Technology & Engineering: Design Engineering
Concept-Modules for "Academia – Industry Interface"

SL	Course-Module : Content and Description
1	**Design Engineering – Significance, importance, requirements, content, applications etc. – An overview session**
2	**Design engineering – relevance for industrial needs in terms of QMS – Product realisation principles**
3	**Design evolution and stages and design & development planning**
4	**Fundamental requirements of design & development engineering documentation and documentation for design disciplines**
5	**Various design standards applicable in the process of design and development for hardware**
6	**Design and development planning, standards and documentation for software**
7	**Factors affecting the design and development processes and their significance**
8	**Quality management and Quality assurance plans and procedures**
9	**Reliability and Maintainability factors related to design assessment**
10	**Redundancy planning in design assessment**
11	**Environmental considerations for design assessment and development**
12	**Derating and principles for design analysis and assessment**
13	**Environmental stress screening for design considerations**
14	**Thermal design considerations and thermal management in design assessment**
15	**Electro-magnetic interference and electro-magnetic compatibility in design analysis and design considerations and standards & test plans**
16	**ESD (Electro-static discharge) aspects in design assessment**
17	**Design considerations for electronic cabinet design and design of enclosures/housings**
18	**Vibration, shock and control of mechanical stresses in design engineering**
19	**Testability, ATEs, FDFL, BITE and simulation**
20	**Design for safety, safety considerations in design assessment**
21	**Design for quality – quality considerations in design assessment**

22	**Life cycle management – Design considerations**
23	**System analysis – principles – design assessment**
24	**Design reviews and criteria and outcomes**
25	**Robotic systems and Robotic software – design considerations and processes**
26	**Methods and procedures for design verification and validation and Product qualification testing**
27	**Mechanical design engineer- Responsibilities**
28	**Mechanical design principles – considerations**
29	**Mechanical drawings – points to note, considerations, formats and details**
30	**Mechanical design – FEM analysis, structural analysis and simulation**
31	**Design of mechanical shelters – design features, tests and considerations**
32	**Design and selection of fasteners and choices and considerations**
33	**Design considerations – Adhesives, plastics, composites and other build-materials, seals, coolants**
34	**Design considerations – surface finish, conversion coatings, plating, painting – standards and issues involved**
35	**Mechanical packaging design**
36	**Design considerations in control systems and automation applications**
37	**IP (Ingress protection) ratings – Design criteria**
38	**Design for robustness/ruggedness and Ruggedisation**
39	**Other specific mechanical design modules as relevant for other disciplines**
40	**Design considerations for computing and processing environment in electronics– selection of backplanes, selection of processor technology, firmware, interfaces handling and other design considerations**
41	**Printed Circuit Board Design and considerations**
42	**VME, PCI, cPCI, PXI, VPX/VXS, PC-104, technologies and design issues**
43	**Design considerations for interfaces, drivers and communication architecture**
44	**Design criteria for embedded platforms and systems and steps to follow**
45	**Design criteria for data capture elements and data conversion from RF to video formats, Optical to digital videos/Electro-optics, Lasers and other**

	sensors & signal processing design considerations
46	**Selection of data portrayal equipment and display selection – types – design considerations on applications**
47	**Design of digital receivers and considerations**
48	**EMI reduction techniques in electronic design**
49	**Design principles in RF electronics- selection of active and passive components and RF testing**
50	**COTS technologies – Design considerations and applications in electronics**
51	**Design considerations for embedded software domain, Real Time Software design – selection of RTOS, firmware blocks, OOPS and design aspects in application programming and developing APIs**
52	**Design of Graphic User Interfaces and tool development**