

**JAIPURIA INSTITUTE OF MANAGEMENT, NOIDA**

**PGDM (SM); TRIMESTER I; ACADEMIC YEAR 2020-21**

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| --- | --- |
| Course Code and title | OM 101: Statistics for Management |
| Credits | 3 |
| Term and Year | I Term, 2020-21 |
| Course Pre-requisite(s) | Knowledge of Descriptive Statistics |
| Course Requirement(s) | Working knowledge of Excel |
| Course Schedule (day and time of class) | As per the time table |
| Classroom # (Location) | As per the time table |
| Course Instructor | Dr. Richa Misra/ Prof Sonali Singh |
| Course Instructor Email |  |
| Course Instructor Phone (Office) |  |
| Student Consultation Hours |  |
| Office location |  |

**1. Course Overview**

Statistics for Management is an introductory course in Decision Sciences. Business decisions are rarely made by intuitions alone. Statistics and quantitative techniques can enable managers and decision makers to analyze business situations and make informed business decisions on the basis of this analysis. The core purpose of this course is to help students to analyze different problem situations. To achieve this purpose, basic understanding and learning of tools and techniques of Statistics is important. It will be helpful in developing analytical thinking approach among students so that they may take objective decisions in their personal and professional life thereby reducing the risk of making wrong decisions. The emphasis throughout the course is on reasoning, analysis and interpretations rather than on technical details. Working knowledge of Descriptive Statistics is pre-requisite for the course and OM 101 in itself a pre-requisite for Business Research Methods, Marketing Research and Business Analytics courses.

**2. Programme Learning Outcomes (PLOs)**

PO 1: Communicate effectively

PO 2: Demonstrate the ability to work in teams to achieve desired goals

PO 3: Reflect on business situations applying relevant conceptual frameworks in service management context

PO 4: Evaluate different ethical perspectives

PO 5: Discuss the centrality of customer experience in service management

PO 6: Exhibit innovative and creative thinking

**3. Course Learning Outcomes (CLOs)**

At the end of the course, the students should be able to:

**CLO1:** Carry out exploratory data analysis.

**CLO2:** Analyze uncertain business situations.

**CLO3:** Apply relevant conceptual frameworks to business situations for inferences.

**4. Mapping of CLOs with PLOs**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
| CLO 1 |  |  |  |  |  | I\* |
| CLO 2 |  |  | M |  |  |  |
| CLO 3 | R\* |  |  |  |  |  |

*\*For course attainment*

**5. Books and References**

**Text Book**

* Statistics for Management, Richard I. Levin, David S. Rubin, M. H. Siddiqui, S. Rastogi, Pearson Education, Delhi, 2017, 8th Edition.

### References:

* Business Statistics for Contemporary Decision Making, Ken Black, 5th Edition, Wiley India Pvt. Ltd.
* Statistics for Managers Using Microsoft Excel-Levine, Stephan, Krehbiel & Berenson, 5th Edition, PHI Learning Pvt. Ltd.
* Complete Business Statistics-Aczel, 6th Edition, Tata Mcgraw–Hill.
* Aczel Amir D, Complete Business Statistics, Tata McGraw Hill Publishing, Company Limited, New Delhi, 2009, 6th Edition.

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**Internet Resources**

* ebscohost-ebooks: Statistics: A Very Short Introduction, Hand, D. J. In: Very Short Introductions. Oxford: Oxford University Press-eBook.
* ebscohost-ebooks: Starting Statistics: A Short Clear Guide, Burdess, Neil. Los Angeles: SAGE Publications Ltd-eBook.
* ebscohost-ebooks: Using Statistics: A Gentle Introduction, Rugg, Gordon. In: Open up Study Skills. Maidenhead, England: McGraw-Hill Education-eBook
* http://www.indiandata.com:It provides a comprehensive coverage on Indian economics scenario with relevant trade statistics and a directory of Indian Businesses
* www.indiastat.com: The web portal provides well compiled socio-economic statistical information pulled out from various authentic secondary sources.
* http://as.wiley.com/WileyCDA/Section/id-350081.html: It provides journal, books and articles on business statistics.
* http://learnerstv.com
* https://www.khanacademy.org/
* http://stattrek.com/

**6. Session Plan**

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| --- | --- | --- | --- | --- | --- |
| **Session** | **Topic/ Sub Topic** | **Reading Reference** | **Pedagogy** | **Session Learning Outcomes** | **CLO** |
| **Module I:** **Descriptive Statistics** | | | | | |
| 1 | Measures of Central Tendency (Mean, Weighted Mean, Median & Quartiles etc.) | Text, Chpt: 3  Page: 74-104 | Case – Nirmal:  Discussion &  Solving by MS  Excel, Problem  Solving | To make students learn  how, when and why we  use different measures  of central tendency | CLO1 |
| 2 | Measures of Dispersion  Coefficient of Variation | Text, Chpt: 3  Page: 111-135 | Case – Nirmal:  Discussion &  Solving by MS  Excel, Problem  Solving | To make students learn  how, when and why we  use different measures  of dispersion and  relative measures | CLO1 |
| 3 | Measures of Shapes (Skewness & Kurtosis) | Instructor  Handouts | Case – Nirmal:  Discussion &  Solving by MS  Excel, Problem  Solving | To make students  understand relative  measures and how  distributions are  different based on their  shapes | CLO1 |
| 4 | Five-Point Summary  Case Analysis | Unemployment Case | Case Analysis | To make student understand exploratory data analysis | CLO1 |
| **Module II: Probability & Probability Distributions** | | | | | |
| 5 | Introduction and applications of probability  Different approaches towards probability  Law of Addition | Text, Chpt: 4  Page: 154-171 | Caselets, Problem Solving | To recognize and quantify the uncertainty involved in real world business problems | CLO2 |
| 6 | Probabilities under the conditions of independence  Probabilities under the conditions of dependence  Conditional, Joint and Total probability | Text, Chpt: 4  Page: 172-188 | Case: Academic performance, Problem Solving | To understand the independent and dependent events and estimate probabilities | CLO2 |
| 7 | Insights from Additional information  Priori & Posteriori Probabilities  Bayes Theorem | Text, Chpt: 4  Page: 188-196 | Caselets, Problem Solving | To learn that estimates of probability can be revised in managerial situations if additional information is available | CLO2 |
| 8 | Random Variables  Expected Value  Application of Expected Value in decision making | Text, Chpt: 5  Page: 210-224 | Caselets, Problem Solving | To use expected value to make decisions when there is uncertainty | CLO2 |
| 9 | Normal Distribution  Standard Normal Distribution | Text, Chpt: 5  Page: 225-246 | Caselets, Problem Solving | To apply normal distribution in different functional areas | CLO2 |
| **Module III: Inferential statistics** | | | | | |
| 10 | Sampling Concept  Sampling distribution  Use of standard error  Concept of Estimation | Text, Chpt: 6  Page: 278-288  Page: 296-304 | Discussion  Caselets | To make students understand the role of sampling in decision making | CLO3 |
| 11 | Significance Testing-Introduction  Setting up the hypothesis.  Types of errors | Text, Chpt: 8  Page: 379-384 | Caselets | To make students learn how to set up hypothesis for business situations | CLO3 |
| 12 | Conceptual basis to significance testing.  Five-steps testing procedure  Parametric & Non-Parametric Testing | Text, Chpt: 8  Page: 385-410 | Caselets  Problem Solving | To enable students to use sample-information to decide whether a population possesses a particular characteristic | CLO3 |
| 13 | One Sample Test: Testing of mean for population | Text, Chpt: 8  Page: 385-410 | Caselets  Problem Solving | To enable students to use sample-information to decide whether a population possesses a particular characteristic | CLO3 |
| 14 | One Sample Test: Testing of mean for population (t-test)  One Sample Test: Testing of proportion for population | Text, Chpt: 8  Page: 411-417 | Caselets  Problem Solving | To enable students to use sample-information to decide whether a population possesses a particular characteristic | CLO3 |
| 15 | Two Samples Test: Testing differences between two population-means (Large samples) | Text, Chpt: 9  Page: 425-433 | Caselets  Problem Solving | To use samples from two populations to decide about how the populations means are compared | CLO3 |
| 16 | Two Samples Test: Testing differences between two population-means (Small samples)  Concept of p-value | Text, Chpt: 9  Page: 434-444 | Case – Nirmal: Discussion & Solving by MS Excel | To use samples from two populations to decide about how the populations means are compared | CLO3 |
| 17 | Two Samples Test: Paired t test  Testing Difference of Proportions | Text, Chpt: 9  Page: 445-467 | Case – Nirmal: Discussion & Solving by MS Excel | To enable the students to decide how the populations can be compared for related samples | CLO3 |
| 18 | ANOVA | Text, Chpt: 11  Page: 555-581 | Case – Nirmal: Discussion & Solving by MS Excel | To enable the students to use samples from more than two populations to decide about how the populations means are compared | CLO3 |
| **Module IV: Linear Regression and Correlation** | | | | | |
| 19 | Regression model-to analyze relationship between variables | Text, Chpt: 12  Page: 610-640 | Guest Session | To enable students to visualize the relationship between variables | CLO3 |
| 20 | Estimating Multiple regression models  Concept of R-square/Adjusted R-square  Examining significance of predictors | Text, Chpt: 13  Page: 678-699 | Discussion  Case – Pampers : Discussion & Solving by MS Excel | To examine decision making situation where there are more than one independent variable and To estimate the strength of relationship and examining the significance of predictors | CLO3 |

**7. Assessment Tasks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Assessment Component** | **Description** | **Weightage** | **CLOs** |
| Quiz | There will be 2 quizzes as per schedule. Quizzes will be conducted on Moodle. The duration of each quiz will be 10-12 minutes with 10 questions. Each quiz will be of 10 marks. | 20% | Only for grading |
| Individual Viva Voce | It will be based on application of statistical concepts to different business situations and cases. | 20% | CLO 1 |
| Group Project | Project will involve application of course content to the primary/secondary data. They will collect the data (Primary/secondary), analyse it and prepare the report for the same. There will be stage wise submission for the project.  The Project-Report will consist of following heads:  •Table of Content  •Executive Summary  •Introduction  •Objective of the Study/Problem: Topic.  •Methodology: Data Collection  •Concept/Formula used  •Calculation/Excel Output (Excel output table included)  •Analysis & Interpretation.  •Conclusion.  •Limitations of the Study  •Data Sheet (In Annexure)  The Project will be evaluated (on the max. score=20) on the following basis:  •Project Report  •Participation.  •Peer Feedback (of other members of the Group on the Feedback Form) | 20%  Identify the relevant objectives and the information. Collect the appropriate information/data  Analyse the data as per the identified objectives.  Project Report | CLO 3 |
| End-Term Examination | It will be based on the entire course. This will consist of application-based questions, situations and /or on case study | 40% | CLO2, CLO3 |

**8. Rubrics for CLOs**

|  |  |  |  |
| --- | --- | --- | --- |
| **Criteria/Traits** | **Below Expectations**  **(Below 35%)** | **Meet Expectations**  **(35% to 70%)** | **Exceeds Expectations**  **(Above 70%)** |
| **CLO1:** Carry out exploratory data analysis | Student knows the name of the Measures of EDA | Student understands and able to explain the measures of EDA | Student is able to apply the measures of EDA and use for decision making for real business scenario |
| **CLO2:** Analyze uncertain business situations. | Student understands that probability is a measure of uncertainty | Student is able to estimate probability measures for business scenario | Student is able to visualize the uncertainty in business situations and to apply the measures for future decision making |
| **CLO3:** Apply relevant conceptual frameworks to business situations for inferences. |  |  |  |
| Gather Relevant Information and reflect on the business situation | Struggles to pinpoint the information needed. Gathers information from one source. Minimal evidence of search/selection criteria.  Unable to reflect and comprehend the business situation due to poor understanding of required information | Clearly identifies the information required. Gathers information from multiple valid and reliable sources. Evidence of search/selection criteria.  Able to reflect and understand the business situation because of the quality of information gathered and synthesized | Demonstrates a sophisticated understanding of what information is needed.  Gathers extensive information from a variety of valid and reliable sources including journals, texts, etc., specific to the subject. Clear evidence of  Search/selection criteria.  Able to reflect and have a holistic view of the business situation based on extensive information gathered from a variety of sources |
| Select and Use Relevant Concepts and Frameworks | Has limited knowledge on selecting and using relevant concepts and frameworks. Requires extensive assistance in selecting relevant concepts and  frameworks. | Selects and uses relevant concepts and frameworks. Requires minimal assistance in choosing relevant concepts and frameworks. | Selects and uses relevant concepts and frameworks. Needs no assistance in selecting relevant concepts and frameworks. |

**9. Rubrics for Assessment Tasks**

***Rubrics for Individual Viva Voce* (20 marks) *(CLO-1)***

|  |  |  |  |
| --- | --- | --- | --- |
| **Traits/Tasks** | **Below Expectations**  **(Below 35%)** | **Meet Expectations**  **(35% to 70%)** | **Exceeds Expectations**  **(Above 70%)** |
| Gather relevant information from EDA for taking business decisions | Students know the name of the Measures of EDA | Student understands and able to explain the measures of EDA | Student is able to apply the measures of EDA and use for decision making for real business scenario |

***Rubrics for Group Project (20 marks) (CLO-3)***

|  |  |  |  |
| --- | --- | --- | --- |
| **Traits/Tasks** | **Below Expectations**  **(Below 35%)** | **Meets Expectations**  **(35% to 70%)** | **Exceeds Expectation**  **(Above 70%)** |
| Gather Relevant Information | Struggles to pinpoint the information needed. Gathers information from one source. Unable to reflect and comprehend the business situation due to poor understanding of required information | Clearly identifies the information required. Gathers information from multiple valid and reliable sources. Evidence of search/selection criteria.  Able to reflect and understand the business situation because of the quality of information gathered and synthesized | Demonstrates a sophisticated understanding of what information is needed.  Gathers extensive information from a variety of valid and reliable sources including journals, texts, etc., specific to the subject. Clear evidence of  Search/selection criteria.  Able to reflect and have a holistic view of the business situation based on extensive information gathered from a variety of sources |
| Select and Use Relevant Concepts and Frameworks | Has limited knowledge on selecting and using relevant concepts and frameworks. Requires extensive assistance in selecting relevant concepts and  frameworks. | Selects and uses relevant concepts and frameworks. Requires minimal assistance in choosing relevant concepts and frameworks. | Selects and uses relevant concepts and frameworks. Needs no assistance in selecting relevant concepts and frameworks. |

***Rubrics for End Term Exam (40 marks) (CLO2 (15 marks), CLO3 (25 marks))***

|  |  |  |  |
| --- | --- | --- | --- |
| **Traits/Tasks** | **Below Expectations**  **(Below 35%)** | **Meet Expectations**  **(35% to 70%)** | **Exceeds Expectations**  **(Above 70%)** |
| Analyze uncertain business situations. | Understand that probability is a measure of uncertainty | Able to estimate probability measures for business scenario | Able to visualize the uncertainty in business situations and to apply the measures for future decision making |

|  |  |  |  |
| --- | --- | --- | --- |
| **Traits/Tasks** | **Below Expectations**  **(Below 35%)** | **Meets Expectations**  **(35% to 70%)** | **Exceeds Expectation**  **(Above 70%)** |
| **Gather Relevant Information and reflect on the business situation** | Struggles to pinpoint the information needed. Gathers information from one source. Minimal evidence of search/selection criteria.  Unable to reflect and comprehend the business situation due to poor understanding of required information | Clearly identifies the information required. Gathers information from multiple valid and reliable sources. Evidence of search/selection criteria.  Able to reflect and understand the business situation because of the quality of information gathered and synthesized | Demonstrates a sophisticated understanding of what information is needed.  Gathers extensive information from a variety of valid and reliable sources including journals, texts, etc., specific to the subject. Clear evidence of  Search/selection criteria.  Able to reflect and have a holistic view of the business situation based on extensive information gathered from a variety of sources |
| **Select and Use Relevant Concepts and Frameworks** | Has limited knowledge on selecting and using relevant concepts and frameworks. Requires extensive assistance in selecting relevant concepts and  frameworks. | Selects and uses relevant concepts and frameworks. Requires minimal assistance in choosing relevant concepts and frameworks. | Selects and uses relevant concepts and frameworks. Needs no assistance in selecting relevant concepts and frameworks. |

**10. Time Budgeting in Course Planning**

Please note that while assigning activities and planning teaching schedules following table may be of help. The weightage of items in the table is prescriptive and may vary according to course requirement. Yet it is indicative of how student time per course can be budgeted:

|  |  |  |
| --- | --- | --- |
| Activity | Description | Time Budgeted |
| Classes | 2-3 hours per week for 12 weeks | 30 hours |
| Reading | Prescribed readings and making notes | 20 hours |
| Preparation of set questions, exercises and problems | Including shared and group exercises | 30 hours |
| Preparation of assignment | Reading and writing | 15 hours |
| Study and revision for test and centralized examination | Self-preparations | 20 hours |
| **TOTAL** |  | 115 hours |

**11. Instructions**

Students will be expected to maintain a daily log of their learning and make an action plan. The continuous evaluation tools would be implemented as per schedule and collected for evaluation.

Students are encouraged to visit videos available on Impartus, you tube on TED talks, and readings available at websites like course era, etc.

**Academic Conduct**

**Institute’s Policy Statements**

It is the responsibility of every student to be aware of the requirements for this course, and understand the specific details included in this document. It is emphasized that this course requires a significant commitment outside of formal class contact.  The learning tasks in this course may include classes (lectures or seminars), required reading, the preparation of answers to set questions, exercises and problems, and self-study. In addition, students may be required to complete an assignment, test or examination.

**LMS-Moodle/Impartus:**

LMS-Moodle/Impartus is used to host course resources for all courses. Students can download lecture, additional reading materials, and tutorial notes to support class participation.

**Late Submission**

Assessment tasks submitted after the due date, without prior approval/arrangement, will be not be accepted. Requests for extension of time must be made with the faculty member concerned and based on Special Consideration guidelines.

**Plagiarism**:

Plagiarism is looked at as the presentation of the expressed thought or work of another person as though it is one's own without properly acknowledging that person.

Cases of plagiarism will be dealt with according to Plagiarism Policy of the institute. It is advisable that students should read the Student Handbook for detailed guidelines. It is also advisable that students must not allow other students to copy their work and must take care to safeguard against this happening. In cases of copying, normally all students involved will be penalized equally; an exception will be if the student can demonstrate the work is their own and they took reasonable care to safeguard against copying.