

### Proposal for a New Course

<b>Course Number</b>	: CS 545
<b>Course Name</b>	: Software Design Patterns
<b>Credits</b>	: 3-0-0-3
<b>Prerequisites</b>	: UML and OO Programming
<b>Intended for</b>	: UG & PG
<b>Distribution</b>	: Elective for B.Tech. Electrical Engg.& Computer Sc. &Engg., MS/M.Tech., Ph.D.
<b>Semester</b>	: Either Odd or Even

**Preamble:**

Major challenges faced by software industries are time and budget overrun of projects, declining productivity of software architects, designers and coders, evolving requirements which at times are ambiguous, mis-understood leading to project failures. They have realized that a major part of these issues can be addressed by standardizing and codifying the design process and assistance from tools. As a part of this effort, design solutions for recurring problems in software developments have been identified, abstracted and informally/semi-formally described to facilitate their reuse and sharing. These reusable designs are referred as Design Patterns. This course presents Design Patterns addressing frequently encountered design issues, reusable solutions, possible implementations and trade offs between them. This course empowers the participants to be industry ready to join live projects.

**Course Objective:** A major objective of the course is to facilitate learning of software industries design practices through Design Patterns. Learning Design Patterns equips one with software design skills to qualify as a good architect and designer. Participants will learn to describe their design patterns using UML Class and Collaboration diagrams. The course includes case studies, mini-projects and coding assignments in addition to lectures to facilitate and encourage learning by doing.

**Major Topics:**

- Review of UML and concepts of OO programming languages (3 lectures)
- Use Case and System Sequence Diagram (2 Lectures)
- Design Methodology : Responsibility assignment (3 Lectures)
- Design patterns classification and template (3 Lectures )
- Creational Patterns (6 Lectures)
- Structural Patterns ( 6 Lectures)
- Behavioral Patterns (6 Lectures )
- Architectural Patterns (3 Lectures )

- Evaluative Patterns ( 2 Lectures)
- Advance Topics such as Concurrency Patterns, Pattern Lang. (6 Lectures)

**Reference Books:** List is suggestive only, not mandatory

- Applying UML and Patterns An Introduction to Object-Oriented Analysis and Design by Craig Larman, 3<sup>rd</sup> Ed.
- Design Patterns Elements of Reusable Object-Oriented Software, Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, 2015(Paper back)
- Pattern Hatching: Design Patterns Applied, John Vlissides
- Patterns of Enterprise Application Architecture, Martin Fowler
- The Architecture of Open Source Applications, Vol. 1 & 2

Other Faculty may be interested in teaching this course: Dr. Sriram Kialasam, Dr. Varun Dutt, Dr. T. A. Gonsalves, Dr. Shubhojit Roy Chowdhury, and Prof. Yvonne Dittrich, SCEE

Proposed by: B. D. Chaudhary School: SCEE

Signature \_\_\_\_\_ Date \_\_\_\_\_

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Recommended/Not Recommended, with Comments:

\_\_\_\_\_ Date: \_\_\_\_\_

Chairman, CPC

*Approved / Not Approved*

\_\_\_\_\_ Date: \_\_\_\_\_

Chairman, Senate