining, Water jet machining.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	10	0	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal

1	Theory Exam	Student will be asked to describe construction and working of a given unconventional machine tool with neat sketches.	20	Question Paper	External
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)					
Part of end semester theory exam					

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	*0*	*2*	**5**	**0**	**3**	*2*	*2*	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Prepare a given job using given unconventional machine tools**.
LO Description	Prepare a job as per given specification with safety precautions using given unconventional machine tools.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Demonstration of preparation of jobs on unconventional machine tools	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	2	10	Handouts, chalk board, PPT, text book, charts, video film, unconventional machines and lab manual.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by observation	Student will be asked to prepare a job of given specifications along with safety precautions using a given unconventional machine tool.	10	Unconventional Machines and Work Piece on Shop Floor/Observation schedule/check-list	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of end semester practical exam

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	*0*	*2*	**5**	**0**	**3**	*3*	*1*	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Write a part program for a given component.**
LO Description	Describe NC controls and its classifications.

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Numerical control, Computer Numerical control, Direct Numerical Control and part programming, applications and operations of machine tool., Classification of NC system,	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	0	Handouts, chalk board, PPT, text book, charts, video film, and lab manual.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	Student will be asked to describe given NC control systems.	5	Test paper + Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of progressive test-II

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	*0*	*2*	**5**	**0**	**3**	*3*	*2*	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Write a part program for a given component.**
LO Description	Explain working of NC, CNC, DNC and adaptive control using block diagrams

SCHEME OF STUDY

S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Numerical control, Component of NC systems, Applications of NC machine tool, Advantages and Disadvantages, Operation of NC m/c tool system, Basic length unit, NC co-ordinates system, Motion control in NC, Classification of NC controls – CNC - operation, application and advantages ,DNC – components, functions and advantages and ACO and ACC adoptive control.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	NIL	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	Student will be asked to explain working of NC/CNC/DNC/adaptive control using block diagrams	15	Question paper	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of end semester theory exam

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	***0***	***2***	**5**	**0**	**3**	***3***	***3***	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Write a part program for a given component.**
LO Description	Write a Part program using codes for preparatory and miscellaneous functions for a given component.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Part programming-program format, steps in CAPP, Code for preparatory and miscellaneous functions (G and M code), preparation of small part program, NC word, CANNED Cycle.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	2	4	Handouts, chalk board, PPT, text book, charts, video film and mentioned machines.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Assignment	Student will be asked to write a Part program for a given component.	10	Observation schedule/check-list /rating scales /rubrics	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of term work

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	***0***	***2***	**5**	**0**	**3**	***3***	***4***	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Write a part program for a given component.**
LO Description	Run a given part program on a simulator or a CNC machine tool.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Demonstration of execution of a part program on a Simulation Software/CNC Machine tool.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	2	6	Handouts, chalk board, PPT, text book, charts, video film and mentioned machines.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by observation	Student will be asked to run a given part program on a simulator or a CNC machine tool.	10	Observation schedule/check-list /rating scales /rubrics	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of lab work

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	*0*	*2*	**5**	**0**	**3**	*4*	*1*	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Explain the Flexible Manufacturing Systems, Robotics, CIM, Manufacturing, Artificial Intelligence and Machine Learning**.
LO Description	Describe FMS, Robotics using suitable diagrams.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	**Flexible Manufacturing Systems:** Elements, Limitations, Feature & Characteristics, New development. **Robotics**: Introduction to robotics, Law of robotics, Elements of Robot system, Industrial and Non Industrial applications, selection criteria of Robot.	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	NIL	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	Student will be asked to describe given terms associated with FMS/ Robotics using suitable diagrams.	10	Question Paper	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of end semester theory exam

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	*0*	*2*	**5**	**0**	**3**	*4*	*2*	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Explain the Flexible Manufacturing Systems, Robotics, CIM, Manufacturing, Artificial Intelligence and Machine Learning**.
LO Description	Describe CIM, JITM and Lean manufacturing.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	**Computer Integrated Manufacturing:** Concepts, Elements, benefits and basic requirement. **Just In Time Manufacturing:** concepts, elements, Push vs Pull system, Kanban concept, lean manufacturing.	Interactive classroom teaching, demonstration, quiz, assignments, Tutorial.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	6	0	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Theory exam	Student will be asked to describe given terms associated CIM/JITM/ Lean manufacturing using suitable diagrams.	5	Question Paper	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of end semester theory exam

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	*0*	*2*	**5**	**0**	**3**	*4*	*3*	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Explain the Flexible Manufacturing Systems, Robotics, CIM, Manufacturing, Artificial Intelligence and Machine Learning**.
LO Description	Explain Artificial Intelligence and Machine Learning concepts.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	**Artificial Intelligence and Machine Learning:** Introduction of Artificial Intelligence (AI), Vertical AI, Horizontal AI. Introduction of Machine Learning, Types of Machine Learning, Difference between Artificial Intelligence and Machine Learning.	Interactive classroom teaching, demonstration, quiz, assignments, Tutorial.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	4	NIL	Handouts, chalk board, PPT, text book, charts, video film.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Paper pen test	Student will be asked to describe given terms associated Artificial Intelligence / Machine Learning using suitable diagrams.	5	Test paper + Rating scale	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of progressive test-II

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	***0***	***2***	**5**	**0**	**1**	***5***	***1***	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Explain a given Additive manufacturing method.**
LO Description	Describe a given Additive manufacturing method using diagrams.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Introduction, Advantages, Limitations, Classifications, History of 3DP, Need of 3D printing, 3DP technology steps, 3D printing application fields, Additive v/s subtractive Manufacturing processes, Examples of 3D Printing, Construction, Working and Applications of - Fused Deposition Modeling (FDM), Stereolithography (STL), Selective Laser Sintering (SLS), Multi Jet Fusion (MJF), Laminated object Manufacturing(LOM). Additive	Interactive classroom teaching, demonstration, quiz, assignments, tutorial	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	8	0	Handouts, chalk board, PPT, text book, charts, video film.	

	Manufacturing/3D printing Equipments: Process Equipment-Design and process parameters, Governing Bonding Mechanism, Process Design.						
		RGPV (Diploma Wing) Bhopal					

SCHEME OF ASSESSMENT					
S. No.	**Method of Assessment**	**Description of Assessment**	**Maximum Marks**	**Resources Required**	**External / Internal**
1	Theory exam	Student will be asked to describe a given Additive manufacturing method using diagrams.	20	Question Paper	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)
Part of end semester theory exam

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	*0*	*2*	**5**	**0**	**3**	*5*	*2*	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Explain a given Additive manufacturing method.**
LO Description	Prepare a STL file using given software for a given CAD model of a component.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Additive manufacturing process steps	Interactive classroom teaching, demonstration, quiz, assignments, Tutorial.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	2	8	Handouts, chalk board, PPT, text book, charts, video film and System along with mentioned software.	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by observation	Student will be asked to prepare a STL file using given software for a given CAD model of a component.	10	Configured System along with software	Internal

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of lab work

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code			Course Code			CO Code	LO Code	Format No. **4**
		M	*0*	*2*	**5**	**0**	**3**	*5*	*3*	

COURSE NAME	Manufacturing Techniques and Systems
CO Description	**Explain a given Additive manufacturing method.**
LO Description	Prepare a given job using 3D printing machine or simulator.

SCHEME OF STUDY

S. No.	Learning Content	Teaching –Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks
1	Demonstration of preparation of a job using 3D printing machine /simulator.	Interactive classroom teaching, demonstration, quiz, assignments, Tutorial.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz/tutorial to make students practice their knowledge.	2	8	Handouts, chalk board, PPT, text book, charts, video film and System along with mentioned software	

SCHEME OF ASSESSMENT

S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal
1	Laboratory test by observation	Student will be asked to prepare a given job using 3D printing machine /simulator.	10	Configured System along with software and 3D printer/Simulator	External

ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)

Part of end semester practical exam

DIPLOMA IN **MECHANICAL ENGINEERING** SEMESTER: **FIFTH SEMESTER**

SCHEME: **OCBC** COURSE CODE: **503**

NAME OF THE COURSE: **MANUFACTURING TECHNIQUES AND SYSTEMS**

LIST OF SUGGESTED EXPERIMENTS

S. NO.	**LO**	**NAME OF EXPERIMENTS**
1	12	Prepare a job of given specifications along with safety precautions using a Lathe machine
2	12	Prepare a job of given specifications along with safety precautions using a Milling machine
3	12	Prepare a job of given specifications along with safety precautions using a Shaper machine
4	12	Prepare a job of given specifications along with safety precautions using a drilling machine
5	12	Prepare a job of given specifications along with safety precautions using a boring machine
7	12	Prepare a job of given specifications along with safety precautions using a grinding machine tool
8	22	Prepare a job of given specifications along with safety precautions using an EDM/ LBM/EBM/PAM machine tool
9	22	Prepare a job of given specifications along with safety precautions using ECM machine tool
10	22	Prepare a job of given specifications along with safety precautions using USM/AJM/WJM machine tool
11	34	Write and run a given part program on a simulator /CNC machine tool
12	52	Prepare a STL file for a given CAD model of a component. using given software
13	53	Prepare a given job using 3D printing machine