Lovely Professional University, Punjab

Course Code	Course Title	Lectures	Tutorials	Practicals	Credits	
INT350	DATA VISUALISATION	2	0	3	4	
Course Weightage	ATT: 5 CA: 25 MTT: 20 ETT: 50					
Course Focus	EMPLOYABILITY,SKILL DEVELOPMENT					

Course Outcomes :Through this course students should be able to

CO1 :: understand the basic concepts of database design.

CO2 :: determine the data modelling techniques and apply their use on databases

CO3 :: apply the best practices used in SQL

CO4 :: demonstrate the python concepts to visualize the data

CO5 :: understand and apply the basic functions of tableau on the data

CO6 :: analyze the data using dashboards and apply advanced tableau functions

	Reference Books (R)		
Sr No	**Title**	**Author**	**Publisher Name**
R-1	SQL FOR DATA ANALYSIS: ADVANCED TECHNIQUES FOR TRANSFORMING DATA INTO INSIGHTS	CATHY TANIMURA	SHROFF/O'REILLY
R-2	SQL COOKBOOK	ANTHONY MOLINARO	SHROFF/O'REILLY
R-3	HANDS-ON DATA VISUALIZATION: INTERACTIVE STORYTELLING FROM SPREADSHEETS TO CODE	JACK DOUGHERTY	SHROFF/O'REILLY

LTP week distribution: (LTP Weeks)	
Weeks before MTE	
Weeks After MTE	
Spill Over (Lecture)	

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Detailed Plan For Lectures

Week Number	Lecture Number	Broad Topic(Sub Topic)	Chapters/Sections of Text/reference books	Other Readings, Relevant Websites, Audio Visual Aids, software and Virtual Labs	Lecture Description	Learning Outcomes	Pedagogical Tool Demonstration/ Case Study / Images / animation / ppt etc. Planned	Live Examples
Week 1	Lecture 1	Database design and introduction to MySQL(Data warehouse)	R-2 R-3		The lecture will discuss about the design aspects of business databases	Student will be able to learn database design of warehouse and RDBMS	Discussion based on real time examples	
		Database design and introduction to MySQL (ERD)	R-2 R-3		The lecture will discuss about the design aspects of business databases	Student will be able to learn database design of warehouse and RDBMS	Discussion based on real time examples	
		Database design and introduction to MySQL(star and snowflake schemas)	R-2 R-3		The lecture will discuss about the design aspects of business databases	Student will be able to learn database design of warehouse and RDBMS	Discussion based on real time examples	
		Database design and introduction to MySQL (OLAP vs OLTP)	R-2 R-3		The lecture will discuss about the design aspects of business databases	Student will be able to learn database design of warehouse and RDBMS	Discussion based on real time examples	
	Lecture 2	Database design and introduction to MySQL (entity constraints)	R-2 R-3		The lecture will discuss about the database constraints	Student will be able to learn database constraints	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (referential constraints)	R-2 R-3		The lecture will discuss about the database constraints	Student will be able to learn database constraints	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (semantic constraints)	R-2 R-3		The lecture will discuss about the database constraints	Student will be able to learn database constraints	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (comprehension: ERD)	R-2 R-3		The lecture will discuss about the database constraints	Student will be able to learn database constraints	Discussion and demonstration of SQL queries based on real time examples	

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Week 1	Lecture 2	Database design and introduction to MySQL (introduction to SQL)	R-2 R-3		The lecture will discuss about the database constraints	Student will be able to learn database constraints	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (DDL statements)	R-2 R-3		The lecture will discuss about the database constraints	Student will be able to learn database constraints	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (DML statements)	R-2 R-3		The lecture will discuss about the database constraints	Student will be able to learn database constraints	Discussion and demonstration of SQL queries based on real time examples	
Week 2	Lecture 3	Database design and introduction to MySQL(SQL basic statements and operators)	R-1 R-2		The lecture will discuss about the SQL basic statements and operators and regular expressions	Student will be able to learn the the SQL basic statements and operators and regular expression	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (aggregate and inbuilt functions)	R-1 R-2		The lecture will discuss about the SQL basic statements and operators and regular expressions	Student will be able to learn the the SQL basic statements and operators and regular expression	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (string and date-time functions and ordering)	R-1 R-2		The lecture will discuss about the SQL basic statements and operators and regular expressions	Student will be able to learn the the SQL basic statements and operators and regular expression	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (regular expressions)	R-1 R-2		The lecture will discuss about the SQL basic statements and operators and regular expressions	Student will be able to learn the the SQL basic statements and operators and regular expression	Discussion and demonstration of SQL queries based on real time examples	
	Lecture 4	Database design and introduction to MySQL (nested queries)	R-1 R-2		The lecture will discuss about the nested queries and joins	Student will be able to learn the nested queries and joins	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (views)	R-1 R-2		The lecture will discuss about the nested queries and joins	Student will be able to learn the nested queries and joins	Discussion and demonstration of SQL queries based on real time examples	

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Week 2	Lecture 4	Database design and introduction to MySQL (venn diagrams and inner and outer joins, left and right join, cross join join)	R-1 R-2		The lecture will discuss about the nested queries and joins	Student will be able to learn the nested queries and joins	Discussion and demonstration of SQL queries based on real time examples	
		Database design and introduction to MySQL (views with join, intersect, minus, union and union all)	R-1 R-2		The lecture will discuss about the nested queries and joins	Student will be able to learn the nested queries and joins	Discussion and demonstration of SQL queries based on real time examples	
Week 3	Lecture 5	Data modelling(introduction to data modelling)	R-2 R-3		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
		Data modelling(a data model vs a floor model)	R-2 R-3		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
		Data modelling(database design - creation - manipulation cycle)	R-2 R-3		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
		Data modelling(relational schemas)	R-2 R-3		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
	Lecture 6	Data modelling(relational vs non-relational schemas)	R-2 R-3		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
		Data modelling(database design)	R-2 R-3		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
		Data modelling(DDL statements syntax)	R-2 R-3		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
Week 4	Lecture 7	Data modelling(database creation)	R-1 R-2		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
		Data modelling(DML statements syntax)	R-1 R-2		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
	Lecture 8	Data modelling(database manipulation)	R-1 R-2		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	
		Data modelling(database querying)	R-1 R-2		The lecture will discuss about the data modelling	Student will be able to learn the data modelling	Discussion based on real time examples	

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Week 5	Lecture 9	Advanced SQL and best practices(rank functions)	R-2 R-3		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
		Advanced SQL and best practices(partitioning)	R-2 R-3		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
		Advanced SQL and best practices(frames)	R-2 R-3		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
		Advanced SQL and best practices(lead and lag functions)	R-2 R-3		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
	Lecture 10				Online Assignment 1			
Week 6	Lecture 11	Advanced SQL and best practices(case statements)	R-2		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
		Advanced SQL and best practices(UDFs)	R-2		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
		Advanced SQL and best practices(stored procedures)	R-2		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
	Lecture 12	Advanced SQL and best practices(cursors)	R-2		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
		Advanced SQL and best practices(best practices, indexing, clustered vs non-clustered indexing)	R-2		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
		Advanced SQL and best practices(order of query execution)	R-2		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
Week 7	Lecture 13	Advanced SQL and best practices(joins vs nested queries)	R-2 R-3		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	

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Week 7	Lecture 13	Advanced SQL and best practices(profitability analysis, profitable customers, customers without orders)	R-2 R-3		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
		Advanced SQL and best practices(fraud detection)	R-2 R-3		The lecture will discuss about the advanced SQL features	Student will be able to learn the advanced SQL features	Discussion based on real time examples	
		SPILL OVER						
Week 7	Lecture 14				Spill Over			
		MID-TERM						
Week 8	Lecture 15	Data visualization in python (the necessity of data visualization)	R-2 R-3		The lecture will discuss about the data visualization in python	Student will be able to learn the data visualization in python	Discussion and demonstration of SQL queries based on real time examples	
		Data visualization in python (data handling and cleaning)	R-2 R-3		The lecture will discuss about the data visualization in python	Student will be able to learn the data visualization in python	Discussion and demonstration of SQL queries based on real time examples	
		Data visualization in python (sanity checks)	R-2 R-3		The lecture will discuss about the data visualization in python	Student will be able to learn the data visualization in python	Discussion and demonstration of SQL queries based on real time examples	
		Data visualization in python (outliers analysis with boxplots)	R-2 R-3		The lecture will discuss about the data visualization in python	Student will be able to learn the data visualization in python	Discussion and demonstration of SQL queries based on real time examples	
	Lecture 16	Data visualization in python (histograms)	R-2 R-3		The lecture will discuss about the data visualization in python	Student will be able to learn the data visualization in python	Discussion and demonstration of SQL queries based on real time examples	
		Data visualization in python (distribution plots)	R-2 R-3		The lecture will discuss about the data visualization in python	Student will be able to learn the data visualization in python	Discussion and demonstration of SQL queries based on real time examples	

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Week 8	Lecture 16	Data visualization in python (styling options)	R-2 R-3		The lecture will discuss about the data visualization in python	Student will be able to learn the data visualization in python	Discussion and demonstration of SQL queries based on real time examples	
Week 9	Lecture 17	Data visualization in python (pie - chart and bar chart)	R-2		The lecture will discuss about the various data visualization charts	Student will be able to learn the various data visualization techniques	Discussion and demonstration of various data visualization techniques	
		Data visualization in python (scatter plots)	R-2		The lecture will discuss about the various data visualization charts	Student will be able to learn the various data visualization techniques	Discussion and demonstration of various data visualization techniques	
		Data visualization in python (pair plots)	R-2		The lecture will discuss about the various data visualization charts	Student will be able to learn the various data visualization techniques	Discussion and demonstration of various data visualization techniques	
		Data visualization in python (bar graphs and box plots)	R-2		The lecture will discuss about the various data visualization charts	Student will be able to learn the various data visualization techniques	Discussion and demonstration of various data visualization techniques	
		Data visualization in python (heatmaps)	R-2		The lecture will discuss about the various data visualization charts	Student will be able to learn the various data visualization techniques	Discussion and demonstration of various data visualization techniques	
	Lecture 18	Data visualization in python (line charts)	R-2		The lecture will discuss about the various data visualization charts	Student will be able to learn the various data visualization techniques	Discussion and demonstration of various data visualization techniques	
		Data visualization in python (stacked bar charts)	R-2		The lecture will discuss about the various data visualization charts	Student will be able to learn the various data visualization techniques	Discussion and demonstration of various data visualization techniques	
		Data visualization in python (plotly)	R-2		The lecture will discuss about the various data visualization charts	Student will be able to learn the various data visualization techniques	Discussion and demonstration of various data visualization techniques	

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Week 10	Lecture 19	Basic visualization using tableau(introduction to data analytics)	R-2		The lecture will discuss about the data visualization in tableau	Student will be able to learn data visualization in tableau	Discussion and demonstration of various data visualization techniques	
		Basic visualization using tableau(why data visualization?)	R-2		The lecture will discuss about the data visualization in tableau	Student will be able to learn data visualization in tableau	Discussion and demonstration of various data visualization techniques	
		Basic visualization using tableau(what is tableau?)	R-2		The lecture will discuss about the data visualization in tableau	Student will be able to learn data visualization in tableau	Discussion and demonstration of various data visualization techniques	
		Basic visualization using tableau(why tableau?)	R-2		The lecture will discuss about the data visualization in tableau	Student will be able to learn data visualization in tableau	Discussion and demonstration of various data visualization techniques	
	Lecture 20				Online Assignment 2			
Week 11	Lecture 21	Basic visualization using tableau(tableau vs excel and power BI)	R-2		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	
		Basic visualization using tableau(exploratory vs explanatory analysis)	R-2		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	
		Basic visualization using tableau(getting started with tableau)	R-2		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	
		Basic visualization using tableau(bar charts)	R-2		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	
	Lecture 22	Basic visualization using tableau(line charts and filters)	R-2		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	

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Week 11	Lecture 22	Basic visualization using tableau(area charts)	R-2		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	
		Basic visualization using tableau(box plots and pivoting)	R-2		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	
Week 12	Lecture 23	Basic visualization using tableau(maps and hierarchies)	R-2 R-3		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	
		Basic visualization using tableau(pie charts)	R-2 R-3		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	
		Basic visualization using tableau(treemaps and grouping)	R-2 R-3		The lecture will discuss about various data visualization techniques in tableau	Student will be able to learn the various data visualization techniques in tableau	Discussion and demonstration of various data visualization techniques	
	Lecture 24				Online Assignment 3			
Week 13	Lecture 25	Advanced visualization using tableau(dashboards - I)	R-2		The lecture will discuss about the dashboard and joins in tableau	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	
		Advanced visualization using tableau(joins and splits)	R-2		The lecture will discuss about the dashboard and joins in tableau	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	

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Week 13	Lecture 25	Advanced visualization using tableau(numeric and string functions)	R-2		The lecture will discuss about the dashboard and joins in tableau	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	
		Advanced visualization using tableau(logical and date functions)	R-2		The lecture will discuss about the dashboard and joins in tableau	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	
	Lecture 26	Advanced visualization using tableau(histograms and parameters)	R-3		The lecture will discuss about the calculated fields and charts	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	
		Advanced visualization using tableau(scatter plots)	R-3		The lecture will discuss about the calculated fields and charts	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	
		Advanced visualization using tableau(dual axis charts)	R-3		The lecture will discuss about the calculated fields and charts	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	
		Advanced visualization using tableau(top n parameters and calculated fields)	R-3		The lecture will discuss about the calculated fields and charts	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	
Week 14	Lecture 27	Advanced visualization using tableau(stacked bar charts)	R-2		The lecture will discuss about the dashboard and storytelling in tableau	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	
		Advanced visualization using tableau(dashboards -II and filter actions)	R-2		The lecture will discuss about the dashboard and storytelling in tableau	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	

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Week 14	Lecture 27	Advanced visualization using tableau(storytelling)	R-2		The lecture will discuss about the dashboard and storytelling in tableau	Student will be able to learn the advanced visualization techniques in tableau	Discussion and demonstration of various data visualization techniques in tableau	
		SPILL OVER						
Week 14	Lecture 28				Spill Over			
Week 15	Lecture 29				Spill Over			
	Lecture 30				Spill Over			

Scheme for CA:

CA Category of this Course Code is:A0203 (2 best out of 3)

Component	Weightage (%)	Mapped CO(s)
Online Assignment 1	50	CO1, CO2
Online Assignment 2	50	CO3, CO4
Online Assignment 3	50	CO5, CO6

Details of Academic Task(s)

Academic Task	Objective	Detail of Academic Task	Nature of Academic Task (group/individuals)	Academic Task Mode	Marks	Allottment / submission Week
Online Assignment 1	To evaluate the student on the basis of conceptual learning	Evaluation will done on syllabus covered till week 4. Online assignment will be given by Upgrad team	Individual	Online	30	4 / 5
Online Assignment 2	To evaluate the student on the basis of conceptual learning	Evaluation will done on syllabus covered till week 9. Online assignment will be given by Upgrad team	Individual	Online	30	9 / 10
Online Assignment 3	To evaluate the student on the basis of conceptual learning	Evaluation will done on syllabus covered till week 11. Online assignment will be given by Upgrad team	Individual	Online	30	11 / 12

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Detailed Plan For Practicals

Practical No	Broad topic	Subtopic	Other Readings	Learning Outcomes
Practical 1	List of practical	write SQL queries to create and manipulate tables.		Student will learn about create and manipulate tables.
Practical 2	List of practical	write SQL queries to retrieve specific details from a given table.		Student will learn about retrieving specific details from a given table.
Practical 3	List of practical	write SQL queries to demonstrate the use of aggregate functions, inbuilt functions, string, datetime function, and ordering.		Student will learn about demonstrate the use of aggregate functions
Practical 4	List of practical	write SQL queries to use the nested queries.		Student will learn about use the nested queries.
Practical 5	List of practical	creating tableau workbook containing multiple dashboards pertaining to the multiple categories		Student will learn about dashboards
Practical 6	List of practical	demonstrating the match, player and team statistics using tableau		Student will learn about statistics using tableau
Practical 7	List of practical	Demonstrating connecting different data sets in tableau		Student will learn about connecting different data sets in tableau
Practical 8	List of practical	fetching the data from different sources and prepare it for further analysis.		Student will learn about fetching the data from different sources
Practical 9	List of practical	Visualization to understand the hierarchies in data and drill down approaches.		Student will learn about visualization to understand the hierarchies
Practical 10	List of practical	visualization of data using bar and stacked bar charts, line and area charts, box and pie charts.		Student will learn about visualization of data using bar
Practical 11	List of practical	visualization of data using scatter plots		Student will learn about visualization of data using scatter plots
Practical 12	List of practical	visualization of data using grouping and tree maps		Student will learn about visualization of data using grouping and tree maps
Practical 13	List of practical	creating histograms using tableau.		Student will learn about creating histograms using tableau
Practical 14	List of practical	demonstrating the power BI		Student will learn about the power BI
	SPILL OVER			
Practical 15	Spill Over			

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