Course Specifications of:

**Design and Analysis of Engineering Systems**

Program(s) on which the course is given : Preparatory Courses - Urban Design

Compulsory or Elective element of program: Compulsory

Department offering the program: Architecture

Academic year / Level: year/ 2013-2014

Date of specification approval: June 2012

1. Basic Information
2. Title: Statistics and Random Processes Code: Eng 506
3. Credit Hours:3 Lecture:3 practical
4. Semester work:100 Final Exam:200 Practical: Total:300
5. Professional Information

1- Overall aims of course:

By the end of the course the student will be able to

* Analyze of Engineering Systems
* Analyze tools, flow of data diagrams.
* Evaluate problem identifications and its units.
* Evaluate resources data.
* Learn how to deal with the physical components of the system design, system software.

2- Intended learning outcomes of course (ILOs):

1. **Knowledge and understanding**

2.1.1 Identify theories, fundamentals and specialized knowledge in statistics and random processes as well as in related disciplines

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1. **Intellectual skills**

2.2.1 Analyze and assess information in the field of statistics and random processes t and resources and draw analogies to solve problems.

 2.2.2 Link different knowledge sources to solve problems

1. **Professional and practical skills**
   * 1. Write and evaluate professional re

2.3.4 acquire and apply the range of skills necessary to become professional Engineering systems.

1. **General and transferable skills**

2.4.1 Communicate effectively using different means.

2.4.5 Set basis and standards to assess the performance of others.

2.4.6 Work in a group and Lead a team in familiar professional contexts

3- Contents

|  |  |  |  |
| --- | --- | --- | --- |
| Topic No. | Topic | No. of weeks | Total no. of hours |
| 1 | Definition of the system | 1 | 3 |
| 2 | Combinatorics: Counting Methods |  | 3 |
| 3 | Discrete Random Variables. | 1 | 3 |
| 4 | Continuous and Mixed Random Variables | 1 | 3 |
| 5 | Joint Distributions | 1 | 3 |
| 6 | Multiple Random Variables | 1 | 3 |
| 7 | Limit Theorems and Convergence of Random Variables | 1 | 3 |
| 8 | Statistical Inference I: Classical Methods | 1 | 3 |
| 9 | Statistical Inference II: Bayesian Inference and Assignment 1 | 1 | 3 |
| 10 | Introduction to Random Processes | 1 | 3 |
| 11 | Some Important Random Processes and Assignment 2 | 1 | 3 |
| 12 | Introduction to Simulation Using MATLAB | 1 | 3 |
| 13 | Introduction to Simulation Using R | 1 | 3 |
| 14 | Recursive Methods | 1 | 3 |
| 15 | Presentations | 1 | 3 |
| 16 | Final exam | 1 | 3 |
| TOTAL | | 16 | 45 |

4- Course Matrix

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| --- | --- | --- |
| ILO’s code number | Teaching/learning methods and strategies | Assessment methods and strategies |
| 2.1.1 | Acquisition of core knowledge and understanding is achieved mainly through lectures, seminars, tutorials, directed reading, project work and independent study. | Assessment will be through individual coursework assignments, quizzes, oral discussions and reports. In addition final written examinations are given. The grades distribution system is shown in the curriculum table below. |
| 2.2.1 – 2.2.2 | Analysis and problemsolving skills are developed through tutorial/problem sheets and small group exercises.  Research skills are developed through the research project in the course of dissertation or thesis preparation. | Analysis and problem‐solving skills are assessed through oral and written examinations.  Design and research skills are assessed through project write-ups, coursework and project reports, presentations and the final |
| 2.3.2– 2.3.4 | Projects demonstrations, practical work, projects | Practical skills are assessed through projects write-ups, coursework exercises and reports, project reports and presentations and finally on the methodology demonstrated in the work for the dissertation or thesis. |
| 2.4.1 – 2.4.5 – 2.4.6 | Presentations in annual seminars (compulsory to be attended by a panel of departmental staff and other students).  Attendance of workshops or conferences or internal seminars. |  |

5-Assessment schedule

Assessment 1 Assignments on weeks 9-11

Assessment 2 Presentations on week 15

Assessment 3 Final exam on week 16

6- Weighting of assessments

18% Home assignments

15% Presentations

67% Final-term examination

100% Total

7- List of References

6.1 Essential books.

* JL Whitten, VM Barlow, L Bentley . systems analysis and design methods‏, McGraw-Hill Professional. 1997.
* R Jain. The art of computer systems performance analysis‏, cmg ,1991.
* [Kent, Sherman](http://en.wikipedia.org/wiki/Sherman_Kent) (2000). Strategic Intelligence for American World Policy.
* Anderson, Chris. [How to Build Effective Management Systems](http://www.bizmanualz.com/information/2005/01/26/how-to-build-effective-management-systems.html), Bizmanualz, January 26, 2005.

8- Facilities required for teaching and learning

Lecture room equipped with overhead projector

Presentation board, computer and data show

9- Intended learning outcomes of course (ILOs) Matrixes

**9.1 Matrix 01: Course contents & Assignment& ILO's**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No. of weeks** | **Course Content** | **Total no. of hours** | **a. Knowledge and understanding** | **b. Intellectual Skills** | | **c. Professional Skills** | | **d. General Skills** | | |
| 2.1.1 | 2.2.1 | 2.2.2 | 2.3.2 | 2.3.4 | 2.4.1 | 2.4.5 | 2.4.6 |
| 1 | Definition of the system | 3 |  |  |  |  |  |  |  |  |
| 2 | Combinatorics: Counting Methods | 3 |  |  |  |  |  |  |  |  |
| 3 | Discrete Random Variables. | 3 |  |  |  |  |  |  |  |  |
| 4 | Continuous and Mixed Random Variables | 3 |  |  |  |  |  |  |  |  |
| 5 | Joint Distributions | 3 |  |  |  |  |  |  |  |  |
| 6 | Multiple Random Variables | 3 |  |  |  |  |  |  |  |  |
| 7 | Limit Theorems and Convergence of Random Variables | 3 |  |  |  |  |  |  |  |  |
| 8 | Statistical Inference I: Classical Methods | 3 |  |  |  |  |  |  |  |  |
| 9 | Statistical Inference II: Bayesian Inference and Assignment 1 | 3 |  |  |  |  |  |  |  |  |
| 10 | Introduction to Random Processes | 3 |  |  |  |  |  |  |  |  |
| 11 | Some Important Random Processes and Assignment 2 | 3 |  |  |  |  |  |  |  |  |
| 12 | Introduction to Simulation Using MATLAB | 3 |  |  |  |  |  |  |  |  |
| 13 | Introduction to Simulation Using R | 3 |  |  |  |  |  |  |  |  |
| 14 | Recursive Methods | 3 |  |  |  |  |  |  |  |  |
| 15 | Presentations | 3 |  |  |  |  |  |  |  |  |
| 16 | Final exam | 3 |  |  |  |  |  |  |  |  |

**9.2 Matrix 02: Aims & ILO's**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Aims**    **ILO's** | **1** | **2** | **3** | **4** | **5** |
| 2.1.1 |  |  |  |  |  |
| 2.2.1 |  |  |  |  |  |
| 2.2.2 |  |  |  |  |  |
| 2.3.2 |  |  |  |  |  |
| 2.3.4 |  |  |  |  |  |
| 2.4.1 |  |  |  |  |  |
| 2.4.5 |  |  |  |  |  |
| 2.4.6 |  |  |  |  |  |

Course coordinator: **professor dr./** Sadika Ahmed

Course instructor **professor dr./** Sadika Ahmed

Date 20 / 10 / 2014