

Manufacturing Process LAB			
Course Code	21AGL55	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	(0:0:2:0)	SEE Marks	50
Credits	01	Exam Hours	03
<b>Course objectives:</b> <ol style="list-style-type: none"> <li>1. To provide an insight to different machine tools, accessories and attachments.</li> <li>2. Hands on training on machine tools to build the knowledge and confidence which aids the students to enhance their manufacturing skills during the period of their project works.</li> <li>3. To expose the students to CNC Machine Tools, CNC part programming, and industrial robots.</li> <li>4. To provide an insight into different sand preparation and foundry equipment.</li> <li>5. To provide training to students to enhance their practical skills in milling, shaping and hand moulding operations.</li> </ol>			
Sl.NO	<b>Experiments</b>		
1.	<b>Machine shop:</b> <ol style="list-style-type: none"> <li>I. Introduction, Lathe machine, types of lathe machine, working principle of lathe, parts, Cutting tools, accessories &amp; attachment</li> <li>II. Jobs involving in thread cutting, groove cutting &amp; plane turning</li> <li>III. Jobs involving in taper turn, knurling, chamfering &amp; centre drilling</li> </ol>		
2.	<b>Shaper</b> <ol style="list-style-type: none"> <li>I. Introduction, classification of shaper, working principle &amp; parts of shaper</li> <li>II. Jobs involving in cutting of V Groove/ dovetail / Rectangular groove using a shaper</li> </ol>		
3.	<b>Milling machine</b> <ol style="list-style-type: none"> <li>I. Introduction, types, working principle, tools &amp; equipment's used</li> <li>II. Jobs involving in Cutting of Gear Teeth using Milling Machine</li> <li>III. Jobs involved to use indexing for preparation of hexagon</li> </ol>		
4.	<b>Computer Numerical Control (CNC):</b> <ol style="list-style-type: none"> <li>I. Introduction, components of CNC, CNC programming, manual part programming, G Codes, M Codes, programming of simple components in turning, drilling and milling systems, programming with canned cycles. Cutter radius compensations.</li> </ol>		
5.	<b>Foundry shop</b> <ol style="list-style-type: none"> <li>I. Introduction to foundry materials, moulds, uses of cores, melting furnaces, tools &amp; equipment used in Foundry shop</li> <li>II. Mould making using single piece pattern (step block-round)</li> <li>III. Mould making using split piece pattern</li> </ol>		
<b>Course outcomes (Course Skill Set):</b> At the end of the course the student will be able to: <ol style="list-style-type: none"> <li>1. Understand integral parts of lathe, shaping and milling machines and various accessories and attachments used.</li> <li>2. Select cutting parameters like cutting speed, feed, depth of cut, and tooling for various machining operations.</li> <li>3. Perform cylindrical turning operations such as plain turning, taper turning, step turning, thread Cutting, facing, knurling, internal thread cutting, eccentric turning and estimate cutting time.</li> <li>4. Perform machining operations such as plain shaping, inclined shaping, keyway cutting and Indexing etc.</li> <li>5. Explain the use of different computer applications in manufacturing, and able to prepare part Programs for simple jobs on CNC machine tools and robot programming.</li> </ol>			

### Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each course. The student has to secure not less than 35% (18 Marks out of 50) in the semester-end examination (SEE).

#### Continuous Internal Evaluation (CIE):

CIE marks for the practical course is **50 Marks**.

The split-up of CIE marks for record/ journal and test are in the ratio **60:40**.

- Each experiment to be evaluated for conduction with observation sheet and record write-up. Rubrics for the evaluation of the journal/write-up for hardware/software experiments designed by the faculty who is handling the laboratory session and is made known to students at the beginning of the practical session.
- Record should contain all the specified experiments in the syllabus and each experiment write-up will be evaluated for 10 marks.
- Total marks scored by the students are scaled down to 30 marks (60% of maximum marks).
- Weightage to be given for neatness and submission of record/write-up on time.
- Department shall conduct 02 tests for 100 marks, the first test shall be conducted after the 8<sup>th</sup> week of the semester and the second test shall be conducted after the 14<sup>th</sup> week of the semester.
- In each test, test write-up, conduction of experiment, acceptable result, and procedural knowledge will carry a weightage of 60% and the rest 40% for viva-voce.
- The suitable rubrics can be designed to evaluate each student's performance and learning ability. Rubrics suggested in Annexure-II of Regulation book
- The average of 02 tests is scaled down to **20 marks** (40% of the maximum marks).

The Sum of scaled-down marks scored in the report write-up/journal and average marks of two tests is the total CIE marks scored by the student.

#### Semester End Evaluation (SEE):

SEE marks for the practical course is 50 Marks.

SEE shall be conducted jointly by the two examiners, *one internal and another external examiner from other institution*, examiners are appointed by the University

- All laboratory experiments are to be included for practical examination.
- (Rubrics) Breakup of marks and the instructions printed on the cover page of the answer script to be strictly adhered to by the examiners. **OR** based on the course requirement evaluation rubrics shall be decided jointly by examiners.
- Students can pick one question (experiment) from the questions lot prepared by the internal /external examiners jointly.
- Evaluation of test write-up/ conduction procedure and result/viva will be conducted jointly by examiners.
- General rubrics suggested for SEE are mentioned here, writeup-20%, Conduction procedure and result in -60%, Viva-voce 20% of maximum marks. SEE for practical shall be evaluated for 100 marks and scored marks shall be scaled down to 50 marks (however, based on course type, rubrics shall be decided by the examiners)
- Change of experiment is allowed only once and 15% Marks allotted to the procedure part to be made zero.

The duration of SEE is 03 hours

Rubrics suggested in Annexure-II of Regulation book



### **Suggested Learning Resources:**

#### **Text Books**

1. Elements of Mechanical Engineering - Hajra Choudhury & others, Media Promoters 2010.
2. The Elements of Workshop Technology - Vol I & II, S.K. Hajra Choudhury, A.K. Hajra Choudhury, Nirjhar Roy, 11th edition 2001 others, Media Promoters and Publishers, Mumbai.
3. Mikell P, Groover. 2015. Automation, Production Systems and Computer-Integrated Manufacturing. 4<sup>th</sup> Edition, Pearson Learning.
4. P N Rao, 2015, CAD / CAM Principles and Applications, 3rd Edition, Tata McGraw-Hill.
5. Dr. P. Radhakrishnan, CAD/CAM/CIM, 3rd edition New Age International Publishers, New Delhi.

  
**H.O.D.**

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