



CVM
UNIVERSITY

Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: Bachelor of Technology (Mechanical Engineering)

Semester: VIII

Course Code: 202090805

Course Title: Industry 4.0

Course Group: Professional Elective Course - VI

Course Objectives: This course is designed to offer learners an introduction to Industry 4.0 (or the Industrial Internet), its applications in the business world. Learners will gain deep insights into how smartness is being harnessed from data and appreciate what needs to be done in order to overcome some of the challenges.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
Lecture	Tutorial	Practical		Theory		J/V/P*		Total
				Internal	External	Internal	External	
3	0	2	4	50 / 18	50 / 17	25 / 9	25 / 9	150/53

* J: Jury; V: Viva; P: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	Introduction to Industry 4.0: The Various Industrial Revolutions, core idea of Industry 4.0, origin concept of industry 4.0, Industry 4.0 production system, current state of industry 4.0, Technologies, How is India preparing for Industry 4.0	07
2	A Conceptual Framework for Industry 4.0: Introduction, Main Concepts and Components of Industry 4.0, State of Art, Supportive Technologies, Proposed Framework for Industry 4.0.	07
3	Technology Roadmap for Industry 4.0: Introduction, Proposed Framework for Technology Roadmap, Strategy Phase, New Product and Process Development Phase. Internet of Things (IoT) & Industrial Internet of Things (IIoT) & Internet of Services, Smart Manufacturing	09



4	Advances in Robotics Technologies for enabling Industry 4.0: Introduction, Recent Technological Components of Robots- Advanced Sensor Technologies, Internet of Robotic Things, Cloud Robotics, and Cognitive Architecture for Cyber-Physical Robotics, Industrial Robotic Applications- Manufacturing, Maintenance and Assembly.	08
5	The Role of Augmented Reality in the Age of Industry 4.0: Introduction, AR Hardware and Software Technology, Industrial Applications of AR.	06
6	Business issues in Industry 4.0: Lack of A Digital Strategy alongside Resource Scarcity, Lack of standards and poor data security, Financing conditions, availability of skilled workers, comprehensive broadband infra- structure, state support, legal framework, protection of corporate data, liability, handling personal data. Future of Works and Skills for Workers in the Industry 4.0 Era	08
Total		45

List of Practicals / Tutorials:

1	Describe Industry 4.0 and scope for Indian Industry
2	Demonstrate conceptual framework and road map of Industry 4.0
3	Describe Robotic technology and Augmented reality for Industry 4.0
4	Demonstrate obstacle and framework conditions for Industry 4.0
5	Describe Industry 4.0 and scope for Indian Industry
6	Demonstrate conceptual framework and road map of Industry 4.0
7	Describe Robotic technology and Augmented reality for Industry 4.0
8	Demonstrate obstacle and framework conditions for Industry 4.0
9	Describe Industry 4.0 and scope for Indian Industry
10	Demonstrate conceptual framework and road map of Industry 4.0

Reference Books:

1	Industry 4.0: Current Status and Future Trends by Jesús Hamilton Ortiz
2	The Concept Industry 4.0 by Christoph Jan Bartodziej
3	A Roadmap to Industry 4.0 - Smart Production, Sharp Business and Sustainable Development by Anand Nayyar & Akshi Kumar
4	Understanding Industry 4.0: AI, The Internet of Things, and The Future of Work by Bruno S. Sergi, Elena G. Popkova, Aleksei V. Bogoviz and Tatiana N. Litvinova
5	Industry 4.0 by Anagha Sahashtrabudhe

Supplementary learning Material:

1	NPTEL resources
---	-----------------

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Industrial/ Field visits



Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						R: Remembering; U: Understanding; A: Applying; N: Analyzing; E: Evaluating; C: Creating
R	U	A	N	E	C	
10 %	20 %	25%	25 %	10 %	10 %	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	Describe Industry 4.0 and scope for Indian Industry	20
CO-2	Demonstrate conceptual framework and road map of Industry 4.0	35
CO-3	Describe Robotic technology and Augmented reality for Industry 4.0	25
CO-4	Demonstrate obstacle and framework conditions for Industry 4.0	20

Curriculum Revision:

Version:	2
Drafted on (Month-Year):	June-2022
Last Reviewed on (Month-Year):	--
Next Review on (Month-Year):	June-2025