



## **C. U. SHAH UNIVERSITY**

**Wadhwan City**

**FACULTY OF:** - Technology and Engineering  
**DEPARTMENT OF:** - Information Technology  
**SEMESTER:** - VIII  
**CODE:** - 4TE08ITE1  
**NAME:** – Internet of Things and Embedded System

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### **Teaching & Evaluation Scheme:-**

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
4TE08ITE1	Internet of Things and Embedded System	3	0	2	5	4	30	1.5	70	3.0	-	20	30	150

### **Objectives:**

The learning objectives of this course are to:

- Learn overview of the current state of the art in the Internet of Things, connected product concepts, development platforms, user experience, challenges and future directions.
- learn the basic technical skills to design and prototype this new generation of "smart objects".

### **Prerequisites:**

- Basic knowledge of Programming, Networking and Electronics.

### **Course outline:**

Sr. No.	Course Contents	Total Hrs.
1	<b>Introduction to the Internet of Things:</b> Origins. Early concepts and products. Examples of current products and value propositions. Architectures and design patterns. Analysis of a full connected-object experience. State of the Art, challenges and future directions.	9
2	<b>Prototyping Connected Objects:</b> Open-source prototyping platforms. Basic Arduino programming. Extended Arduino libraries. Arduino-based Internet communication.	9
3	<b>Integrating Internet Services:</b> XML and JSON. HTTP APIs for accessing popular Internet services (Facebook, Twitter, and others).	10

<b>4</b>	<b>User Experience and Interaction Design:</b> The three levels of user engagement: aesthetics, functional and emotional. Good examples of user interaction design. Designing your own user experience.	<b>10</b>
<b>5</b>	<b>Project Development and Competition:</b> Development of a project including: value proposition, physical connected object prototyping, programming the behavior, accessing Internet services and designing the user experience.	<b>10</b>
	<b>Total</b>	<b>48</b>

### **Learning Outcomes:**

On completing this subject, the student is expected to be competent in:

- Designing full connected-product experiences by integrating Internet services and physical objects.
- Analyzing, designing, and developing prototypes of Internet-connected products using appropriate tools.
- Identifying, classifying and describing different kinds of Internet-connected product concepts.
- Analyzing the challenges and applying adequate patterns for user-interaction with connected-objects.

### **Books Recommended:**

- Mike Kuniavsky, **Smart Things: Ubiquitous Computing User Experience Design**, Morgan Kaufmann Publishers, 2010.
- Sara Cordoba, WimerHazenbergh, Menno Huisman, **Meta Products: Building the Internet of Things**, BIS Publishers, 2011.
- MassimoBanza, **Getting Started with Arduino (Make: Projects)**, O'Reilly Media, 2008.
- Donald A. Norman, **Emotional Design: Why We Love (or Hate) Everyday Things**, Basic Books, 2004.
- Tom Igoe, Dan O'Sullivan, **Physical Computing: Sensing and Controlling the Physical World with Computers**, Premier Press. 2004.