



Mehran University of Engineering and Technology, Jamshoro
Department of Software Engineering

ORIGINAL SUBMITTED SYLLABUS

Title of Subject	:	Sustainable Software Engineering
Code	:	SE803
Discipline	:	Software Engineering
Effective	:	24PhDSE & onwards
Assessment	:	10% Sessional 30% Mid Semester 60% Final Semester Examination
Credit Hours	:	3 + 0
Minimum Contact Hours:		42

Marks : 100

Objectives of course:

This course will prepare students about aspects of sustainability for software engineering. This course will provide an overview of the perceptions of sustainability for software systems and technical sustainability in the software process.

Course outline:

• **Introduction**

Sustainable software engineering, green soft reference model, the quality model for sustainable software, process models for sustainable software engineering, green model for sustainable software engineering, Aspects of sustainability in software engineering (development process, maintenance process, system production, and system usage aspect)

• **Classifying the Measures of Software Sustainability**

Sustainability in Software Development, Green software system, Software for Sustainability, Sustainability of the software ecosystem, Perceptions of sustainability for software systems, measurement of green and sustainability for software systems.

• **Technical Sustainability**

Technical sustainability in the development process models, technical sustainability in the software process, changes to improve the technical sustainability

• **Evidencing sustainability design through examples**

A framework for energy efficient software, software power consumption models, Developing green software, Refactoring (code level guidelines), Self-adaptation (Green software by design)

BOOKS RECOMMENDED

1. Kramer Kem-Laurin, User experience in the age of sustainability: a practitioner's blueprint, Elsevier, Latest Edition.
2. Ehrenfeld, John R. Sustainability by design: A subversive strategy for transforming our consumer culture, Yale University Press, Latest edition.

Reference Papers:



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1. Naumann, Stefan, et al. "Sustainable software engineering: Process and quality models, life cycle, and social aspects." *ICT Innovations for Sustainability*. Springer, Cham, 2015. 191-205.
2. Penzenstadler, Birgit. "What does Sustainability mean in and for Software Engineering." *Proceedings of the 1st International Conference on ICT for Sustainability (ICT4S)*. 2013.
3. Oyedeji, Shola, Ahmed Seffah, and Birgit Penzenstadler. "Classifying the Measures of Software Sustainability."
4. HYGERTH, HENRIK. "Sustainable Software Engineering: An Investigation into the Technical Sustainability Dimension." M.S Thesis, (2016).
5. Chitchyan, R., Betz, S., Duboc, L., Penzenstadler, B., Easterbrook, S., Ponsard, C., & Venters, C., Evidencing sustainability design through examples, 2015.
6. Oyedeji, Shola, Ahmed Seffah, and Birgit Penzenstadler. "A catalogue supporting software sustainability design." *Sustainability* 10.7 (2018): 2296.
7. Ardito, Luca, et al. "Understanding green software development: A conceptual framework." *IT professional* 17.1 (2015): 44-50.

Approval:

Board of Studies:
Board of Faculty:
AS&RB
Academic Council:

Resolution No. 2.2
Resolution No. 21.10
Resolution No.
Resolution No.

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