IND5002 Digital Physical Integration in Industry 4.0

2022-23 Sem 1, Wednesday, 6~9 pm

EA-02-11

| | Date | Session | Remarks | | |
|-------------------|--------|------------|---|--|--|
| W1 | 16 Aug | Lecture | Module Introduction (Prahlad) Robotics and Automation | | |
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| W2 | 23 Aug | Lecture | Robotics and Automation | | |
| W3 | 30 Aug | Lecture | 3D Printing - Introduction and Overview | | |
| W4 | 06 Sep | Lecture | Digital Manufacturing through 3D Printing | | |
| W5 | 13 Sep | Lecture | Internet of Things | | |
| W6 | 20 Sep | Lecture | Internet of Things | | |
| | 27 Sep | Recess Wee | ek | | |
| W7 | 04 Oct | Lecture | Machining Technology | | |
| W8 | 11 Oct | Lecture | Machining Technology | | |
| W9 | 18 Oct | (Zoom) | Pitching use cases for 60 seconds. | | |
| | | | Group formation. | | |
| W10 | 25 Oct | Zoom | 7.30~9 pm Innovation – ideation Prahlad | | |
| | | Lecture | | | |
| W11 01 Nov Common | | Common | 1. Automation (6.00–6.45 pm) | | |
| | | Industry | 2. 5G technologies in Industry 4.0 (6.45– | | |
| | | Lectures | 7.30 pm) | | |
| | | (Zoom) | 3. An Industry 4.0 Startup Journey | | |
| | | (TBC) | (7.40~8.25 pm) | | |
| | | | 4. 3D Printing (8.25 ⁹ pm) | | |
| W12 | 08 Nov | (Zoom) | 7.30~9 pm Consultations | | |
| W13 | 15 Nov | (Zoom) | Presentations. (12+3 minutes) | | |
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Lecturers

A/Prof. Prahlad Vadakkepat (ECE)

Dr. Ho Chaw Sing (ECE)

Prof. Biplab Sikdar (ECE)

A/Prof. A Senthil Kumar (ME)

Assessments

25% – Project 1 Report – Assignment, Survey article

25% - Project 2 Presentation - Industry Use case

25% – Project 3 Group Presentation

25% - Project 3 Group Report

Submission and Presentation Dates

| Date | Reports and Presentations | | | % |
|--------|--|--------------|----------------------------------|-----|
| 11 Sep | P1R – Project 1 Report | Submission | Survey article | 25% |
| 15 Oct | P2P – Project 2 Presentation | Submission | Single pitching slide with video | |
| 18 Oct | P2P – Project 2 Presentation | Presentation | Single pitching slide with video | 25% |
| 12 Nov | P3P – Project 3 Presentation P3R – Project 3 Report | Submission | Group project report | 25% |
| 15 Nov | P3P – Project 3 Presentation | Presentation | Group project presentation | 25% |

P1R (Project 1 Report) – Assignment, Survey article (25% individual) – 11 September Current state of art in the topics covered by Industry 4.0.

Subject can be related to any of the 5 areas (Robotics, AI, IoT, Additive Manufacturing and Machining).

Recommended format – 4 to 5 pages. PDF file to submit to submission folder in CANVAS. Bibliography page is not counted.

Turnitin in CANVAS – similarity index should be less than 20%.

P1R (Project 1 Report) -Survey article

Project 1 is a survey article to get the feel of the state of the art and possibilities along Industry 4.0. The article material can be prepared with the help of lecture materials and by independent reading.

For the survey article (Project 1) to use information strictly from public domain and should exploit research resources from NUS libraries using web of science and IEEE explorer.

All must adhere to NUS plagiarism and integrity policy. Do not indiscriminately copy information available on internet. The front page should clearly indicate the student's name and matric number.

Please feel free to contact the lecturers if you need guidance.

P2P (Project 2 Presentation)
– Industry
Use case
(25%
individual) Submit use cases, record, and insert the video in a single slide PPT. Pitch use cases with the single PPT for 90 seconds.

15 October

18 October

Peers to vote for and select top 17 use cases which will be used for group project in P3P & P3R. P2P (Project 2 Presentation) - Industry Use case Project 2 is specific to industry use-cases. The students (who are in industry) suggest use-cases from their working space or what their industry looks forward to or what they wish to pursue in a new carrier along a specific technology space.

Top 17 use-cases (depending on the total number of students) are voted by the class to pursue for further study. This is typical industrial practice where multiple ideas are shared and best ideas are taken forward for development or for developing 'minimum variable product(s).'

P3P (Project 3 Presentation) & P3R (Project 3 Report) – Group project (25% group) & Group Report (25% group) – Submit by 12 November

- ♦ Presentations are on 15 Nov.
- ♦ Work on the use case and prepare a report and present on how the Industry 4.0 related aspects can be developed for the use case. To do relevant literature review, propose the way digitalization can be done and what technologies are required. To evaluate the prospects and consequences of the proposal.
- ♦ Written report (25%) and PPT presentation with Q&A (25%). The presentation will be for 10 minutes (2 minutes per person) followed by 5 minutes discussion.
- Every member of the team needs to speak.

P3 (Project 3) – Group project Project 3 involves both report and presentation on the selected usecase.

This involves independent study relating to lecture material, as well as consultation with lecturers.

The presentations lead to further sharing and learning.

P3R (Project 3 Report) – Group project

- ♦ For the report (Project 3) to use information strictly from public domain and should exploit research resources from NUS libraries using web of science and IEEE explorer.
- ♦ The report for Project 3 should follow standard format with abstract, introduction, minimum 3 chapters in the body, conclusion, and references. All must adhere to NUS plagiarism and integrity policy. Do not indiscriminately copy information available on internet. The front page should clearly indicate the student's name and matric number.
- ♦ Please feel free to contact the lecturers if you need guidance.