



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

**ORIGINAL SUBMITTED SYLLABUS**

<b>Title of Subject</b>	:	<b>FORMAL METHODS IN SOFTWARE ENGINEERING</b>
<b>Code</b>	:	SE612
<b>Discipline</b>	:	Software Engineering (2 <sup>nd</sup> Semester)
<b>Effective</b>	:	20 ME SE and onwards
<b>Pre-requisite</b>	:	None
<b>Assessment</b>	:	10% Sessional 30% Mid Semester 60% Final Semester Examination
<b>Credit Hours</b>	:	3+0
<b>Minimum Contact Hours:</b>		<b>Marks : 100 + 0</b>

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**Specific Objectives of course:**

- Course is intended to Describe the costs and benefits of formal methods', Construct formal models of sequential software systems, Implement sequential software systems based on formal [SEP]models, Verify attributes of formal models, Demonstrate formal correctness of simple procedure [SEP]

**Course outline:**

- Introduction to formal methods and specification. State-Based Formal Methods.
- Transformational systems. Traditional approaches. Z specification.
- Formal development cycle. Temporal Specification: reactive systems, syntax and semantics of temporal logic, temporal specification of reactive systems (safety, aliveness, fairness).
- Model Checking: Generating finite models, Analysis of a simple model checking algorithm. Symbolic model checking.
- Overview of reduction methods. Spin and Promela.
- Case study and practical verification of properties.
- Current research topics based on Formal Methods.

**BOOKS RECOMMENDED**

1. Z: An Introduction to Formal Methods by Antoni Diller, [Latest Edition], John Wiley & Sons, Inc.
2. Modern Formal Methods and Applications, Hossam A. Gabbar, Springer-Verlag [Latest Edition]. [SEP]
3. Formal Software Development: From VDM to Java, Charatan, Quentin, and Aaron [SEP]Kans. Palgrave Macmillan, [Latest Edition]. [SEP]
4. Understanding Z: a Specification Language and its Formal Semantics. J. M. Spivey. [Latest Edition]. Cambridge University Press, New York, NY, USA. [SEP]

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**Approval:**

Board of Studies:	Res.No.02	Dated:25-09-2018
AS&RB:	Res.No. 154.17(a)	Dated: 04-12-2018
Academic Council:	Res.No. 94.4	Dated: 27-03-2019