



Subject Code	Name of Subject	Sessions	Hours/ Week	Hours/ Semester (14 weeks)*	Credits	Subject Type
BFT504M	Introduction to Internet of Things	Lecture	1	28	2	Major Process based
		Practical	1			
		Tutorial	-			
		Demo	-			
		Studio Practice	-	-		
		Self-Study	-			

**Teaching sessions to be planned for 14 weeks, excluding visits to fairs/exhibition and end term examination week.*

SUBJECT AIM

- Understand the basics of IoT& its design solution
- Application of IoT ideas in Business Domains

LEARNING OUTCOMES OF THE SUBJECT

Knowledge

1. Concept of IoT
2. Functional views of IoT
3. IoT and its Applications in Smart Factory & Smart Manufacturing

Skill

1. Ability to understand & conceptualize Smart Factory & Smart Manufacturing
2. Capability to transform automated environment to IoT enabled environment



Synthesis

1. Design and Develop basic IoT applications for a strategic development of Apparel industry
2. Combine IoT with other technologies like
 - Artificial Intelligence

To simulate and build applications required for Smart Factory & Smart Manufacturing

CONTENT

Session No.	Hours	Topic	Detailing	Suggested Pedagogy and Duration (Hours)	Self Study
1-2	4 hrs	What Is the Internet of Things (IoT)?	Overview Understanding the difference between Things and Things in IoT Real Life Examples, IoT Devices Trends GUI building Understanding embedded systems	Lecture& Demo 2 hrs.	Revise the sensor concepts as covered in the subject – Elements of Technology. Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015 https://www.tutorialspoint.com/embedded_systems/index.htm
2-5	6 hrs	IoT-	Understanding the Building blocks of IOT		• Revise the



		<p>Embedded System -An Architectural Overview:</p>	<p>Sensing</p> <ul style="list-style-type: none"> • Sensors can be either on-board the microcontroller or attached to the microcontroller. <p>Actuation</p> <ul style="list-style-type: none"> • IoT devices can have various types of actuators attached that allow taking actions upon the physical entities in the vicinity of the device. <p>Communication</p> <ul style="list-style-type: none"> • Communication modules are responsible for sending collected data to other devices or cloud-based servers/storage and receiving data from other devices and commands from remote applications. 	<p>Lecture 4 hrs / Demo 2hrs.</p>	<p>concept of DC, servo and step up motors</p> <p>Revise the concept of networking as taught in Elements of Technology.</p> <p>Deployment', River Publishers, 2014 5. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.</p> <ul style="list-style-type: none"> •
5 - 9	6 hrs.	<p>Networking and Internet</p>	<p>Need to Network</p> <p>Networking components</p> <p>Bluetooth</p> <p>WiFi, Ethernet</p> <p>Internet structure/ Protocols</p> <p>Client Server Module offered by free space</p> <p>Data capturing</p> <p>TCP/IP Application Layers</p> <p>HTTP</p> <p>MQTT</p>	<p>Lecture/Demo/Expert Lecture</p>	<p>William Stallings, "Computer Networking with Internet protocols and Technology", Pearson Education, 6th printing 2011.</p>

		CO-AP			
10-13	6 hrs	Design and implementation of IoT devices requirement	Building on embedded circuit Understanding the MIT inverter app.	. Transaction of curriculum in industry/ In house Lab with an expert	
13-16	8 hrs.	Design and implementation of IoT devices requirement	Circuit developed with the hardware and server API to connect to Bluetooth and Cloud services .	Lecture/Demo/lab exercises.	

NATURE OF ASSIGNMENTS

EVALUATION CRITERIA

Continuous Assignment 1 : 30 Marks (Mid Term)	Continuous Assignment 2 : 30 Marks (End Term)	End Term Jury : 40 Marks
<p>Small Project proposal (Distributed in week-5) (30 marks)</p> <p>Submit a project proposal in one page. The project proposal should follow a standard template with the headers as abstract, components used and proposed deliverables.</p> <p>This evaluation will be done on the basis of clarity and scope of the project idea (aligned to the need</p>	<p>Assignment-2 - Project Development will be evaluated in 3 phases marked for 10 marks each, wherein the groups can refine their work in each phase. Total Duration: Week 6 – 15</p> <p>a) During week 6-10, students will work on the project which was proposed in week-5.</p> <p>Deliverables: Submission of circuit diagram , User interface pages developed, (Marks – 10)</p>	<p>Final project which is a culmination of work developed as assignment 1 and 2 is to be presented along with a report submission for final evaluation – jury</p>

<p>of the Apparel Industry). Students can work in a group of 4.</p>	<p>b) Second project evaluation : Due in Week 12 (10 marks) Deliverables: connect the embedded system over a client server model starting with connection to your phone using Bluetooth or wifi</p> <p>Third Project evaluation :Due in Week 15 (10 marks) Deliverables: connect the project to cloud.</p>	<p>based</p>
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EVALUATION MATRIX

Mid-Term/ Mid-Module Assessment	End-Term/ End-Module Assessment	End Term Evaluation (Jury)	Total
30	30	40	100

REFERENCE MATERIAL

- Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015
- https://www.tutorialspoint.com/embedded_systems/index.htm
- David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, —IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, Cisco Press, 2017
- Deployment', River Publishers, 2014 5. N. Ida, Sensors, Actuators and Their Interfaces, Scitech Publishers, 2014.
- William Stallings, "Computer Networking with Internet protocols and Technology", Pearson Education, 6th printing 2011.
- ArshdeepBahga, Vijay Madiseti, —Internet of Things – A hands-on approach, Universities Press, 2015
- Olivier Hersent, David Boswarthick, Omar Elloumi, —The Internet of Things – Key applications and Protocols, Wiley, 2012 (for Unit 2).



- h. Jan Höller, Vlasios Tsiatsis, Catherine Mulligan, Stamatis Karnouskos, Stefan Avesand, David Boyle, “From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence”, Elsevier, 2014.
- i. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), —Architecting the Internet of Things, Springer, 2011.
- j. Michael Margolis, Arduino Cookbook, Recipes to Begin, Expand, and Enhance Your Projects, 2nd Edition, O’Reilly Media, 2011.

INFRASTRUCTURE REQUIREMENT

- Computer lab with Arduino IDE downloaded

EQUIPMENT/TOOLS/MATERIAL

- IoT kit

CURRICULUM DEVELOPMENT TEAM

Faculty Anchor - Dr. S. Angammal Santhi – Professor, NIFT-Chennai

Faculty Co-Anchor: Dr. Deepak Panghal - Assistant Professor, NIFT-Delhi

Team Members: Mr. S. Prabakar - Assistant Professor, NIFT-Chennai