PRINCIPLES OF DISTRIBUTED EMBEDDED SYSTEMS

I Semester: Embedded Systems

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
BESB06	Elective	3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

OBJECTIVES:

The course should enable the students to:

I. Understand the design principles of distributed embedded systems.

II. Design CAN network based systems.

III. Understand RTOS to design embedded system

COURSE LEARNING OUTCOMES (CLOs):

1. Understand Real Time Computer Systems requirements Real Time Systems and Real Time Communication.
2. Understand global time, Internal , external clock synchronization and Real Time Model
3. Understand Real Time Communication, temporal relations and dependability
4. Understand Power energy awareness, event triggered , rate constrained and time triggered.
5. Understand and remember Operating System, Real Time Operating Systems Inter component communication and
6. Understand and remember task management, dual role of time , inter task interactions process input/output and agreement protocols
7. Understand and remember error detection and importance of RTOS ,System design and scheduling problem
8. Understand and remember state and dynamic scheduling, system design and validation time -triggered architecture
9. Understand and remember Can open CAN open standard object directory
10. Understand and remember Electronic data sheets ,devices ,analyze CAN Standards
11. Understand and remember CAN Standards and configuration files ,service data objectives and network management CAN open messages
12. Understand and remember CAN Standards and device profile encoder, real time environment RTOS with examples of Real Time Communication.
13. Analyze to understand real time system design with CAN Standards
14. Analyze to understand RTOS to design Embedded Systems with examples
15. Analyze to understand CAN and Design CAN network based systems with examples.

UNIT-I	REAL-TIME ENVIRONMENT	Classes: 09

Real-time computer system requirements, classification of real time systems, simplicity, global time, internal and external clock synchronization, real time model. Real time communication, temporal relations, dependability, power and energy awareness, real time communication, event triggered, rate constrained, time triggered.

UNIT -II	REAL-TIME OPERATING SYSTEMS	Classes: 09
Inter component communication, task management and dual role of time; Inter task interactions, process input/output, agreement protocols, error detection.		
UNIT -III	**SYSTEM DESIGN**	**Classes: 09**
Scheduling problem, static and dynamic scheduling, system design. Validation, time-triggered architecture.		
UNIT -IV	**INTRODUCTION TO CAN**	**Classes: 09**
Introduction to CAN open CAN open standard, object directory, electronic data sheets and devices.		
UNIT-V	**CAN STANDARDS**	**Classes: 09**
Configuration files, service data objectives, network management CAN open messages, device profile encoder.		

Text Books:

1. Hermann Kopetz, "Real–Time systems-Design Principles for distributed Embedded Applications", Springer, 2nd Edition, 2011.
2. Glaf P. Feiffer, Andrew Ayre and Christian Keyold, "Embedded networking with CAN and CAN open", Copperhill Media Corporation, 1st Edition, 2008.

Reference Books:

1. Rajkamal, 'Embedded system-Architecture-Programming-Design",Tata Mc Graw Hill, 3rd Edition, 2011.
2. Frank Vahid, Tony Givargis, "Embedded System Design", JohnWiley and sons, 2nd Edition, 2002.
3. Lyla B Das, "Embedded Systems-An Integrated Approach", Pearson,1st Edition,2013.
4. David E. Simon, "An Embedded Software Primer", PearsonEducation, 1st Edition, 1999.

Web References:

1. https://www.youtube.com/watch?v=Uk9zFrEGguM
2. http://freevideolectures.com/blog/2010/11/130-nptel-iit-online-courses.

E-Text Books:

1. https://www.jntubook.com/dgital-communications-textbook
2. http://tradownload.com/results/neamen-digital-communications-.html
3. http://www.everythingvtu.wordpress.com