



**JINDAL GLOBAL  
BUSINESS SCHOOL**  
INDIA'S FIRST MULTI-DISCIPLINARY GLOBAL BUSINESS SCHOOL



**O.P. Jindal Global University**  
*A Private University Promoting Public Service*  
**NAAC Accreditation - 'A' Grade**

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Jindal Global Business School  
*Course Outline*

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Course Title	Operations Research
Core or Elective	Elective
Program and Batch	BBA-24, BBA-BA-24, BBA-FB-24, BBA-FM-24
Semester & Academic Year	Fall 2026
Credits	3
Discipline/Area	Operations Management & Supply Chain
Name of the Faculty Member/Course Instructor	Dr. Sachin Yadav
Contact Details of the Faculty Member	<a href="mailto:sachin.yadav@jgu.edu.in">sachin.yadav@jgu.edu.in</a>
Contact Details of Support Staff	<a href="mailto:jgbs-ec@jgu.edu.in">jgbs-ec@jgu.edu.in</a>
Faculty Member's Open Office Day/s & Time	TBA

### **Introduction to the Course**

Operations Research is an essential academic discipline that provides UG-students with a comprehensive set of decision-making tools and methodologies aimed at maximising the efficiency and effectiveness of complex business processes. This course offers an introductory overview of OR including its methodology and their practical applications within real-world corporate contexts. The curriculum will include essential OR principles and applications, problem-solving methodologies, and the pragmatic use of mathematical models to enhance operational efficiency and facilitate well-informed decision-making.

### **Course Learning Objectives**

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

1. CLO1-Understand the fundamental concepts and techniques of Operations Research.
2. CLO2-Apply OR techniques to analyse and solve real-world business problems.
3. CLO3- Develop critical thinking and analytical skills through hands-on activities

### **Programme Competency Goals**

BBA Programme Competency Goals (PCGs)		BBA Programme Learning Objectives (PLOs)	
		Students will be able to	
1	<b>Responsible Global Citizenship:</b> Ability to understand the interplay between local and global issues and to act with sensitivity towards ethical and social issues	1. Understand Local business issues	
		2. Understand Global business issues	
		3. Demonstrate sensitivity towards ethical issues	
		4. Demonstrate sensitivity towards social issues	
2	<b>Effective communication:</b> Ability to effectively exchange ideas and information	5. Present their ideas with clarity	
		6. Write in a coherent manner	
		7. Use technology for communication	
3	<b>Critical Thinking:</b> Ability to identify, analyze business problems and propose effective solutions.	8. Identify main issues of business problems	
		9. Examine information from different sources	
		10. Draw inferences from analysis	
4	<b>Teamwork:</b> Ability to work and contribute effectively in group-settings	11. Understand the factors to work effectively in groups	
		12. Contribute effectively in groups	

#### PLO-PCG Assessments Mapping Matrix

Program Learning Objectives (PLOs)	Program Competency Goals (PCGs)	Course Assessment Item
This course helps you to develop the following Program Learning Outcomes:	This course helps you to develop the following Program Competency Goals:	This learning outcome will be assessed in the following items
PLO8, PLO9, PLO10	PCG3	A1, A2, A3, A4
PLO11, PLO12	PCG4	A2

#### Evaluation Schema

The course grade will be determined based on:

Assessment Task	Weightage (Percentage)	Nature (Individual/Group)	Week of Assessment	PLOs to be Assessed
A1: Class Participation	10%	Individual	In all classes, week 1-15	PLO8, PLO9, PLO10
A2: Case Study/Project Presentation	20%	Group	Week 12-14	PLO8, PLO9, PLO10, PLO11, PLO12
A3: Mid Term	20%	Individual	Week 10-12	PLO8, PLO9, PLO10
A4: Reflection Reports	20%	Individual	In the mid-term week	PLO8, PLO9, PLO10
A4: End Term Examination	30%	Individual	In the JGU examination period/week	PLO8, PLO9, PLO10

#### Description of Assessments:

**A1- Class participation (10%)**- You are expected to interact with the faculty to resemble the concept of understanding through question and answer and discussion. This assessment emphasises continuous student involvement and consistency, as well as the quality of their contributions in terms of logical and technical ability and their willingness to collaborate in a dynamic, situation-based learning environment.

**A2- Case Study/Project presentation (20%)**- You are expected to carefully analyse a case study and present your findings in a PowerPoint format. The presentation must include thorough problem identification, analysis, and a recommendation (probable solution and action plan).

**A3- Mid term (20%)**- The midterm examination will be of 20 marks with a maximum duration of 90 minutes duration. This will be a pen and paper invigilated exam held on the JGU campus.

**A4- Reflection Reports (20%)**- After selecting realistic disrupted supply chain games and activities, students will submit short reflective reports capturing insights, key learning, and links to QMM concepts and their theories. The focus is on critical thinking, identifying sensitive issues (e.g., Profit, losses, path optimisation, transportation & operational time and cost, trade-offs), and connecting experiential outcomes with global, ethical, and sustainability issues.

**A5- End Term Examination (30%)**- The end term examination will be of **30 marks of 1.5 hours duration**. This will be an invigilated exam according to the mode, modalities and process as decided by CoE.

#### Rubrics for Assessments

Criteria	Exceeds Expectations	Meets Expectations	Below Expectations

Content	The assignment demonstrates exceptional knowledge and understanding of the subject matter. The content is thorough, well-organized, and insightful.	The assignment demonstrates a good understanding of the subject matter. The content is well-organized and presents relevant information.	The assignment demonstrates limited understanding of the subject matter. The content is disorganized and presents incomplete or inaccurate information.
Analysis	The assignment provides insightful and original analysis of the topic, using relevant examples and evidence to support arguments.	The assignment provides a good analysis of the topic, using some examples and evidence to support arguments.	The assignment provides limited or no analysis of the topic, with little or no use of examples or evidence.
Presentation	The assignment is well-presented, with clear and concise writing, appropriate use of visuals, and effective use of referencing and citation.	The assignment is adequately presented, with clear writing, appropriate use of visuals, and adequate referencing and citation.	The assignment is poorly presented, with unclear writing, inadequate use of visuals, and insufficient referencing and citation.
Research	The assignment demonstrates extensive research, using a variety of high-quality sources to support arguments.	The assignment demonstrates some research, using a mix of sources to support arguments.	The assignment demonstrates limited research, using few or unreliable sources to support arguments.
Overall	The assignment exceeds expectations in all areas and demonstrates exceptional work.	The assignment meets expectations in most areas and demonstrates good work.	The assignment falls short of expectations in most areas and demonstrates inadequate work.

### Presentation Rubric

Criteria	Exceeds Expectations	Meets Expectations	Below Expectations
Content	The presentation demonstrates exceptional knowledge and understanding of the subject matter. The content is thorough, well-organized, and insightful.	The presentation demonstrates a good understanding of the subject matter. The content is well-organized and presents relevant information.	The presentation demonstrates limited understanding of the subject matter. The content is disorganized and presents incomplete or inaccurate information.
Delivery	The presentation is engaging and dynamic, with clear and confident delivery, appropriate use of body language, and effective use of visual aids.	The presentation is engaging, with clear delivery, appropriate use of body language, and adequate use of visual aids.	The presentation is dull or unengaging, with unclear delivery, inappropriate use of body language, and insufficient use of visual aids.

Time Management	The presentation is well-timed and covers all relevant topics within the allotted time.	The presentation is adequately timed and covers most relevant topics within the allotted time.	The presentation is poorly timed and fails to cover relevant topics within the allotted time.
Interaction	The presentation encourages interaction and engagement with the audience, using appropriate questioning and responding effectively to audience feedback.	The presentation attempts to engage the audience, but with limited success in encouraging interaction or responding to audience feedback.	The presentation does not attempt to engage the audience or respond to audience feedback.
Overall	The presentation exceeds expectations in all areas and demonstrates exceptional work.	The presentation meets expectations in most areas and demonstrates good work.	The presentation falls short of expectations in most areas and demonstrates inadequate work.

### Teaching Method

The class will consist of a well-balanced combination of lectures, stories, case studies and hypothetical scenarios. The student will be responsible for their education in this setting, and the faculty will be a facilitator. Instead of studying "what to do," we will utilise the cases as instances of real-world events where concerns develop, and both good and poor practices are shown. This will replace the traditional method of learning "what to do." The key to effective learning in this manner is to observe a large number of instances and situations, as well as to acquire both inductive and deductive approaches from the diverse experiences of students and managers.

### Textbook / Other Readings

#### Textbook:

1. Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.
2. Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw-Hill
3. Wagner, H.M., "Principles of Operations Research", 2na Edition, PHI
4. Sharma, J. K., "Operations Research Theory and Applications", 4th 2009 Edition, Macmillan

### Session Plan

Session Details	Topics	PLOs Covered
<b>Session 1</b>	Introduction & History	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of operations research	
Subtopics to be covered	Learn about types of Linear/Non-Linear Programming model	
Readings	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw-Hill	

Case Title & Number	-	
Pedagogy	Lecture and case study	
<b>Session 2</b>		
Objective of the session	Introduction to Linear Programming	PLO8, PLO9, PLO10
Subtopics to be covered	To provide an overview of variables, parameters, Linear programming, and conditions in the linear model	
Readings	Learn about Formulation, Graphical Method, feasible, infeasibility, infinite Solutions, etc.	
Case Title & Number	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Pedagogy	-	
<b>Session 3</b>		
Objective of the session	Introduction to Simplex Algorithm	PLO8, PLO9, PLO10
Subtopics to be covered	To provide an overview of the Simplex method and various conditions	
Readings	Learn about Formulation, Simplex method, feasibility, infeasibility, etc.	
Case Title & Number	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw: Hill	
Pedagogy	Lecture	
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<b>Session 4</b>		
Objective of the session	Duality and Post-optimal Analysis	PLO8, PLO9, PLO10
Subtopics to be covered	To provide an overview of Duality and Post-optimal Analysis	
Readings	Learn about formulation, economic interpretation, and managerial significance.	
Case Title & Number	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw: Hill	
Pedagogy	Lecture and case study	
<b>Session 5</b>		
Objective of the session	Goal Programming	PLO8, PLO9, PLO10
Subtopics to be covered	To provide an overview of Goal Programming	
Readings	Learn about the weight method& priority method	
Case Title & Number	Taha, H. A., Natrajan, A.M., Balasubramanie, P. and Tamilarasi, A., "Operations Research", 8th Edition, Pearson Prentice Hall.	
Pedagogy	-	
<b>Session 6</b>		
Objective of the session	Introduction to Solver	PLO8, PLO9, PLO10
Subtopics to be covered	To acquaint the students with Solver	
	Learn how to solve business problems (discussed in sessions 1-5) using computer software.	

	Hands-on practice with numerical-based problems.	
Readings	Not Applicable	
Case Title & Number	Not Applicable	
Pedagogy	Discussion, problem solving and demonstration	
<b>Session 7</b>	Assignment Problem	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Assignment models	
Subtopics to be covered	Learn about balanced & Unbalanced, Degeneracy & solution using solver, Hungarian method.	
Readings	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw·Hill	
Case Title & Number	-	
Pedagogy	Classroom teaching	
<b>Session 8</b>	Transportation models	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Transportation models	
Subtopics to be covered	Learn about degeneracy, balanced & unbalanced Transportation problems & solutions using solver.	
Readings	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw·Hill	
Case Title & Number	-	
Pedagogy	Classroom teaching	
<b>Session 9</b>	Assignment & Transportation models	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Transportation models	
Subtopics to be covered	Learn about LP formulation	
Readings	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw·Hill	
Case Title & Number	-	
Pedagogy	Classroom teaching	
<b>Session 10</b>	Practice on Solver & LINGO 19.0	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of dealing basic business problems using Solver & LINGO 19.0/PYTHON	
Subtopics to be covered	Learn about writing style in Solver, LINGO/Python Software.	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Discussion, problem solving and demonstration	
<b>Session 11</b>	Game Theory-I	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Game Theory	
Subtopics to be covered	Learn about Optimal solutions to Pure & mixed strategy games	

Readings	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw-Hill	
Case Title & Number	-	
Pedagogy	Classroom teaching	
<b>Session 12</b>		
Game Theory-II		PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Game Theory	
Subtopics to be covered	Learn about Optimal solutions to Graphical method	
Readings	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw-Hill	
Case Title & Number	-	
Pedagogy	Classroom teaching	
<b>Session 13</b>		
<b>Guest Lecture-1: Mr. Ashutosh Mishra, Data Scientist, Operation research, Bayer, Bengaluru</b>		PLO8, PLO9, PLO10
Objective of the session	To offer a practical understanding of operations research with respect to business.	
Subtopics to be covered	Discussion around operations research in the industry.	
Readings	-	
Case Title & Number	-	
Pedagogy	Online Session	
<b>Session 14</b>		
Decision Theory-I		PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Decision Theory	
Subtopics to be covered	Learn about Decision-making under Uncertainty	
Readings	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw-Hill	
Case Title & Number	-	
Pedagogy	Classroom teaching	
<b>Session 15</b>		
Decision Theory-II		PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Decision Theory	
Subtopics to be covered	Learn about Decision-making under Risk, Decision Tree	
Readings	Hillier, F.S. and Lieberman, G.J., "Introduction to Operations Research" 2009 8th Edition, Tata McGraw-Hill	
Case Title & Number	-	
Pedagogy	Classroom teaching	
<b>Session 16</b>		
Basic business problems using Python		PLO8, PLO9, PLO10
Objective of the session	To provide an overview of dealing basic business problems using Solver & Python	
Subtopics to be covered	Learn about writing style in Solver, LINGO/Python Software.	

Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Discussion, problem solving and demonstration	
<b>Session 17</b>	Network Model	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Network models	
Subtopics to be covered	Learn about maximum Flow, minimal span tree, shortest route methods & their LP formulation	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Lecture	
<b>Session 17</b>	Network Model-PERT	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of PERT models	
Subtopics to be covered	Learn about PERT methods, critical path & its diagram	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Lecture	
<b>Session 18</b>	Network Model-CPM I	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of CPM models	
Subtopics to be covered	Learn about Activity on Nodes, Activity on Arrow, Cost calculation, Critical Path, etc.	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie, P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Lecture	
<b>Session 19</b>	Network Model- CPM II	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Crashing	
Subtopics to be covered	Learn about Crashing & Path optimisation	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	

Pedagogy	Lecture	
<b>Session 20</b>	Queuing Theory-I	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Queuing Theory-I	
Subtopics to be covered	Learn about Costs related with queuing models-I	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Lecture and case study	
<b>Session 21</b>	Queuing Theory-II	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Queuing Theory-II	
Subtopics to be covered	Learn about Cost related with queuing models-II	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Lecture and case study	
<b>Session 22</b>	Solving Basic business problems using CPLEX	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of dealing basic business problems using Solver / R Software/CPLEX/PYTHON	
Subtopics to be covered	Learn about writing style in Solver, LINGO/Python Software.	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Discussion, problem solving and demonstration	
<b>Session 23</b>	<b>Guest Lecture-2: Mr. Anurag Vaishya, Manager, Numeros Motors, Bengaluru</b>	PLO8, PLO9, PLO10
Objective of the session	To offer a practical understanding of operations research with respect to business.	
Subtopics to be covered	Discussion around operations research in the industry.	
Readings	-	
Case Title & Number	-	
Pedagogy	Online Session	
<b>Session 24</b>	Queuing Theory-III	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Queuing Theory-III	

Subtopics to be covered	Learn about Cost related with queuing models-III	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Lecture and case study	
<b>Session 25</b>	Queuing Theory-IV	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Queuing Theory-IV	
Subtopics to be covered	Learn about Cost related with queuing models-IV	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Lecture and case study	
<b>Session 26</b>	Simulation	PLO8, PLO9, PLO10
Objective of the session	To provide an overview of Simulation	
Subtopics to be covered	Learn about Monte Carlo simulation, random numbers, application in queuing	
Readings	Taha, H. A., Natrajan, A.M., Balasubramanie,P. and Tamilarasi, A. ,"Operations Research", 8th Edition, Pearson Prentice Hall.	
Case Title & Number	-	
Pedagogy	Lecture and case study	
<b>Session 27</b>	Case Project-based presentation for assessment	PLO8, PLO9, PLO10, PLO11, PLO12
Objective of the session	To assess the understanding of students for the subject and how they have implemented that understanding in the form of a project.	
Subtopics to be covered	-	
Readings	-	
Case Title & Number	-	
Pedagogy	-	
<b>Session 28</b>	Case Project-based presentation for assessment	PLO8, PLO9, PLO10, PLO11, PLO12
Objective of the session	To assess the understanding of students for the subject and how they have implemented that understanding in the form of a project.	
Subtopics to be covered	-	
Readings	-	
Case Title & Number	-	
Pedagogy	-	

<b>Session 29</b>	Reading & Revision Week/ Examination Week*	
Objective of the session	NA	
Subtopics to be covered	NA	
Readings	NA	
Case Title & Number	NA	
Pedagogy	NA	
<b>Session 30</b>	Reading & Revision Week/ Examination Week*	
Objective of the session	NA	
Subtopics to be covered	NA	
Readings	NA	
Case Title & Number	NA	
Pedagogy	NA	

\*Elective Endterm Examinations may take place in the last week of classes.

### **Disability Support**

JGU endeavours to make all its courses accessible to students. The Disability Support Committee (DSC) has identified conditions that could hinder a student's overall wellbeing. These include physical and mobility-related difficulties, visual impairment, hearing impairment, mental health conditions, and intellectual/learning difficulties, e.g., dyslexia and dyscalculia. Students with any known disability needing academic and other support are required to register with the Disability Support Committee (DSC) by following the procedure specified at <https://jgu.edu.in/disability-support-committee/>

Students who need support may register any time during the semester up until a month before the end semester exam begins. Those students who wish to continue receiving support from the previous semester, must re-register within the first month of a semester. Last-minute registrations and support might not be possible as sufficient time is required to make the arrangements for support.

The DSC maintains strict confidentiality about the identity of the student and the nature of their disability and the same is requested from faculty members and staff as well. The DSC takes a strong stance against in-class and out-of-class references made about a student's disability without their consent and disrespectful comments referring to a student's disability.

All general queries are to be addressed to [disabilitysupportcommittee@jgu.edu.in](mailto:disabilitysupportcommittee@jgu.edu.in)

***Disclaimer: This course outline including assessments, mode, nature and weightage of assessments, sessions, sequence of sessions and/or readings may be revised during the semester if such need arises.***