



# 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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## Minutes of board of studies meeting of Department of Chemical Engineering, Sathyabama Institute of Science and Technology, held on 3<sup>rd</sup> Jan 2022

A meeting of board of studies of Department of Chemical Engineering was held in virtual mode at 11:00 AM on 3<sup>rd</sup> Jan 2022. The meeting was attended by

1. Dr.S.Sathish – Head/ Associate Professor /Chemical
2. Dr.D.Prabu –Associate Professor/ Chemical
3. Dr.K.Sathishkumar – Expert member/ Associate Professor – SSN college of Engineering
4. Dr.A.Annam Renita- Professor/Chemical – Internal Member
5. Dr.J.Aravindkumar – Assistant Professor / Chemical – Internal Member
6. Dr.D.Venkatesan - Assistant Professor / Chemical – Internal Member
7. Dr.Sanjeet Kumar Singh - Assistant Professor / Chemical

The Board of studies discussed the Agenda and decided as under:

- **Item no 1:** In order to maintain the employability skill a new open elective course on Industry 4.0 for bio and Chemical Engineers is introduced. The course with the title Industry 4.0 was introduced for 2019 batch which covers the area from all the discipline. Now the course is modified with the recent technology pertain to Chemical and Bio disciplines.
- **Item no. 2** Seeking approval for the modification in Industry 4.0 for bio and chemical engineers as a Project Based learning Approach for UG - B.Tech - CHEM/BME/BTE as a 2 credit course. The course is assessed in the way of 50% theory and 50% practical course. Internal marks from CAE 1 and CAE 2 and assignments. Instead of ESE theory exam, the students will be assessed based on the case study (design, implementation, operation) presentation.


The external member approved the course content and appreciates the modifications. All the members unanimously recommended the changes. The Chairman approved the decisions. The meeting ended with Thank you note.

(S/A)


Expert member

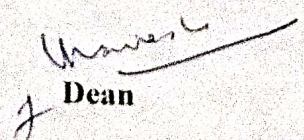
Member

Member



Head 03/JAN/2022



  
Dean



SCHA 4005 SAIC4004	INDUSTRY 4.0 FOR BIO & CHEMICAL ENGINEERS PROJECT BASED LEARNING APPROACH	L	T	P	C	Max. Marks
		1	0	2	2	100

**COURSE OBJECTIVE:**

- To demonstrate the achievement of efficient and economically viable production without being hazardous to human health and environment. 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.

**UNIT 1: MODELLING AND SIMULATION****6 Hours**

Introduction to Industry 4.0 - The Various Industrial Revolutions - Modeling Principles: Introduction, definition of modeling and simulation, different types of models, application of mathematical modeling.

Simulation: Introduction, Simulation Tools, Process Simulation Software Platforms and Applications, Trends in Process Simulation Engineering

**UNIT 2: SMART INDUSTRY****6 Hours**

Road to Industry 4.0 - Green manufacturing, Robotic Automation, Industrial Applications- Manufacturing, Control, Maintenance and Assembly, RFID- Type, RFID system, applications, RFID in health care, Embedded Systems - Embedded firmware, Platform software design, Wireless design, Embedded testing, modeling & automation, Hardware platform design, Device Management, Monitoring – Industrial monitoring, condition monitoring, Health monitoring.

**UNIT 3 BIG DATA ANALYTICS AS SERVICE PROVIDER****7 Hours**

Technologies for enabling Industry 4.0 - Role of data, information, knowledge and collaboration in future organizations. Big Data - Background - Programming- Python and R - Git - Docker - Pipelines - DNA and RNA Sequencing - Massively parallel sequencing - Applications - Next Generation Sequencing and its future and big data analytics in healthcare - Big Data Repositories - Cloud platforms and computing for automation - Embedded systems in healthcare - Digitization the future of healthcare - medical cyber physical systems - Case study - Integration of Multi-Omics Big Data in Cardiovascular Risks and Diseases.

**UNIT 4 PLANT/PROCESS MANAGEMENT****6 Hours**

Business issues in Industry 4.0 - Nanobiotechnology: Synthesis of different Nanostructures, Characterization of Nanostructures, Nanostructures in Diagnosis and Therapy. Tissue Engineering: Scaffolds: Natural and Artificial polymers, Scaffold fabrication, 3D Bioprinting; Bioreactors for Tissue Engineering: Effect of different Parameters, Conditions; Tissue engineering for Skin, Bone, Vasculature and Cornea; Regulatory framework in development and marketing tissue-based products.

**UNIT 5 PROTOTYPING – TESTING AND COMMUNICATION****20 Hours**

Applications and Case Studies - New ideas – centered design process – functional prototype - testing methods/ideas – prototyping and test beds – proof of concept – assembly – prototyping apps – addressing the complex problems.

**COURSE OUTCOMES:****Max.45 Hours**

- CO1. Articulate on the new age technologies in the modeling of biochemical engineering.
- CO2. Integrate different emerging technologies to evolve Smart Factories
- CO3. Deduce the components that lead to industrial digital revolution
- CO4. Ability to assess the developments in bioengineering.
- CO5. Criticize the professional and ethical issues in novel industrial technologies.
- CO6. Develop a prototype/ innovative ideas in the various fields of biochemical engineering.

*J. J. J.*  
08/01/22



**TEXT / REFERENCE BOOKS**

1. Diego Galar Pascual, Pasquale Daponte, Uday Kumar, Handbook of Industry 4.0 and SMART Systems, 1st Editio, CRC Press, 2020
2. Sider W.D., Seader J. D., and Lewin D.R., Product and Process Design principles, Synthesis, Analysis and Evaluation, 2nd Edition, John Wiley and Sons, 2010.
3. Thomas Varghese & K.M. Balakrishna, Nanotechnology: An Introduction to Synthesis, Properties and Applications of Nanomaterials, Atlantic, 2012
4. Uthayan Elangovan, Smart Automation to Smart Manufacturing: Industrial Internet of Things, Momentum Pr, 1st Edition, 2019.

Max Marks: 100

**END SEMESTER EXAMINATION PATTERN**

**PROJECT PRESENTATION**

*Juliano*  
03/01/2022