SATHYABAMA
INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

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Department of Electrical and Electronics

New course introduced

SL. NO.	COURSE CODE	COURSE OFFERED
1	SEEA1403	INDUSTRY 4.0 FOR ELECTRICAL ENGINEERS

SEEA1403	INDUSTRY 4.0 FOR ELECTRICAL ENGINEERS	L	T	P	Credits	TotalMarks
		2	0	0	2	100

COURSE OBJECTIVES

To impart basic idea in Industry 4.0.

To provide students with good depth of knowledge of designing Industrial 4.0 Systems for various application.

Learn the design and analysis of Industry 4.0 systems for Energy and smart vehicular applications.

UNIT1   INTRODUCTION TO INDUSTRY 4.0   9 Hrs.

Introduction, Historical Context, General framework, Application areas, Dissemination of Industry 4.0 and the disciplines that contribute to its development, Artificial intelligence, The Internet of Things and Industrial Internet of Things, Additive manufacturing, Robotization and automation,Current situation of Industry 4.0. Introduction to Industry 4.0 to Industry 5.0 Advances

UNIT 2   INDUSTRY 4.0 AND CYBER PHYSICAL SYSTEM   9 Hrs.

Introduction to Cyber Physical Systems (CPS), Architecture of CPS, Data science and technology for CPS, Prototypes of CPS, Emerging applications in CPS, Domain applications of CPS: Agriculture, Infrastructure, Disaster management, Energy, Transportation. Case study: Application of CPS in health care domain.

UNIT 3   SMART ENERGY SOURCES   9Hrs.

Energy Storage for Mitigating the Variability of Renewable Electricity Sources- Types of electric energy storage, Potential of Sodium-Sulfur Battery Energy Storage to Enable Integration of Wind-Case study. Electric Vehicles as Energy Storage: V2G Capacity Estimation.

UNIT 4   SMARTGRID   9Hrs.

Smart grid definition and development Smart Grid, Understanding the Smart Grid, Smart grid solutions, Design challenges of smart grid and Industry 4.0, Building the Smart Grid-Case study.

UNIT 5   SMART APPLICATIONS   9 Hrs.

Understanding Smart Appliances -Smart Operation-Smart Monitoring-Smart Energy Savings-Smart Maintenance, Case study-Smart Cars, Self-Driving Cars, Introducing Google's Self-Driving Car, Intellectual Property Rights.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 - Understand the basic concepts of Industry 4.0 and the other related fields.

CO2 – Understand cyber physical system and the emerging applications.

CO3 - Analyze the different energy storage systems

CO4 - Analyze a smart grid system.

CO5 – Implement the industry 4.0 to solve engineering problems.

CO6 – Design of smart vehicle and analyze its performance.

TEXT / REFERENCE BOOKS

1. Jean-Claude André, ─Industry 4.0‖, Wiley- ISTE, July 2019, ISBN: 781786304827,2019.
2. Diego Galar Pascual, Pasquale Daponte, Uday Kumar, ─Handbook of Industry 4.0 and SMART Systems‖ Taylor and Francis,2020
3. Miller M, ─The internet of things: How smart TVs, smart cars, smart homes, and smart cities are changing the world‖, Pearson Education, 2015, ISBN: 9780134021300.
4. Pengwei Du and Ning Lu, ─Energy storage for smart grids: planning and operation for renewable and variable energy resources VERs ‖, Academic Press, 2018, Reprint edition , ISBN-13: 978-0128100714
5. Hossam A. Gabbar, ─Smart Energy Grid Engineering‖, Academic Press, 2017, ISBN 978-0-12-805343-0.
6. Mini S. Thomas, John Douglas McDonald, ─Power System SCADA and Smart Grids‖, CRC Press, 2017.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks:100   **Exam Duration:3 Hrs.**

PART A: 10 Question of 2 marks each – No choice   **20 Marks**

PART B: 2 Questions from each unit of internal choice; each carrying 16 marks   **80 Marks**