



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Engineering

Level: Under Graduate

Branch: Plastic Technology

Subject Code: BE05023051

Subject Name: Auxiliary Equipments in Plastic Industries

| | |
|-------------------------|----------------------------------|
| w. e. f. Academic Year: | 2024-25 |
| Semester: | 5 |
| Category of the Course: | Professional Elective Course - 1 |

| | |
|----------------------|--|
| Prerequisite: | To study Auxiliary Equipments, you need a foundational understanding of primary processing methods and polymer material properties. Additionally, a basic grasp of processing machineries and thermodynamics is essential to understand how these units support the main production line |
| Rationale: | There is an inevitable need of Auxiliary equipments in today's modern plastic processing industries. The auxiliary equipments help in running the plastic processes with automation and preciseness. At the end of this course the student will be able to have the knowledge of various auxiliary equipments used in plastic industries. This knowledge will help the students to operate the auxiliary equipments in line with the processing machines |

Course Outcome:

After Completion of the Course, Student will able to:

| No | Course Outcomes |
|----|---|
| 01 | Understand Pre & Post Part handling systems |
| 02 | Explain the Working, Heating & Cooling for plastic processing machines |
| 03 | Understand the centralized conveying system and recycling plastics using auxiliary equipments |
| 04 | Explain the working and importance of Auxiliary Equipments used in Extrusion Process |
| 05 | Operate various Auxiliary equipments used in plastic processing industries. |

Teaching and Examination Scheme:

| Teaching - Learning Scheme (in Hours per Semester) | | | | | Total Credits = TH/30 | Assessment Pattern and Marks | | | | | Total Marks |
|---|----|----|-----|----|--------------------------|------------------------------|--------|---------------------|----------|---------|-------------|
| L | T | P | PBL | TH | | Theory | | Tutorial /Practical | | | |
| | | | | | | ESE (E) | PA (M) | PA (I) | TW/SL(I) | ESE (V) | |
| 45 | 00 | 30 | 15 | 90 | 03 | 70 | 30 | 20 | 30 | 50 | 200 |

Where L = Lecture, T= Tutorial, P= Practical, PBL=Problem Based Learning, TH = Total Hours, ESE = End- Semester Examination, PA = Progressive Assessment



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Course Content:

| Unit No. | Content | No. of Hours | % of Weightage |
|--------------|--|--------------|----------------|
| 1. | Pre & Post part handling for Injection Molding machines -Robotic & Conveyor Belt techniques -Insert molding In mold Labeling with Robotics -Post Molding-Conveyor belts -Counting of parts -Segregation of runner and parts -Conveyor systems for taking runner and feeding it into the grinder | 8 | 20 |
| 2. | Heating & Cooling equipments for plastic processing machines like Injection, Extrusion & Blow Molding Raw Material Drying - Oven Drying - Hopper Drying - De-humidifying air dryer - Mold Temperature Controller - Chiller for Cooling - Cooling Tower BIS Standard- IS/ISO 20430: Plastics Machines: Injection Moulding Machines — Safety Requirements | 15 | 30 |
| 3. | Centralized conveying system for plastic powders & granules -Hopper loaders -Volumetric & Gravimetric blenders | 6 | 10 |
| 4. | Recycling using Auxiliary Equipments - Granulators (Low, Medium & High Speed Granulators) - Shredders | 6 | 15 |
| 5. | Auxiliary Equipments for Extrusion Machinery - Crammer Feeders - Hopper loaders - Mixing Sections - Post Extrusion Mixing - Screen Changers - Breaker Plate and Die cleaning - Take Off & Cutting Equipment for Pipe & tubing | 10 | 25 |
| Total | | 45 | 100 |

Distribution of Theory Marks

| R Level | U Level | A Level | N Level | E Level | C Level |
|---------|---------|---------|---------|---------|---------|
| 15 | 25 | 15 | 10 | 5 | 0 |

Suggested Specification Table with Marks (Theory):

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Plastic Materials & Processes by Seymour S. Schwartz And Sidney H. Goodman
2. Extrusion of Plastics by Hensen
3. Polymer Extrusion by Rauwendaal



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(b) Open source software and website:

1) <https://nptel.ac.in/>

Suggested Course Practical List: If any

Practical based on above topics.

Sustainable Development Goals:

The Auxiliary Equipments in Plastic Industries course advances SDG 9 and SDG 12 by equipping students with the technical skills to manage high-efficiency, automated manufacturing systems that significantly reduce material waste and energy consumption. Furthermore, the inclusion of granulating and recycling units directly supports a circular economy by turning industrial scrap back into usable resources.

• Problem Based Learning Activities

| Sr. No. | Activity | No. of hours | Total hours claimed | Evaluation Criteria |
|---------|--|---|---------------------|--|
| 1 | Seminar based on technical topics | Duration- 10 hrs | 10 | Based on content, report preparation and presentation |
| 2 | Mini project | Duration-10 hrs | 10 | Based on content, literature review, report preparation and presentation |
| 3 | Micro project | Duration-05 hrs | 05 | Based on content, literature review, report preparation and presentation |
| 4 | Industry/Research laboratory visit | Visit = 5h, Report preparation = 5h | 10 | Based on report submitted. |
| 5 | Poster/chart/power point preparation on technical topics | Duration = 10 h | 10 | Based on Poster/Chart/PPT preparation and presentation skills |
| 6 | Assignment writing. | 5 assignments of 2h each. | 10 | Based on the assignment submitted. |
| 7 | Technical Video based learning related to the subject | Duration of video = 5h Report preparation = 5h | 10 | Report /presentation based on the video learning outcomes. |



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|----|---|---|----|--|
| 8 | Group Discussion on emerging/trending technical topics based on subject | Duration = 1 h each | -- | Based on performance in group discussion, technical depth, knowledge etc. |
| 9 | Attending Expert Lecture/Webinar/Seminar | Duration- 1hr each | -- | Based on Short report |
| 10 | Self-learning on-line course | Minimum duration of the course should be 10h. | 10 | Examination based assessment at the end of course. Based on the certificate produced |
| 11 | Exhibition/ Conference/ Trade Fair/ Industrial exposure for 2-3 days | Visit- 15 hr Report preparation- 5 hr | 20 | Based on learning, observations and short report. |
| 12 | Working model on technical topics | Working = 15 h | 15 | Based on design, understanding & presentation of the model |
| 13 | Non-working model on technical topics | Non- working = 5 h | 5 | Based on design, understanding & presentation of the model |
| 14 | Videos on Industrial safety aspects based on subject | Duration of video = 5h Report preparation = 5h | 10 | Based on report submitted |

Above activities are suggestive, faculty can choose any of these activities and cover up the Problem based learning hours.. The number of hours is suggestive. Faculty can sub-divide the number of hours based on the activity. However, the total number of hours is fixed.
