Course Descriptor

Course: DES641A, Design for Industry 4.0 and Industrial Internet of Things (3-0-0-0) 9 Credits

Instructor: Dr. Amar Behera

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Contact Information: Design Studio, 605H-A Tel: 2401 (Work)

Class Timings: Mondays and Thursdays - 12 noon to 1.30 pm

Course Contents (draft): Design processes, the design eco system for complex products, product lifecycles, systems thinking, design and integration, the Industry 4.0 paradigm, machine learning and its applications in products, big data techniques in support of design & engineering activities, APIs as components in complex / compound products, new materials as part of new product development (NPD) processes, new manufacturing methodologies, smart devices and tech-enabled products: connectivity using IIoT

Reference Texts:

- Karl T. Ulrich, Steven D. Eppinger, Product Design and Development, McGraw-Hill Education (7th edition)
- Vivek Bhise, Designing Complex Products with Systems Engineering Processes and Techniques, CRC Press
- J. Paulo Davim, Nikolaos Efkolidis, Panagiotis Kyratsis, Advances in Product Design Engineering, Springer
- Alasdair Gilchrist, Industry 4.0 - The Industrial Internet of Things, Apress, 2016

Assessments:

Attendance:	10 marks	Practical project:	30 marks
Portfolio:	30 marks	Final exam:	30 marks

Pass Percentage: **40%** *(a minimum of 40 percent marks will have to be scored to pass this course)*

Lecture Schedule (tentative):

31-Jul	L1: Intro	25-Sep	L15: Co-creation and crowdsourcing
02-Aug	L2: Design processes	27-Sep	L16: Product servitization
07-Aug	L3: Complex products	02-Oct	Mahatma Gandhi Jayanti
09-Aug	L4: Product lifecycles	04-Oct	L17: Machine learning
14-Aug	L5: Systems thinking	09-Oct	L18: Big data
16-Aug	L6: Systems design and integration	11-Oct	L19: APIs
21-Aug	L7: Smart and connected products	16-Oct	L20: New materials
23-Aug	L8: End to end digital integration, customization and personalization	18-Oct	L21: New manufacturing processes
28-Aug	L9: Data driven design	23-Oct	Dussehra
30-Aug	L10: Digital twins	25-Oct	L22: Smart devices and tech-enabled products
04-Sep	L11: Intelligent design automation	30-Oct	L23: IoT Practical session
06-Sep	L12: Extended supply chains	01-Nov	L24: IoT Practical session
11-Sep	L13: Agile collaboration networks	06-Nov	L25: IoT Practical session
13-Sep	L14: Open innovation	08-Nov	L26: IoT Practical session
18-Sep	Mid-Sem Examinations	13-Nov	L27: IoT Practical session
20-Sep		15-Nov	L28: IoT Practical session & closure