SECOND SEMESTER 2020-21

Course Handout Part II

16-01-2021

In addition to part-I (General Handout for all courses appended to the timetable), this portion gives further specific details regarding the course.

Course No.   : **MATH F242**
Course Title   : **OPERATIONS RESERACH**
Instructor-in-charge : **DK SATPATHI**
Instructor   : DK Satpathi, V Vipin

1. **Scopes and Objective of the Course:**

This course begins with applications overview of Operations Research, and introduces dynamic programming and network models. After a review of probability distributions, inventory models and queuing systems will be covered. Decision- making under certainty, risk, and uncertainty; along with an introduction to game theory will be dealt. Finally simulation techniques, introduction for estimating solutions to problems, that are not amenable to conventional solution techniques, will be made. Students will also be taught the basic concepts on system reliability.

2. **Text Book:**
   1. Hamdy A Taha, "Operations Research: An Introduction", Pearson Education, Tenth Edition, 2018.
   2. Venkateswaran S and B. Singh, "Operations Research" EDD Notes.Vol.3, 1997.

3. **Reference Book:**
   1. Hillier and Lieberman, Bodhibrata Nag, Preetam Basu, "Introduction to Operations Research", T M H, Tenth Edition, 2017.
   2. Bernard W. Taylor, "Introduction to Management Science   Twelfth Edition, Pearson,2016
   3. Anderson, Sweeney and Williams, "Quantitative methods for business Eleventh Edition", Cengage Learning, 2009.
   4. Ayyub, B.M. and McCuen R.H., "Probability, Statistics and Reliability for Engineers and Scientists", Chapman & Hall 2e, 2003.

4. Lecture Plan

Lecture Nos.	Learning Objectives	Topics to be Covered	Chapter in the Text Book
1	Introduction to Operations Research	Introduction, Historical Development, Impact of O.R., Phases of O.R., Overview of O.R., Modeling Approach	Chapter 1 (T1)
2-4	Review of Basic	Random variables, Binomial, Poisson,	Chapter 14 (T1) 14.1,14.2,14.3,14.4

	Probability	Exponential and Normal Distribution	
5-13	Introduce Queueing Systems	Definition, Birth and Death process, Role of Exponential Distribution, Generalized Poisson Queueing Models, Specialized Poisson Queues.	Chapter 7 (T2) 7.1,7.2,7.3,7.4,7.5 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.5.5, 7.5.6
14- 20	When to produce / purchase and how much	Deterministic and Probabilistic Inventory Models	Chapter 8 (T2) 8.1,8.2,8.3(Model I, Model II, Model III, Model IV, Model V) 8.4(Model VII, Model VIII)
21-25	How to solve complex system and basic concept of simulation	Introduction, Generation of random variates from different distributions, Simulation of Single-server queueing model and inventory model.	Chapter 9 (T2) 9.1,9.2,9.4,9.4.1,9.4.8,9.8,9.9
26-30	To understand the basic concept of Reliability	Basic concepts, Hazard rate function, Reliability of the systems, failure time distributions.	Chapter 6 (T2) 6.1,6.2,6.3,6.4,6.4.1,6.4.2 6.9,6.9.1,6.9.2
31- 33	Learn about Decision analysis and Game theory	Decision analysis under uncertainty and Game Theory	Chapter 15 (T1) 15.3,15.4
34-37	Learn basic concepts Network Models	Definition, Shortest route Problem, CPM and PERT	Chapter 6 (T1) 6.1,6.5.1,6.5.2,6.5.5
37-40	To understand dynamic programming	Deterministic Dynamic Programming,	Chapter 12 (T1) 12.1,12.2,12.3,12.3.1

5. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Mid-Semester Test	90 mts	35	05/03 3.30 - 5.00PM	Open Book
Project (Report & Seminar)		25 (15+10)	Details will be discussed in the first tutorial class	Open Book
Comprehensive Examination	2 hours	40	15/05 AN	Open Book

6. Make-Up Policy: Only genuine cases will be entertained.

7. Consultation Hour: To be announced in the class.

8. Notice: Notices concerning this course will be displayed on CMS

9. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

INSTRUCTOR-IN-CHARGE