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| **Module code** | TM-4307 |
| **Module Title** | Advanced Manufacturing Processes |
| **Degree/Diploma** | Bachelor of Engineering (Manufacturing Systems) |
| **Type of Module** | Major Option |
| **Modular Credits** | 4 | **Total student Workload** | 8 hours/week |
| **Contact hours** | 4 hours/week |
| **Prerequisite** | TM-3302 |
| **Anti-requisite** | None |
| **Aims**The module introduces the students to advanced manufacturing processes to make them industry or research ready in the modern fields of manufacturing. Students will be introduced to micro and nano manufacturing processes to gain an extensive knowledge of innovative problem solving techniques that can be used successfully in manufacturing semiconductor devices. The students will be introduced to the conceptual simplicity of semiconductor manufacturing apart from familiarizing them with the chemical & electrochemical and laser based manufacturing processes. Micro and nano machining and introduction to characterization devices will enable them to carry out post-processing of green part successfully.  |
| **Learning Outcomes***On successful completion of this module, a student will be expected to be able to*: |
| Lower order: | 30% | * Follow basic photolithography processes.
* Understand the laser based and discharge machining techniques.
* Understand the difference between additive and subtractive manufacturing process.
* Follow the basic guidelines of characterization equipemnt for different micro and naoscale surfaces.
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| Middle order:  | 30% | * Analyze the process parameters of different advanced manufacturing prcess.
* Apply the appropriate advanced manufacturing techniques for different applications.
* Think creatively towards semiconductor device design.
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| Higher order: | 40% | * Design the different semiconductor devices from manufacturing point of view.
* Test the performance of the micro/nano scale devices..
* Design the process for manufacture using mechanical and thermal energy proesses for different applications and characterize the fabricated parts.
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| **Module Contents*** Design Methodology, Synthesis, Creativity and Conceptualization.
* Chemical and Electrochemical Machining Processes
* Mechanical and Thermal Energy Processes
* Laser Cladding
* Micro and Nano machining
* Microfabrication
* Additive Nanofabrication
* Subtractive Nanofabrication
* Nanoparticle Synthesis
* Characterization
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| **Assessment** | Formative assessment | Monthly online MCQ tests will be used to test and to give feedback for their learning |
| Summative assessment | Examination: 40% |
| Coursework: 60%- 1 class tests (25%)- 2 Assignments (10%)- 1 group project (15%) |