C. U. SHAH UNIVERSITY- Wadhwan City

FACULTY OF TECHNOLOGY AND ENGINEERING
DEPARTMENT OF COMPUTER ENGINEERING
B.TECH. SEMESTER: - VIII

Subject Name: – Internet of Things and Embedded System
Subject Code: - 4TE08ITE1

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							Total
							Theory				Practical (Marks)			
							Sessional Exam		University Exam		Internal		University	
		Th	Tu	Pr	Total		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	**Introduction to the Internet of Things:** 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	**Prototyping Connected Objects:** Open-source prototyping platforms. Basic Arduino programming. Extended Arduino libraries. Arduino-based Internet communication.	9
3	**Integrating Internet Services:** XML and JSON. HTTP APIs for accessing	10

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

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, WimerHazenberg, Menno Huisman, Meta Products: Building the Internet of Things, BIS Publishers, 2011.
- MassimoBanzi, 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.
- Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1 st Edition, VPT, 2014 2.
- Francis daCosta, "Rethinking the Internet of Things: A Scalable Approach to Connecting Everything", 1 st Edition, Apress Publications, 2013 3.
- Cuno Pfister, Getting Started with the Internet of Things, O"Reilly Media, 2011, ISBN: 978-1-4493- 9357-1