|  |  |
| --- | --- |
| **Course Title:** | Statistical Methods |
| **Course Code:** | STAT 105 |
| **Program:** | Statistics |
| **Department:** | Statistics and Operations Research |
| **College:** | Science |
| **Institution:** | King Saud University |

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# A. Course Identification

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1. Credit hours:** | | | | 3((2+0+2 | | | | | | | | | | | | |
| **2. Course type** | | | | | | | | | | | | | | | | |
| **a.** | University | |  | | College | | |  | Department | | | |  | Others |  |  |
| **b.** | | Required | | | |  | Elective | | |  |  | | | | | |
| **3. Level/year at which this course is offered:** | | | | | | | | | | | | **Level 4 / Year 2** | | | | |
| **4. Pre-requisites for this course** (if any)**: STAT 100** | | | | | | | | | | | | | | | | |
| **5. Co-requisites for this course** (if any)**:** | | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | | |

## 6. Mode of Instruction (mark all that apply)

| **No** | **Mode of Instruction** | **Contact Hours** | **Percentage** |
| --- | --- | --- | --- |
| **1** | **Traditional classroom** | **3** | **100%** |
| **2** | **Blended** |  |  |
| **3** | **E-learning** |  |  |
| **4** | **Correspondence** |  |  |
| **5** | **Other** |  |  |

**7. Actual Learning Hours** (based on academic semester)

|  |  |  |
| --- | --- | --- |
| **No** | **Activity** | **Learning Hours** |
| **Contact Hours** | | |
| **1** | **Lecture** | **45** |
| **2** | **Laboratory/Studio** |  |
| **3** | **Tutorial** | **30** |
| **4** | **Others** (specify) |  |
|  | **Total** | **75** |
| **Other Learning Hours\*** | | |
| **1** | **Study** | **40** |
| **2** | **Assignments** | **40** |
| **3** | **Library** | **20** |
| **4** | **Projects/Research Essays/Theses** |  |
| **5** | **Others** (specify) |  |
|  | **Total** | **100** |

**\*** The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

# B. Course Objectives and Learning Outcomes

|  |
| --- |
| 1. Course Description Statistical Methods is a course in statistics designed to provide students with the basic concepts of data analysis and statistical computing. Topics covered include sampling distributions, estimation, hypothesis testing, analysis of variance, correlation, regression, chi-square tests and introduction to nonparametric methods. |
|  |
| 2. Course Main Objective |
| By the end of this course, student will be able to:   1. Understanding the concepts of the statistical inference and applications to real data. 2. Estimating the unknown parameters of the population. 3. Formulating and testing the statistical hypothesis. 4. Running the statistical tests based on a given sample and calculates the statistical measures of the sample. 5. Understand the concepts of one and two way analysis of variance. 6. Understand the concepts of correlation and regression. 7. Preparing and writing the statistical reports. |

# C. Program Learning Outcomes Assessment

## 1. Program Learning Outcomes Assessment Results.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **#** | **Program Learning Outcomes** | **Assessment Methods**  (Direct and Indirect) | **Performance Target** | **Results** |
| **Knowledge** | | | | |
| K1 | Understand the important statistical concepts, theorems, methods and probability models. | -Teaching lectures.  Support students with new concepts and activate readings group discussions and writing reports. | 75% | 80% |
| K2 | Recognize principles of statistical reasoning and their use in understanding, analysing and developing formal arguments. | 75% | 80% |
| K3 | Recognize the role of statistics and its application in the other fields, for example social and biological sciences. | 75% | 65% |
| K4 | Understand the overall process in designing studies, collecting and analysing data, and interpreting and presenting results. | 75% | 82% |
| K.. |  |  |  |  |
| **Skills** | | | | |
| S1 | Pose statistical problems and choose and apply appropriate statistical theories, models and tools to solve and analyses the problems. | Group discussion to analyses and differentiate the differences among theories.  Research project in the final year.  Assignments and exercises to make students able to criticize statistical techniques. | 60% | 65% |
| S2 | Demonstrate how statistics is used in the solution of real-life problems. | 70% | 60% |
| S3 | Use various statistical software to study and analyses data, as well as interpret and assess computed results. | 60% | 63% |
| **Values** | | | | |
| C1 | Communicate effectively statistical methods and results in appropriate context, and present logical arguments, both orally and in writing. | Discussion, presentation and writing reports. | 63% | 72% |
| C2 | Use technology for communication and analysis. |
| **Comments on the Program Learning Outcome Assessment results.** | | | | |
| In most of the program learning outcomes results were achieved as set as performance targets.  Few PLOs resulted under the target and the necessary actions are taken to overcome this issue. | | | | |

\* Include the results of measured learning outcomes during the year of the report according to the program plan for measuring learning outcomes

\*\* Attach a separate report on the program learning outcomes assessment results for male and female sections and for each branch (if any)

## 2. Analysis of Program Learning Outcomes Assessment

(including strengths, Areas for Improvement:, and priorities for improvement)

|  |
| --- |
| **Strengths :** |
| * **The intended learning outcomes are continuously evaluated by different methods during all the period of study.** * **The Department of Statistics has various assessments methods to measure students’ learning achievements.** * **Extension of library opening hours according to utilization, as well as provision of online catalogues and digital libraries.** |
| **Areas for Improvement:** |
| * **Students’ progress should be monitored, and their learning outcomes should be measured continuously.** * **Academic guidance needs improvement in terms of full time trained administrative staff.** |
| **Priorities for Improvement:** |
| **Using English language as a medium of instruction in more courses.**   * **A system should be developed to allow the Program of Statistics to be monitored continuously in order to ensure its development is clearly aligned with its mission.** * **Develop a plan to train faculty members in the latest methodologies of establishing both direct and indirect measures of student learning assessment.** * **Improve students' supporting services.** * **Develop an effective mechanism to deal with students having sub-satisfactory performance.**   **Enhance utilization of E-learning system.** |

# C. Course Content

|  |  |  |
| --- | --- | --- |
| **No** | **List of Topics** | **Contact Hours** |
| 1 | Some discrete distributions: Binomial, Hyper geometric, Poisson, Uniform,  Some continuous distributions: Normal, t, Chi squares, F, Probabilities,  tables, Critical points | 6 |
| 2 | Central limit theorem and sampling distribution of means, proportion, variance one & two populations | 9 |
| 3 | Estimation: Point and interval estimation for mean, proportion, variance (one and two populations) | 9 |
| 4 | Hypothesis testing. | 9 |
| 5 | Chi-square tests. | 9 |
| 6 | Analysis of variance. | 9 |
| 7 | Analysis of correlation and regression. | 6 |
| 8 | Nonparametric methods. | 3 |
| **Total** | | 60 |

# D. Teaching and Assessment

## Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

| **Code** | **Course Learning Outcomes** | **Teaching Strategies** | **Assessment Methods** |
| --- | --- | --- | --- |
| **1.0** | **Knowledge** | | |
| 1.1 | Knowledge of basic principles of the statistical data analysis. | Lecture | Written Exam |
| 1.2 | Memorizing statistical methods and techniques of sampling distributions. | Lecture | Written Exam |
| 1.3 | Implement the suitable statistical methods of the available data. | Lecture | Written Exam |
|  | Explain the meaning of statistical inference, analysis of variance, correlation and regression. | Lecture | Written Exam |
| **2.0** | **Skills** | | |
| 2.1 | Ability to the capability of choosing the appropriate statistical method for a particular application | Lecture | Written Exam and Oral presentations |
| 2.2 | Formulate significant research questions, analyze data and interpret the results. | Lecture | Written Exam and Oral presentations |
| 2.3 | Read, evaluate, and interpret numerical, statistical and general scientific information. | Lecture | Written Exam |
| **3.0** | **Values** | | |
| 3.1 | Ability to write professional statistical report. | Lecture | Written Exam |
| 3.2 | Using statistical packages. | Lecture | Written Exam |

## 

## Assessment Tasks for Students

| **#** | **Assessment task\*** | **Week Due** | **Percentage of Total Assessment Score** |
| --- | --- | --- | --- |
| **1** | First Midterm Exam | 7 | 25 % |
| **2** | Second Midterm Exam | 12 | 25 % |
| **3** | Oral presentations | 13, 14, 15 | 10 % |
| **6** | Final Exam | 16 | 40% |

**\*Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

# E. Student Academic Counseling and Support

|  |
| --- |
| **Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :** |
| For at least two hours a week, faculty and teaching staff are available to provide student consultations and academic advice. |

# F. Learning Resources and Facilities

## 1.Learning Resources

|  |  |
| --- | --- |
| **Required Textbooks** | Devore, L.J. (2007). Probability and Statistics for Engineering and the Sciences, Duxbury Press. |
| **Essential References Materials** | Freumd, R.J. and Wilson, W.J. (2003). Statistical Methods, Academic Press, New York. |
| **Electronic Materials** | Web sites dedicated to statistical methods available on the internet |
| **Other Learning Materials** | Power point presentations and other handouts posted on the course web site. |

## 2. Facilities Required

| **Item** | **Resources** |
| --- | --- |
| **Accommodation**  (Classrooms, demonstration rooms/labs, etc.) | Classroom |
| **Technology Resources**  (AV, data show, Smart Board, software, etc.) | Statistical Packages |
| **Other Resources**  (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list) |  |

# G. Course Quality Evaluation

| **Evaluation**  **Areas/Issues** | **Evaluators** | **Evaluation Methods** |
| --- | --- | --- |
| Effectiveness of teaching | Students | Indirect (Survey) |
| Quality of learning resources | Students | Indirect (Survey) |
| Achievement of course learning outcomes | Faculty | Direct (Oral presentations + Written exam) |

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

**Assessment Methods** (Direct, Indirect)

# H. Specification Approval Data

|  |  |
| --- | --- |
| **Council / Committee** | Course instructor/ Dr. Mohamed Abdelkader |
| **Reference No.** |  |
| **Date** | 14/01/2021 |