**COURSE SYLLABUS**

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| **Course Title**：Material Selection and Design |
| **Credits / Hours** | 3/3 | **Course Number** |  | **□Required ■Elective** |
| **Course Description**The course is based on real world engineering and product design scenario, aiming to provide students with the understanding on (i) Considerations, principle and constrains in material selection process (ii) Failure analysis, prevention and investigation. This course will provide material properties related knowledge, as well as case studies to train students on engineering problem solving skills. |
| **Course Topics** |
| **Topic** | **Content** |
| Material Selection, design and process restrictions | 1. 1. Families of common engineering materials
2. 2. How “shape” affect product lifetime and performance?
3. 3. Manufacturing process – Choices and constrains
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| Materials and the environment | 1. Deterioration of materials in aggressive environment2. Environmental impact – energy consumption and disposal |
| Failure analysis: risk assessment | 1. Definition of failure2. Avoiding accidents: FMEA assessment3. Avoiding accidents: FTA assessment |
| Failure analysis: investigation | 1. Finding the root cause of failure2. Who is responsible? Engineering ethics and legal matters |