



**JAIPURIA INSTITUTE OF MANAGEMENT
PGDM; TRIMESTER II; ACADEMIC YEAR 2018-19**

Course Code and title	OM-101: Statistics for Management
Credits	3
Term and Year	I Term, 2019-20
Course Pre-requisite(s)	Knowledge of Descriptive Statistics
Course Requirement(s)	Working knowledge of Excel
Course Schedule (day and time of class)	
Classroom # (Location)	
Course Instructor	
Course Instructor Email	
Course Instructor Phone (Office)	
Student Consultation Hours	
Office location	

1. Course Overview

OM-101 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. Graduate Attributes (GAs), Key Differentiators (KDs), Programme Learning Outcomes (PLOs), and CLOs

Graduate Attributes (GAs)

- GA 1: Self-initiative
- GA 2: Deep Discipline knowledge
- GA 3: Critical Thinking and Problem Solving
- GA 4: Humanity, Team-Building and Leadership Skills
- GA 5: Open and Clear Communication
- GA 6: Global Outlook
- GA 7: Ethical Competency and Sustainable Mindset
- GA 8: Entrepreneurial and Innovative

Key Differentiators

KD 1: Entrepreneurial Mindset
KD 2: Critical Thinking
KD 3: Sustainable Mindset
KD 4: Team-Player

Programme Learning Outcomes (PLOs)

The graduates of PGDM at the end of the programme will be able to:

PLO 1: Communicate effectively and display inter-personnel skills
PLO 2: Demonstrate Leadership and Teamwork towards achievement of organizational goals
PLO 3: Apply relevant conceptual frameworks for effective decision-making
PLO 4: Develop an entrepreneurial mind set for optimal business solutions
PLO 5: Evaluate the relationship between business environment and organizations
PLO 6: Demonstrate sustainable and ethical business practices
PLO 7: Leverage technologies for business decisions
PLO 8: Demonstrate capability as an Independent learner

Course Learning Outcomes (CLO)

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

CLO1: Perform exploratory data analysis.
CLO2: Calculate probability-estimates to represent uncertainty.
CLO3: Apply sample(s) data to infer about the population.
CLO4: Estimate linear relationship between two or more variables for future projections.

3. Mappings

Mapping of CLOs with GAs

	GA 1	GA 2	GA 3	GA 4	GA 5	GA 6	GA 7	GA 8
CLO 1			X					
CLO 2			X					
CLO 3			X					
CLO 4			X					

Mapping of CLOs with KDs

	KD 1 (Entrepreneurial Mindset)	KD 2 (Critical Thinking)	KD 3 (Sustainability)	KD 4 (Team Player)
CLO 1		X		

CLO 2		X		
CLO 3		X		
CLO 4		X		

Mapping of CLOs with PLOs

	PLO-1	PLO-2	PLO-3	PLO-4	PLO-5	PLO 6	PLO-7	PLO-8
CLO1			Medium					
CLO2			Low					
CLO3			High					
CLO4			Medium					

4. Prescribed VED framework

Module	Vital (prerequisite or basic knowledge or skills)	Essential (Non-imperative yet significant)	Desirable (adds substance, breadth, or interest to a subject or skill)
Descriptive Statistics	<ul style="list-style-type: none"> • Exploratory Data Analysis • Measures of Central Tendency • Coefficient of Dispersion 	<ul style="list-style-type: none"> • Presenting the Data • Coefficient of Variation • Skewness • Five-Point Summary 	<ul style="list-style-type: none"> • Kurtosis • Box-Plot and Stem & Leaf
Probability & Probability Distributions	<ul style="list-style-type: none"> • Introduction and applications of probability • Normal Distribution • Standard Normal Distribution 	<ul style="list-style-type: none"> • Probabilities under the conditions of independence • Law of Addition • Probabilities under the conditions of dependence • Conditional, Joint and Total probability • Expected Value & Applications 	<ul style="list-style-type: none"> • Different approaches towards probability • Bayes Theorem • Random Variables • Binomial & Poisson Distribution
Inferential statistics	<ul style="list-style-type: none"> • Sampling: Concept • Concept of Estimation • Point and interval estimation • Significance Testing-Introduction • Setting up the hypothesis. • p-value 	<ul style="list-style-type: none"> • Sampling Techniques: Random Sampling • Estimation-How to estimate mean of a population from the sample • Sample size Estimation • Five-steps testing procedure • One Sample Test: Testing of mean for population • t-test 	<ul style="list-style-type: none"> • Sampling distribution • Use of standard error • Types of errors • Conceptual basis to significance testing • Parametric & Non-Parametric Testing • One Sample Test: Testing of proportion for population • Testing Difference of Proportions

		<ul style="list-style-type: none"> Two Samples Test: Testing differences between two population-means (Large & small samples) Paired t test ANOVA 	
Linear Regression and Correlation	<ul style="list-style-type: none"> Identify the independent & dependent variables Regression model-to analyze relationship between variables 	<ul style="list-style-type: none"> Estimating Multiple regression models Concept of R-square/Adjusted R-square Examining significance of predictors 	<ul style="list-style-type: none"> Bi-variate Regression model To estimate the relationship between two variables Regression Analysis vs Cause & Effect relationship

	Pre-class
	In-class
	Beyond class

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.

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.indiadata.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/>

<http://home.ubalt.edu/ntsbarsh/business-stat/opre504.htm>

6. Session Plan

Session	Topic/ Sub Topic	Reading Reference	Pedagogy	Session Learning Outcomes	CLO
Module I: Descriptive Statistics					
1	<ul style="list-style-type: none"> Review and Applications of Descriptive Statistics Tools for Decision Making (Review and assimilation of Remedial Classes) 	Text, Chpt: 3 Page: 74-135	Case: Academic performance, Discussion	Using Summary Statistics to describe the data have exploratory analysis of data	CLO1
Module II: Probability & Probability Distributions					
2	<ul style="list-style-type: none"> 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
3	<ul style="list-style-type: none"> 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
4	<ul style="list-style-type: none"> 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
5	<ul style="list-style-type: none"> 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
6	<ul style="list-style-type: none"> Binomial & Poisson Distribution 	Text, Chpt: 5 Page: 225-246	Caselets, Problem Solving	To apply Binomial & Poisson Distribution to estimate Probability	CLO2
7	<ul style="list-style-type: none"> 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					
8	<ul style="list-style-type: none"> Sampling: Concept Sampling Techniques: Random Sampling 	Text, Chpt: 6 Page: 278-288	Guest Session	To make students understand the role of sampling in decision making	CLO3

9	<ul style="list-style-type: none"> • Sampling distribution • Use of standard error 	Text, Chpt: 6 Page: 296-304	Discussion Caselets	To make students understand the role of sampling in decision making	CLO2, CLO3
10	<ul style="list-style-type: none"> • Concept of Estimation • Point Estimation • Interval estimation of Mean and Proportion 	Text, Chpt: 7 Page: 328-348	Caselets Solving by MS Excel	To make students learn how to estimate certain characteristics of a population from the sample	CLO3
11	<ul style="list-style-type: none"> • Sample size Estimation 	Text, Chpt: 7 Page: 364-369	Problem Solving	To make students understand the importance of appropriate sample size and how to estimate	CLO3
12	<ul style="list-style-type: none"> • 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
13	<ul style="list-style-type: none"> • 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
14	<ul style="list-style-type: none"> • 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
15	<ul style="list-style-type: none"> • 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
16	<ul style="list-style-type: none"> • 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
17	<ul style="list-style-type: none"> • 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

18	<ul style="list-style-type: none"> 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
19	<ul style="list-style-type: none"> 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					
20	<ul style="list-style-type: none"> Regression model-to analyze relationship between variables 	Text, Chpt: 12 Page: 610-640	Guest Session	To enable students to visualize the relationship between variables	CLO4
21	<ul style="list-style-type: none"> Bi-variate Regression model: Concept To estimate the relationship between two variables 	Text, Chpt: 12 Page: 641-663	Case –Omni : Discussion & Solving by MS Excel	To enable the students to estimate the relationship between two variable and take decision based on them	CLO4
22	<ul style="list-style-type: none"> Estimating Multiple regression models Assumptions of CLRM 	Text, Chpt: 13 Page: 678-699	Discussion	To examine decision making situation where there are more than one independent variable and	CLO4
23	<ul style="list-style-type: none"> Concept of R-square/Adjusted R-square Examining significance of predictors 	Text, Chpt: 13 Page: 678-699	Case – Pampers : Discussion & Solving by MS Excel	To estimate the strength of relationship and examining the significance of predictors	CLO3, CLO4
24	<ul style="list-style-type: none"> Review and assimilation of the entire course Summing up the learning and briefing them about the future analytical courses 	--	Discussion & Review	Review & Assimilation	CIO1-4

7. Assessment Tasks

Assessment Component	Description	Weightage	CLOs
Quiz	There will be 3 quizzes as per schedule. Quizzes will be conducted on Moodle/Pen-Paper. The duration of each quiz will be 10-15 minutes with 10 questions. Each quiz will be of 10 marks. Quiz 1 will be based on CLO1, Quiz 2 on CLO 2, and Quiz 3 on CLO3.	20%	CLO1, CLO2, CLO3
Group Project	<p>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.</p> <p>The Project-Report will consist of following heads:</p> <ul style="list-style-type: none"> •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) <p>The Project will be evaluated (on the max. score=20) on the following basis:</p> <ul style="list-style-type: none"> •Project Report •Participation. •Peer Feedback (of other members of the Group on the Feedback Form) 	20%	CLO3, CLO4
Mid-Term Examination	It will be based on the first half of the course. This will consist of application-based questions, situations and /or on case study	20%	CLO1, CLO2
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, CLO4

8. Rubrics for Assessment Tasks

RUBRICS for Quiz (20%)

Criteria	Unsatisfactory (Below 35%)	Satisfactory (35%- below 70%)	Good (70% and above)
Clarity of Concepts	Only up to 35% answers are correct. Most of the concepts are not clear and student is unable to understand the same.	35%-70% answers are correct. Many of the concepts are clear and understood by student.	70% and above answers are correct. Majority of concepts are clear and understood by student.

RUBRICS for Mid Term Exam (20%) and End Term Exam (40%)

Criteria	Unsatisfactory (Below 35%)	Satisfactory (35%- below 70%)	Good (70% and above)
Clarity of Concepts and ability to apply them to take business decisions	Only up to 35% answers are correct. Most of the concepts are not clear and student is unable to understand the same.	35% - 70% answers are correct. Many of the concepts are clear and understood by student and student is able to solve the problems given and provide answer in business language	70% and above answers are correct. Majority of concepts are clear and understood by student and student provides answers in correct business language and is able to indicate additional information required for better decision making

RUBRICS for Group Project (20%)

Criteria	Unsatisfactory (Below 35%)	Satisfactory (35%- below 70%)	Good (70% and above)
Identify the relevant objectives and the information <i>(25%)</i>	Objectives inadequately defined Incomplete information identified	Objectives defined but some finer points missing Information identified up to average extent	Objectives well defined Relevant appropriate information identified
Collect the appropriate information/data <i>(25%)</i>	Inadequate information collection	Average information collection	Adequate (directly and indirectly related) information collection

Analyse the data as per the identified objectives <i>(25%)</i>	No analysis only presenting the data	Basic analysis performed	Complete and appropriate Data Analysis Able to use Interpretation for decision making
Project Report <i>(25%)</i>	Language is poor Defined format is missing Reference is inadequate Table of index is absent Formatting is poor Results & Interpretations not there	Language is average Format is followed References is somewhat adequate Occasionally format is not good Results with average interpretation	Is adequately Impressive Format is followed Proper referencing Results, interpretation, conclusion, limitations, suggestions for future research are there

9. 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	15 hours
Preparation of set questions, exercises and problems	Including shared and group exercises	30 hours
Preparation of assignment	Reading and writing	10 hours
Study and revision for test and centralized examination	Self-preparations	20 hours
TOTAL		105 hours

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.

10. 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.