



# SATHYABAMA

## INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with 'A' grade by NAAC  
Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai - 600 119.



### Department of Mechatronics Engineering

### School of Mechanical Engineering

Minutes of Board of Studies Meeting held on 27-06-2020 (Saturday)

Meet Time: 10.00 a.m. to 12.30 noon

The meeting started with the welcome address delivered by Dr. S. Prakash, Professor and Dean (Session Chair). He introduced the courses to the BOS panel members. The following are the BOS members were present during the Mechatronics Engineering BOS meeting.

Sl. No.	Name	Designation	Institution	Role
1	Dr. S. Prakash	Professor and Dean	Sathyabama Institute of Science & Technology	Chair person
2	Dr.L.Vijayaraghavan	Professor	IIT Madras, Chennai	BoS Member (External)
3	Dr.N.GaneshKumar	Associate Professor	PSG Tech, Coimbatore	BoS Member (External)
4	Dr. B. Kanimozhi	Professor	Sathyabama Institute of Science & Technology	Member
5	Dr. S. Sivasaravanan	Associate Professor	Sathyabama Institute of Science & Technology	Member
6	Dr. M Sangeetha	Associate Professor	Sathyabama Institute of Science & Technology	Member
7	Dr. J. R. Deepak	Associate Professor	Sathyabama Institute of Science & Technology	Member
8	Dr.J. Lilly Mercy	Assistant Professor	Sathyabama Institute of Science & Technology	Member
9	Mr. V. Jayaprakash	Assistant Professor	Sathyabama Institute of Science & Technology	Member
10	Mr. J. Senthil Kumar	Assistant Professor	Sathyabama Institute of Science & Technology	Member
11	Mr. M Vigneshwar	Students	Sathyabama Institute of Science & Technology	Student Member
12	Mr Aman Dinodya	Students	Sathyabama Institute of Science & Technology	Student Member

- Dr. S. Prakash proposed a new course entitled **Industry 4.0** based on the futuristic requirements for the students. The curriculum consists of various engineering discipline to promote inter disciplinary innovate thinking in students. The backdrop in introducing such courses is to promote collaborative research among the students leading to novel ideas. The curriculum includes topics from basic sciences, bioengineering, building sciences, smart manufacturing practices, smart world and Cyber Physical Systems.
- Dr. L. Vijayaraghavan, Professor from IIT Madras welcomed the idea of introducing **Industry 4.0** course saying that Sathyabama Institute of science and technology would be the pioneer in introducing **Industry 4.0** in the curriculum
- Dr. L. Vijayaraghavan, Professor from IIT Madras, Chennai and Dr. N. Ganesh Kumar, Associate Professor from PSG Tech (External BOS members) reviewed all the courses. The Board members appreciated the inclusion of the new courses in 2019 Regulation.

- **NEW COURSE ENTITLED INDUSTRY 4.0**

## SAIC4001 INDUSTRY 4.0

L T P Credits Total Marks

2 - 2 2 100

### UNIT 1 ADVANCED TECHNOLOGY AND ADVANCED MATERIALS 7 Hrs.

Advanced electro-optical sensing technology-active, passive multi-spectral and hyper spectral imaging; electronic beam steering; vacuum technology, surface and coating technology, health care technology, Nanotechnology- Nanomechanics, Nano optoelectronics; energy storage technology-next generation Li-based Batteries, Hydrogen storage, solar photovoltaic's, Flexible electronics. Intellectual Property Rights - case studies governing/pertaining to Materials/Technology.

### UNIT 2 TRANSFORMING TECHNOLOGIES IN BIOENGINEERING 7 Hrs.

Establishment of smart biotechnology factory, Artificial intelligence in Bioprocess technology, Omics – Big data analysis through automation, 3D bio printing for tissue engineering. Simulation tools, RSM and Box model. Cyber physical system based telemedicine, diagnosis and therapeutics through real time biosensors. Bionanotechnology. Intellectual Property rights (IPR): Case Studies.

### UNIT 3 ADVANCEMENTS IN SUSTAINABLE BUILT ENVIRONMENT 7 Hrs.

Introduction – Technological developments in Architectural, Engineering and Construction (AEC) - Building Information Modelling (BIM) using Cloud computing technology and Internet of things (IoT) – Unmanned Aerial Vehicles, sensors – Additive manufacturing in construction – Concrete 3D printing - Materials used - Lightweight and functionally graded structures - Net Zero Energy buildings, Bioswales, Biofiltration pond, Ecosan systems- Recent developments in Waste water Management, Air pollution control, waste disposal - Integration of energy, water and environmental systems for a sustainable development- Emerging Technologies: Robot Highway- Vertical farming - Intellectual Property rights: Case studies.

### UNIT 4 SMART MANUFACTURING 8 Hrs.

Smart factories and interconnection, Smart Manufacturing – automation systems, Additive Manufacturing, Smart grids, Micro

Electro Mechanical Systems (MEMS), Stealth technology, Metal Finishing, Self propelled vehicles, e mobility, Green fuels, drones – unmanned aerial vehicles(UAVs), aerodynamics. Robotic Automation and Collaborative Robots – Augmented reality and haptics, engineering cybernetics and artificial intelligence (AI), Disruptive Technologies – Frugal Innovations – Emerging Technologies - Autonomous Robots, Swam Robot, Modular Robotics, Space craft, Intellectual Property Rights (IPR): Case Studies.

### UNIT 5 SMART WORLD 8 Hrs.

Smart Sensors and IIOT, Smart grid, Hybrid renewable energy systems, Electronics in Smart city, Integration of Sensors in Robots and Artificial Intelligence, 5G Technology, Communication protocols, Human-Machine Interaction, Virtual Reality, Quantum Computing: Changing trends in transistor technology: Processor, Emerging Trends: Deep Space, Swarm Robots, Cyborg, Geofencing, Pervasive Computing, Intellectual Property Rights- Case Studies.

### UNIT 6 CYBER PHYSICAL SYSTEMS 8 Hrs.


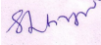

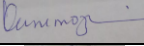
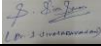


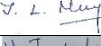
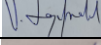

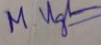
Introduction to Cyber Physical Systems (CPS), Architecture of CPS, Data science and technology for CPS, Prototypes of CPS, Emerging applications in CPS including social space, crowd sourcing, healthcare and human computer interactions, Industrial Artificial Intelligence, Networking systems for CPS applications, Wearable cyber physical systems and applications, Domain applications of CPS: Agriculture, Infrastructure, Disaster management, Energy, Transportation, Intellectual Property Rights (IPR) : Case Studies.

Max. 45 Hrs.

### TEXT / REFERENCE BOOKS

1. William D. Callister, "Materials Science and Engineering, An Introduction, John Willey and Sons Inc. Singapore, 2001.
2. V. Raghavan, "Physical Metallurgy: Principle and Practice, Prentice Hall India Pvt Ltd, 2006.
3. Flavio Craveiro, Jose Pinto Duarte, Helena Bartolo and Paulo Jorge Bartolo, "Additive manufacturing as an enabling technology for digital construction: A perspective on Construction 4.0", Automation in Construction, Vol. 103,pp. 251-267, 2019.
3. Klaus Schwab, "Fourth Industrial Revolution", Random House USA Inc, New York, USA, 2017.
4. Oliver Grunow, "SMART FACTORY AND INDUSTRY 4.0. The current state of Application Technologies", Studylab Publications, 2016.
5. Alasdair Gilchrist, "INDUSTRY 4.0: Industrial Internet of Things", Apress, 2016.
6. Sang C. Suh, U. John Tanik, John N Carbone, Abdullah Eroglu, "Applied Cyber-Physical Systems", Springer Publications, New York, 2013

- Signature of BOS members

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1	Dr. S. Prakash	
2	Dr.L.Vijayaraghavan	
3	Dr.N.Ganesh Kumar	
4	Dr. B. Kanimozhi	
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