TCET/FRM/IP-02/09 Revision A

Semester Plan
(Beyond Curriculum Bridge Course)

SemesterVII Course**B.E. Civil Engineering**

Subject:**Optimization Technique in Civil Engineering** Class**B.E. Civil (A&B)**

Sr. No	Module No.	Lesson No.	Topics Planned (Technology to be used)	Modes of Learning	Planned /Completion Date	Resource Book Reference/Online Courses	Remarks
1	M1	1.1	Historical Development; Engineering applications of Optimization; Art of Modeling	Lecture, PPT, practical	Planned 18/07/2017	1.1	
2	M1	1.2	Objective function; Constraints and Constraint surface; Formulation of design problems as mathematical programming problems	Lecture, PPT, practical	Planned 19/07/2017	1.1 1.2	
3	M1	2.1	Classification of optimization problems	Lecture, PPT, practical	Planned 25/07/2017	1.1 1.2	
4	M1	2.2	Optimization techniques – classical and advanced techniques	Lecture, PPT, practical	Planned 26/07/2017	1.1 1.2	
5	M2	3.1	Stationary points; Functions of single and two variables; Global Optimum	Lecture, PPT, practical	Planned 01/08/2017	1.1 1.2	
6	M2	3.2	Convexity and concavity of functions of one and two variables	Lecture, PPT, practical	Planned 02/08/2017	1.1 1.2	

Issued By MR	Approved By Principal

7	M2	4.1	Optimization of function of one variable and multiple variables; Gradient vectors; Examples	Lecture, PPT, practical	Planned 08/08/2017	1.1 1.2 1.3	
8	M2	4.2	Optimization of function of multiple variables subject to equality constraints; Lagrangian function	Lecture, PPT, practical	Planned 09/08/2017	1.1 1.2 1.3	
9	M2	5.1	Optimization of function of multiple variables subject to equality constraints; Hessian matrix formulation; Eigen values	Lecture, PPT, practical	Planned 16/08/2017	1.1 1.2	
10	M3	5.2	Standard form of linear programming (LP) problem; Canonical form of LP problem; Assumptions in LP Models; Elementary operations	Lecture, PPT, practical	Planned 22/08/2017	1.1 1.2	
11	M3	6.1	Graphical method for two variable optimization problem; Examples	Lecture, PPT, practical	Planned 23/08/2017	1.1 1.2	
12	M4	6.2	Motivation of simplex method, Simplex algorithm and construction of simplex tableau; Simplex criterion; Minimization versus maximization problems	Lecture, PPT, practical	Planned 29/08/2017	1.1 1.2	

13	M4	7.1	Motivation of simplex method, Simplex algorithm and construction of simplex tableau; Simplex criterion; Minimization versus maximization problems	Lecture, PPT, practical	Planned 30/08/2017	1.1 1.2	
14	M4	7.2	Revised simplex method; Duality in LP; Primal-dual relations; Dual Simplex method; Sensitivity or post optimality analysis	Lecture, PPT, practical	Planned 05/09/2017	1.1 1.2	
15	M5	8.1	Use of software for solving linear optimization problems using graphical and simplex methods	Lecture, PPT, practical	Planned 06/09/2017	1.1 1.2	
16	M5	8.2	Use of software for solving linear optimization problems using graphical and simplex methods	Lecture, PPT, practical	Planned 12/09/2017	1.1 1.2 1.3	
17	M6	9.1	Examples for transportation, assignment, water resources, structural and other optimization problems	Lecture, PPT, practical	Planned 13/09/2017	1.1 1.2 1.3	
18	M6	9.2	Examples for transportation, assignment, water resources, structural and other optimization problems	Lecture, PPT, practical	Planned 19/09/2017	1.1 1.2	
19	M6	10.1	Examples for transportation, assignment, water resources, structural and	Lecture, PPT, practical	Planned 20/09/2017	1.1 1.2	

			other optimization problems				
20	M6	10.2	Examples for transportation, assignment, water resources, structural and other optimization problems	Lecture, PPT, practical	Planned 26/09/2017	1.1 1.2	

Bridge courses Objective: Bridging of gaps with respect to prerequisites and industry skills or to carryout research in that particular field. (20 Hrs / Semester / student)

S.No.	Bridge courses/Technology	Duration (Week/hrs)	Modes of Learning	Recommended Sources
1.	**Optimization Technique in Civil Engineering**	2 Hrs/ Week	Practice Session/ Self Learning/ Revision	MS Office

Remark Course	Syllabus Coverage Planned 20	Practice Session Planned 02	Beyond Syllabus Planned 01

No. of (lectures planned)/(lecture taken)
Planned 20

Text Books

1. S.S. Rao, "Engineering Optimization: Theory and Practice", New Age International Pvt. Ltd., New Delhi, 2000.
2. G. Hadley, "Linear programming", Narosa Publishing House, New Delhi, 1990.
3. H.A. Taha, "Operations Research: An Introduction", 5th Edition, Macmillan, New York, 1992.
4. K. Deb, "Optimization for Engineering Design-Algorithms and Examples", Prentice-Hall of India Pvt. Ltd., New Delhi, 1995.

Digital Reference

1) http://nptel.ac.in/civil

Name & Signature of Faculty | Signature of HOD | Signature of Principal /Dean (Academics)

Date | Date | Date

Note

1. Plan date and completion date should be in compliance
2. Courses are required to be taught with emphasis on resource book, course file, text books, reference books, digital references etc.
3. Planning is to be done for 15 weeks where 1st week will be AOP, 2nd -13th for effective teaching and 14th -15th week for effective university examination oriented teaching, mock practice session and semester consolidation.
4. According to university syllabus where lecture of 4 hrs/per week is mentioned minimum 55 hrs and incase of 3 lectures per week minimum 45 lectures are to be engaged are required to be engaged during the semester and therefore accordingly semester planning for delivery of theory lectures shall be planned.
5. In order to improve score in NBA, faculty members are also required to focus course teaching beyond university prescribed syllabus and measuring the outcomes w.r.t learning course and programme objectives.
6. Text books and reference books are available in syllabus. Here only additional references w.r.t. non –digital/ digital sources can be written (if applicable)
7. Technology to be used in class room during lecture shall be written below the topic planned within the bracket.