Malaviya National Institute of Technology Jaipur
Department of Computer Science and Engineering

Academic Year :2017-18
Autumn Semester

MTE-II Examination Schedule

Analytical Reasoning & Experiential Learning with Applications to Software and Program Analysis
(October 9 - 13, 2017)

S.No.	Course Code	9:30 am - 10:30 am	10:30 am - 11:00 am	11:00 am - 12:00 pm	12:00 pm - 2:30 pm	2:30 pm - 4:30 pm
1	09/10/2017 (Monday)	Lecture 1	Coffee Break	Lecture 2	Registration, Lunch Break	Tutorials (1 - 2)
2	10/10/2017 (Tuesday)	Lecture 3	Coffee Break	Lecture 4	Lunch Break	Tutorials (3 - 4)
3	11/10/2017 (Wednesday)	Lecture 5	Coffee Break	Lecture 6	Lunch Break	Tutorials (5 - 6)
4	12/10/2017 (Thursday)	Lecture 7	Coffee Break	Lecture 8	Lunch Break	Tutorials (7 - 8)
5	13/10/2017 (Friday)	Lecture 9	Coffee Break	Lecture 10	Lunch Break	Tutorials (9 - 10)

Day 1: *An overview of important discovery problems in program analysis and software analytics. Key graph algorithms to address those problems.*

Lecture 1 (SCK): Important discovery problems of software analytics including use cases to bring out the generality of applied graph theory that is crucial.

Lecture 2 (SCK): An overview of key graph algorithms, their applicability, and the engineering challenges for practical applications.
Tutorials 1-2 (SCK): An experiential learning lab to learn the Page Rank algorithm and its significance for applications.

The *first tutorial* will introduce the Page Rank problem, the mathematical significance of the Page Rank concept, and the algorithmic options for solving the problem. The *second tutorial* will include an exercise to implement one Page Rank algorithm and reflect on the results from the viewpoint of its possible

Day 2: *An exposition of the graph database platform and query language technology and its use for modeling complex program analysis and software analytics problems.*

Lecture 3 (SCK): An introduction to a graph database platform, a textual graph query language, and a visual graph query language.

Lecture 4 (SCK): An introduction to modeling complex software analytics problems as graph problems. A discussion of practical challenges of modeling and making effective use of applied graph theory.
Tutorial 3-4 (SCK): An experiential learning lab to exercise graph database technology to the problem of detecting software safety and security vulnerabilities and relate it to a similar exercise for detecting disease genes.

Malaviya National Institute of Technology Jaipur
Department of Computer Science and Engineering

Academic Year :2017-18
Autumn Semester

MTE-II Examination Schedule

The *third tutorial* will illustrate the use of the Atlas graph database platform to detect software vulnerabilities. The *fourth tutorial* will draw a parallel with bioinformatics by discussing the problem of detecting disease genes.

Day 3: Topic: *An introduction to graph matching algorithms and their applications in software analytics and program analysis.*

Lecture 5(SCK): An introduction to the suffix tree string matching algorithms and their significance for software analytics (Case Study: bioinformatics).

Lecture 6(SCK): An introduction to graph matching algorithms and their significance for software analytics.

Tutorial 5-6(SCK): A graphical programming paradigm and graph visualization and its application-specific customization.

The *fifth tutorial* will illustrate the notion of an *extensible common software graph schema* for and graph visualization for software analytics. The *sixth tutorial* will illustrate the graphical programming paradigm for software analytics using the software graph schema.

Day 4:

Lecture 7(VL): Static and dynamic program analysis: Tools and Techniques
Lecture 8(VL): Leakage paths in multiple Apps through collusion: case study of Android Apps.
Tutorial 7-8(MSG): Exercising the UI intensive I/Os in Apps: Use cases

Day 5:

Lecture 9(VL): Introduction to software vulnerabilities, exploits and challenges in their detection
Lecture 10(MSG): Software Vulnerability detection in a large software: case study of Experimental OS
Tutorial 9-10 (VL): SModeling and verification of control flow and leakage paths in Apps