ISLAMIC UNIVERSITY OF TECHNOLOGY

Course Outline and Course Plan

Name of the Teacher	Md Nazmul Haque	Position	Lecturer
Department	Computer Science and Engineering	Programme	B. Sc. in Software Engineering
Course Code	SWE 4739	Course Title	Embedded Software Development
Academic Year	2021- 2022	Semester	7th
Contact Hours	3.0	Credit Hours	3.0
Text books and Reference books (if any)	**1. Introduction to Embedded Systems** **2. Linkers and Loaders**	Authors of the books	1. E. A. Lee and S. A. Seshia 2. John R. Levine
Prerequisites (If any)		Curriculum Requirement	Compulsory
Course Homepage			
Teaching Methods/ Approaches	☑ **Lecture** ☐ **Group discussion** ☐ **Demonstration** **Problem solving** ☑ **Project** ☑ **Others: Presentation by Students**		
Teaching aids	☑**Multi-media** ☐ **OHP** ☑ **Board and Marker** ☐**Others**		

Course Assessment Method								
Attendance (10%)	**Quiz 15% of Total Marks (Best 3 out of 4)**						**Mid Semester (25%)**	**Semester Final (50%)**
Evaluate based on the participation in the class	1st Quiz	2nd Quiz	3rd Quiz	4th Quiz	Others		Week/Date	Week/Date
	Week/Date	Week/Date	Week/Date	Week/Date	Assignment	Homework		
	4th Week	7th Week			2 Assignments in replacement of Quiz	Will be given accordingly	As per schedule of IUT	As per Schedule of IUT

Course Contents and Objectives	**Contents** **This course covers computing elements, structures in embedded software, resource access protocols, uniprocessor scheduling, programming-language support, languages for model-driven development, worst-case execution time analysis, and overview of embedded distributed systems. Other topics include specification and design of embedded systems, specification languages, hardware/software co-design, performance estimation, co-simulation, embedded architectures, processor architectures and software synthesis, system-on-a-chip paradigm, retarget able code generation and optimization, verification and validation, environmental issues and considerations.** **Objectives**

Course Outcomes	Course Outcomes (COs)
	CO1 - Explain CO2 - Calculate CO3 - Design

Weekly plan for course content		
Weeks	**Topics**	**Task/Reading**
1	**Introduction**	**Embedded Environment, Cross compilation, Tool-Chain**
2	**Linkers and Loaders**	**Assembly, Linking, Loading, Debugging**
3	**Embedded Software Development Process**	**Edit-Test-Debug Cycle, agile development, Testing**
4	**Real time Systems**	**Hard and Soft Real- time systems, real time scheduling**
5	**Embedded Processors and Memory Architecture**	**Processor architecture, DSP processor, memory, overlay**
6	**Program Verification**	**Formal verification methods**
7	**Discussions and Presentations**	

Mapping of COs and POs

Course Outcome (CO)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1:	√											
CO2:		√										
CO3:			√									

Program Outcomes (POs : PO1 ~ PO12)

PO No.	Program Outcomes (POs)
	Students graduating from the Bachelor of Science in Computer Science and Engineering (B.Sc. in CSE) program, upon graduation students will have the ability to:
PO1	**Engineering knowledge: Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in K1 to K4 respectively to the solution of complex engineering problems.**
PO2	**Problem analysis: Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (K1 to K4)**
PO3	**Design/development of solutions: Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (K5)**
PO4	**Investigation: Conduct investigations of complex problems using research-based knowledge (K8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.**
PO5	**Modern tool usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (K6)**
PO6	**The engineer and society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (K7)**
PO7	**Environment and sustainability: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (K7)**
PO8	**Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (K7)**
PO9	**Individual work and teamwork: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.**

PO10	**Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.**
PO11	**Project management and finance: Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.**
PO12	**Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.**

Class Schedule

Day	Slot A	Slot B
Tuesday	10:00 AM – 11:130 AM	2:30 PM – 3:40 PM
Thursday	11:30 AM – 12:40 PM	2:30 PM – 3:40 PM

Instructor contact details:
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