



**ST ALOYSIUS COLLEGE,  
MANGALURU (AUTONOMOUS)**

**Re-accredited by NAAC “A” Grade**

**Course Structure and Syllabus  
of**

**POST GRADUATE DIPLOMA IN COMPUTER  
APPLICATIONS (PGDCA)**

(With effect from academic year 2020-21 onwards)

**ALOYSIUS INSTITUTE OF MGMT & INFORMATION  
TECHNOLOGY BEERI, MANGALURU – 575 003**

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**Re-accredited by NAAC with ‘A’ Grade - CGPA 3.62**

**Ranked 94 in College Category – 2018 Under NIRF, MHRD,  
Government of India Recognised by UGC as “College with  
Potential for Excellence” College with ‘STAR STATUS’ conferred  
by DBT, Government of India**

Date: 25-06-2020 **NOTIFICATION**

Sub: Syllabus of Post Graduate Diploma in Computer Applications (PGDCA).

Ref: 1. Decision of the Academic Council meeting held on 09-06-2020 vide Agenda No: 21(2020-21)

2. Office Notification dated 25-06-2020

Pursuant to the above, the Syllabus of Post Graduate Diploma in Computer Applications (PGDCA) under Credit Based Semester System which was approved by the Academic Council at its meeting held on 09-06-2020 is hereby notified for implementation with effect from the academic year **2020-21**.

#### **PRINCIPAL REGISTRAR**

To:

1. The Chairman/Dean/HOD.
2. The Registrar
3. Library
4. PG Office

#### **New syllabus for the Skill Development Process**

At present, IT education and training in the country can broadly be classified as falling into formal education system or non-formal education system. The word "Business Analytics" perfectly summarizes every type of job we categorize under business analytics. "Business" emphasizes the importance of business understanding, and "Analytics" refers to the importance of statistics, computer engineering, and operation research in this type of role. An analytics professional can ultimately work in a very strategy-oriented role or can work as a very specialized deep learning scientist. The former role has a stronger component of business, while the latter role has a much stronger component of analytics.

The core subjects like Business Analytics, Relational Database Management Systems, Data Analytics for Business Using Excel, Tally Database management System along with Practical's in the first semester; In the second semester concepts of Python, Marketing and HR Analytics, Social Media Analytics. Soft Skills module to tap full potential of the students by improving time

and self-management, communication skills, team spirit, Entrepreneurship etc as a part of the course

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**Scheme of Teaching || New Syllabus from 2020**

**I Semester**

<b>Sl No</b>	<b>Subject Code</b>	<b>Subject Title</b>	<b>Credits</b>	<b>Total No of Hours</b>	<b>Lecture Hrs / week</b>	<b>Tutorial Hrs / week</b>	<b>Practical Hrs / week</b>	<b>Self Study Hrs / week</b>
1	D 101.1	Fundamentals of Business Analytics	4	45	3	2	--	2
2	D 102.1	Database Management Systems	4	45	3	2	--	2
3	D 103.1	Business Excel Applications	4	45	3	2	--	2
4	D 104.1	Data Analytics	4	45	3	2	--	2

		using R						
5	D 105.1	RDBMS with ORACLE Lab	3	90	--	(1 x 2) 2	(3 x 2) 6	--
6	D 106.1	Business Excel and R Lab	3	90	--	(1 x 2) 2	(3 x 2) 6	--
7	D 107.1	Business Communication	2	30	2	2	--	4
8	D 108.1	Seminar	----	30	----	2	---	--
		<b>Total</b>	<b>24</b>		<b>14</b>	<b>14</b>	<b>12</b>	<b>10</b>

\* HC – Hard Core SC – Soft Core HCL – Hard Core Lab SCL – Soft Core Lab OE – Open Elective

### II Semester

Sl No	Subject Code	Subject Title	Credits	Total No of Hours	Lecture Hrs / week	Tutorial Hrs / week	Practical Hrs / week	Self Study Hrs / week
1	D 101.2	Python for Data Analysis	4	45	3	2	--	2
2	D 102.2	Marketing and HR Analytics	4	45	3	2	--	2
3	D 103.2	Social Media Analytics for Business	4	45	3	2	--	2
4	D 104.2	Python for Data Analysis Lab	3	90	--	(1 x 2) 2	(3 x 2) 6	--
5	D 105.2	Marketing and Social Media Analytics Lab	3	90	--	(1 x 2) 2	(3 x 2) 6	--
6	D 106.2	Foundations of Entrepreneurship	2	30	2	2	--	4
7	D 107.2	Project Work	6	90	--	(1 x 2) 2	(3 x 2) 6	--
8	D 108.2	Seminar	----	30	----	2	---	--
		<b>Total</b>	<b>26</b>		<b>11</b>	<b>14</b>	<b>18</b>	<b>10</b>

\* HC – Hard Core SC – Soft Core HCL – Hard Core Lab SCL – Soft Core Lab OE – Open Elective

### I Semester

Sl No	Subject Code	Subject Title	Credits	Theory Examination (hours)	Practical Examination (hours)	Max Marks for Internal Assessment	Max. Marks for Term End Exam	Total Marks
1	D 101.1	Fundamentals of Business Analytics	4	3	--	30	70	100
2	D 102.1	Database Management Systems	4	3	--	30	70	100
3	D 103.1	Business Excel Applications	4	3	--	30	70	100
4	D 104.1	Data Analytics using R	4	3	--	30	70	100
5	D 105.1	RDBMS with ORACLE Lab	3	--	3	25	50	75
6	D 106.1	Business Excel and R Lab	3	--	3	25	50	75
7	D 107.1	Business Communication	2	---	---	50	---	50
8	D 108.1	Seminar	---	--	--	--	-	--
		<b>Total</b>	<b>24</b>			<b>220</b>	<b>380</b>	<b>600</b>

\* HC – Hard Core SC – Soft Core HCL – Hard Core Lab SCL – Soft Core Lab OE – Open Elective AON – Add On

### II Semester

Sl No	Subject Code	Subject Title	Credits	Theory Examination (hours)	Practical Examination (hours)	Max Marks for Internal Assessment	Max. Marks for Term End Exam	Total Marks
1	D 101.2	Python for Data Analysis	4	3	--	30	70	100
2	D 102.2	Marketing and HR Analytics	4	3	--	30	70	100
3	D 103.2	Social Media Analytics for Business	4	3	--	30	70	100
4	D 104.2	Python for Data Analysis Lab	3	--	3	25	50	75

5	D 105.2	Marketing and Social Media Analytics Lab	3	--	3	25	50	75
6	D 106.2	Foundations of Entrepreneurship	2	---	---	50	---	50
7	D 107.2	Project Work	6	--	---	100	100	200
8	D 108.2	Seminar	----	--	--	--	-	--
		<b>Total</b>	<b>26</b>			<b>290</b>	<b>410</b>	<b>700</b>

\* HC – Hard Core SC – Soft Core HCL – Hard Core Lab SCL – Soft Core Lab OE – Open Elective AON – Add On

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### I Semester

#### D 101.1 : FUNDAMENTALS OF BUSINESS ANALYTICS

**Total No. of Lectures : 45 Total Marks: 100 [ L - T - P - S ] No. of Lectures / Week :**

**4 Credits : 4 [ 3 - 1 - 0 - 2 ] Course objectives:**

- To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.
- To become familiar with the processes needed to develop, report, and analyze business data.
- To learn how to use and apply Excel and Excel add-ins to solve business problems.

#### **Learning outcome:**

- Students should be able to implement analytical models in the software tools. • In addition, students should be able to interpret the results of business analytics and their implications to business administrations.
- According to the data analysis results, students should be able to make data driven decisions to optimize the business process and address issues in business administrations.

#### **Unit - I**

**Business View of Information Technology Applications:** Business Enterprise Organization, Its Functions, and Core Business Processes, Baldrige Business Excellence Framework, Key Purpose of Using IT in Business, The Connected World: Characteristics of Internet-Ready IT Applications, Enterprise Applications (ERP/CRM, etc.) and Bespoke IT Applications, Information Users and Their Requirements

**Types of Digital Data** - Structured Data, Unstructured Data, Semi-Structured Data, Difference

Between Semi-Structured and Structured Data. **(9 hrs)**

## **Unit - II**

**Introduction to OLTP and OLAP** - OLTP (On-Line Transaction Processing), OLAP (On-Line Analytical Processing), Different OLAP Architectures, OLTP and OLAP, Data Models for OLTP and OLAP, Role of OLAP Tools in the BI Architecture, OLAP Operations on Multidimensional Data

**Business Intelligence** - Analytical Information for Decision Support, Information Sources before Dawn of BI?, Business Intelligence (BI) Defined, Evolution of BI and Role of DSS, EIS, MIS, and Digital Dashboards, Need for BI at Virtually all Levels, BI For Past, Present, and Future, The BI Value Chain **(9 hrs)**

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## **Unit - III**

**BI Definitions and Concepts** - BI Component Framework, BI Users, Business Intelligence Applications, BI Roles and Responsibilities, Best Practices in BI/DW, the Complete BI Professional,

**Basics of Data Integration** - Need for Data Warehouse, Definition of Data Warehouse, Data Mart, Goals of a Data Warehouse, What Constitutes a Data Warehouse, Extract, Transform, Load; Data Integration, Data Integration Technologies, Data Quality, Data Profiling. **(9 hrs)**

## **Unit - IV**

**Multidimensional Data Modeling** - Data Modeling Basics, Types of Data Model, Data Modeling Techniques, Fact Table, Dimension Table, Typical Dimensional Models, Dimensional Modeling Life Cycle

**Basics of Enterprise Reporting** - Reporting Perspectives Common to all Levels of Enterprise, Report Standardization and Presentation Practices, Enterprise Reporting Characteristics in OLAP World, Balanced Scorecard, Dashboards, Creating Dashboards, Scorecards vs. Dashboards.

**(9 hrs)**

## **Unit - V**

**Case studies:Case Study Briefs - GoodLife HealthCare Group** –Introduction, Business Segments, Organizational Structure, Quality Management, Marketing, Alliance Management, Future Outlook, Information Technology at GoodLife Group, Human Capital Management & Training Management

**GoodFood Restaurants Inc.-** Introduction, Business Segments, Impeccable Processes and Standard Cuisine, Marketing, Supplier Management, Quality Management, Organization Structure, Future Outlook, Information Technology at GoodFood

**TenToTen Retail Stores** – Introduction, Business Segments, Organizational Structure, Marketing, Supplier Management, Quality Management, Future Outlook, Information

**Text Book:**

[1]. R N Prasad, Seema Acharya, "Fundamentals of Business Analytics", 2<sup>nd</sup> Edition, 2016, Wiley India

**References:**

- [1]. S. Christian Albright, Wayne L. Winston, "Business Analytics: Data Analysis & Decision Making", 5<sup>th</sup> Edition, 2014, Cengage Learning India.
- [2]. Laursen, Thourland, "Business Analytics for Managers: Taking Business Intelligence Beyond Reporting", 2<sup>nd</sup> Edition, 2015 Wiley
- [3]. Haladi, "Business Analytics: An Application Focus", 1<sup>st</sup> Edition, 2013, PHI Publications. [4]. Camm/Cochran/Fry/Ohlmann/Anderson/Sweeney/Williams "Essentials of Business Analytics" 1<sup>st</sup> edition, Pearson Press

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**D 102.1 : DATABASE MANAGEMENT SYSTEMS**

**Total No. of Lectures : 45 Total Marks : 100 [ L – T – P – S ] No. of Lectures / Week : 4 Credits : 4 [ 3 – 1 - 0 - 2 ]**

**Learning Objectives:** Developing and managing efficient and effective database applications requires understanding the fundamentals of database management systems, techniques for the design of databases, and principles of database administration. This course emphasized database concepts, developments, use and management in three main sections: database concepts, practice, and emerging trends.

**Learning Outcome:** Upon successfully completing this course, the student will:

- Understand the fundamentals of relational, object-oriented, and distributed database systems including: data models, database architectures, and database manipulations
- Understand the theories and techniques in developing database applications and be able to demonstrate the ability to build databases using enterprise DBMS products such as Oracle or SQL Server.
- Be familiar with managing database systems
- Understand new developments and trends in databases.

**Unit – I**

**Database Systems:** Introducing the database and DBMS, Why the database is important, Historical Roots: Files and File Systems, Problems with File System Data Management, Database Systems.

**Data Models:** The importance of Data models, Data Model Basic Building Blocks, Business Rules, The evaluation of Data Models, Degree of Data Abstraction.

**The Relational Database Model:** A logical view of Data, Keys, Integrity Rules, Relational Set Operators, The Data Dictionary and the system catalog, Relationships within the Relational Database, Data Redundancy revisited, Indexes, Codd's relational database rules. **(9 hrs) Unit – II**

**Entity Relationship Model:** The ER Model, Developing ER Diagram, Database Design Challenges: Conflicting Goals.

**Advanced Data Modeling:** The Extended Entity Relationship Model, Entity clustering, Entity integrity: Selecting Primary keys, Design Cases: Learning Flexible Database Design.

**Normalization of database tables:** Database Tables and Normalization, The need for Normalization, The Normalization Process, Improving the design, Surrogate Key Considerations, High level Normal Forms, Normalization and database design, denormalization. **(9 hrs) Unit –**

### III

**Introduction to SQL:** Data Definition Commands, Data Manipulation Commands, Select queries, Advanced Data Definition Commands, Advanced Select queries, Virtual Tables, Joining Database Tables.

**Advanced SQL:** Relational Set Operators, SQL Join Operators, Subqueries and correlated queries, SQL Functions, Oracle Sequences, Updatable Views, and Procedural SQL. **Database Design:** The Information System, The Systems Development Life Cycle, The Database Life Cycle, Database Design Strategies, Centralized Vs Decentralized design. **(9 hrs)**

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### Unit – IV

**PL/SQL:** Subprograms, types of PL/SQL blocks, Simple Anonymous Block, Identifiers, types of identifiers, Declarative Section, variables, Scalar Data Types, The % Type attribute, bind variables, sequences in PL/SQL expressions, Executable statements, PL/SQL block syntax, comment the code, deployment of SQL functions in PL/SQL, Convert Data Types, newted blocks, operators. Interaction with the oracle server, Invoke SELECT Statements in PL/SQL, SQL cursor concept, Data Manipulation in the Server using PL/SQL, SQL Cursor Attributes to obtain Feedback on DML, Save and discard transactions.

### (9 hrs) Unit –V

**Control Structures in PL/SQL:** Conditional processing using IF statements and CASE statements, Loop Statement, while loop statement, for loop statement, the continue statement composite data types : PL/SQL records, The % ROWTYPE attribute, insert and update with PL/SQL records, INDEX by tables,

INDEX BY Table Methods, Use INDEX BY Table of Records, Explicit Cursors, Declare the Cursor, Open the Cursor, Fetch data from the Cursor, Close the Cursor, Cursor FOR loop, The % NOTFOUND and % ROWCOUNT Attributes, the FOR UPDATE Clause and WHERE CURRENT Clause, Exception Handling, Handle Exceptions with PL/SQL, Trap Predefined and nonpredefined Oracle Server Errors, User – Defined Exceptions, Propagate Exceptions, RAISE\_APPLICATION\_ERROR Procedure

**(9hrs)**

### Text Books:

- [1]. Ramez Elmasri, Shamkant B. Navathe “Fundamentals of Database Systems”, 8<sup>th</sup> Ed, 2014, Pearson
- [2]. Abraham Silberschatz, Heny Korth, Sudarshan, “Database System Concepts”, 6<sup>th</sup> Ed, 2012, McGraw Hill
- [3]. Kevin Loney, “Oracle Database 11g The Complete Reference”, 1<sup>st</sup> Ed, 2011, McGraw Hill

### Reference Books:

- [1]. Thomas Conolly, Carolyn Begg, "Database Systems: A Practical Approach to Design, Implementation & Management", 5<sup>th</sup> Edition, 2012, Pearson Asia.
- [2]. Raghu, Gehrke, "Database Management Systems", 3<sup>rd</sup> Ed , 2009, McGraw Hill [3]. Molina, Jeffrey D Ullman, Widom, "Database Systems : The complete book", 2<sup>nd</sup> Ed, 2013, Pearson
- [4]. Catherine M Ricardo, "Databases Illuminated", 2<sup>nd</sup> Ed, 2010, Jones & Bartlet Publishers. [5]. Jeffrey A Hoffer, V Ramesh, Heikki Topi, "Modern Database Management", 11<sup>th</sup> Ed, 2013, Pearson
- [6]. David M Kroenke, David Auer, "Database Concepts", 6<sup>th</sup> Edition, 2009, Pearson Asia. [7]. Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, Richard T Snodgrass, V S Subramanian, Roberto Zicari, "Advanced Database Systems", 6<sup>th</sup> Edition, 2012, Morgan Kaufmann.

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### **D 103.1 : BUSINESS EXCEL APPLICATIONS**

**Total No. of Lectures : 45 Total Marks : 100 [ L - T - P - S ] No. of Lectures / Week : 4  
Credits : 4 [ 3 - 1 - 0 - 2 ]**

**Learning Objectives :** This course will take you through a proven, structured process to improve your ability to collect, analyse and forecast business and financial data in order to generate valuable insights from business data.

It will also teach you how to report on business data and present information and analysis.

**Learning Outcomes:** After you have finished this course, you should have

- Gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making.

- Become familiar with the processes needed to develop, report, and analyze business data.
- Learn how to use and apply Excel and Excel add-ins to solve business problems.
- Effective way of manipulating the database to produce useful decision making information for management & analytics.

#### **Unit - I**

**Financial Modelling:** Difference between a Spreadsheet and a Financial Model; Types and Purposes of Financial Models; Tool Selection; The Ideal Financial Modeller **Building a Model:** Model Design; The Golden Rules for Model Design; Design Issues; The Workbook Anatomy of a Model; Project Planning Your Model; Model Layout Flow Charting; Steps to Building a Model; Information Requests; Version-Control Documentation. **9 hrs**

#### **Unit - II**

**Best Practice Principles of Modelling:** Enter Data Only Once; Use Consistent Formulas; Format and Label Clearly; Methods and Tools of Assumptions Documentation; Linked Dynamic Text Assumptions Documentation.

**Financial Modelling Techniques:** Problems with Excel; Error Avoidance Strategies; Linking to External Files; Building Error Checks

**9 hrs**

#### **Unit - III**

**Using Excel in Financial Modelling:** Formulas and Functions in Excel; Excel Versions; Handy

Excel Shortcuts; Basic Excel Functions; Logical Functions; Nesting: Combining Simple Functions to Create Complex Formulas

**Functions for Financial Modelling:** Aggregation Functions; LOOKUP Formulas; Nesting INDEX and MATCH; OFFSET Function; Regression Analysis; CHOOSE Function; Working with Dates; Financial Project Evaluation Functions; Loan Calculations. **9 hrs**

#### **Unit - IV**

**Tools for Model Display:** Basic Formatting; Custom Formatting; Conditional Formatting; Sparklines; Bulletproofing Your Model; Customising the Display Settings; Form Controls **Tools for Financial Modelling:** Hiding Sections of a Model; Grouping; Array Formulas; Goal Seeking; Structured Reference Tables; PivotTables; Macros

**Common Uses of Tools in Financial Modelling:** Escalation Methods for Modelling; Nominal and Effective (Real) Rates; Calculating Cumulative Totals; Calculation a Payback Period; Weighted Average Cost of Capital (WACC); Building a Tiering Table; Modelling Depreciation Methods; Break-Even Analysis. **9 hrs**

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#### **Unit - V**

**Model Review:** Rebuilding an Inherited Model; Improving Model Performance; Auditing a Financial Model; Stress-Testing, Scenarios, and Sensitivity Analysis in Financial Modelling; Scenario Analysis Tools and Methods; Advanced Conditional Formatting; Comparing Scenario Methods.

**Presenting Model Output:** Preparing an Oral Presentation for Model Results; Preparing a Graphic or Written Presentation for Model Results; Chart Types; Working with Charts; Handy Charting Hints; Dynamic Named Ranges; Charting with Two Different Axes and Chart Types; Bubble Charts; Creating a Dynamic Chart; Waterfall Charts.

**9 hrs**

#### **Text Book:**

- [1]. Danielle Stein Fairhurst, "Using Excel for Business Analysis", 1<sup>st</sup> Edition, 2012, Wiley India.
- [2]. Michael Alexander, Jared Decker, Bernard Wehbe, "Microsoft Business Intelligence Tools for Excel Analysts", 1<sup>st</sup> Edition, 2014, Wiley International
- [3]. R N Prasad, Seema Acharya, "Fundamentals of Business Analytics", 1<sup>st</sup> Edition, 2012, Wiley India

#### **References:**

- [5]. Wayne Winston, "Microsoft Excel 2013 Data Analysis and Business Modeling", 2014, Microsoft Press
- [6]. S. Christian Albright, Wayne L. Winston, "Business Analytics: Data Analysis & Decision Making", 5<sup>th</sup> Edition, 2014, Cengage Learning India.
- [7]. Cornell, Paul, "Beginning Excel What-If Data Analysis Tools", 1<sup>st</sup> Edition, 2013, Wiley Apress
- [8]. Michael Alexander, John Walkenbach, "Excel Dashboards & Reports", 2<sup>nd</sup> Ed, 2013, Wiley

India

[9]. Conrad Carlberg, "Business Analysis with Microsoft Excel", 3<sup>rd</sup> Edition, 2011, Que Publishers

[10]. Francesco Iannello, "Excel: Strategic Use Of The Calc Spreadsheet In Business Environment. Data Analysis And Business Modeling", 2<sup>nd</sup> Edition, 2013, Que Publishers

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### **D 104.1 : DATA ANALYTICS USING R**

**Total No. of Lectures : 45 Total Marks : 100 [ L - T - P - S ] No. of Lectures / Week :**

**4 Credits : 4 [ 3 - 1 - 0 - 2 ]**

**Learning Objectives:** In this course candidate will learn how to program in R and how to use R for effective data analysis. The course covers practical issues in statistical computing which includes programming in R, reading data into R, accessing R packages, writing R functions, debugging, profiling R code, and organizing and commenting R code. Topics in statistical data analysis will provide working examples.

**Learning Outcomes:** After completing the course the student is expected to •

- be able to use and program in the programming language R
- be able to use R to solve statistical problems
- be able to implement and describe Monte Carlo the technology
- be able to minimize and maximize functions using R

#### **Unit -I**

**R Programming:** Introducing R, The need for R, Installing R, RStudio; Basic Objects – Vector, Matrix, Array, Lists, Data frames, Functions

**Managing Workspace :** R's working directory, Inspecting the environment, Modifying global options Managing the library of packages;

**Basic Expressions:** Assignment expressions, Conditional expressions Loop expressions **(9 hrs)**

#### **Unit -II**

**Working with basic Objects :** Using object functions, logical functions, math functions, Applying numeric methods, statistical functions, apply-family functions

**Working with Strings :** Getting started with strings, Formatting date/time, Using regular

expressions

**Working with Data** : Reading and writing data, Visualizing data, Analyzing data **(9 hrs)**

### Unit - III

**Inside R**: Understanding lazy evaluation, the copy-on-modify mechanism, lexical scoping, how an environment works; Metaprogramming -functional programming; Computing on language

**Object Oriented Programming**: Introducing object-oriented programming, Working with the S3 object system, Working with S4, Working with the reference class, Working with R6;

Working with relational databases; Working with NoSQL databases **(9 hrs)**

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### Unit - IV

**Data Manipulation** : Using built-in functions to manipulate data frames, Using SQL to query data frames via the sqldf package, Using data.table to manipulate data, Using dplyr pipelines to manipulate data frames, Using rlist to work with nested data structures; Profiling code, Boosting code performance

**Data: Descriptive Statistics and Tabulation**: Summary Commands, Summarizing Samples, Summary Statistics for Vectors, Summary Commands With Single Value Results & With Multiple Results; Cumulative Statistics – Simple, Complex; Generic Summary Commands for Data Frames; Special Row and Column Summary Commands, Summary Tables, Contingency Tables, Cross Tabulation **(9 hrs)**

### Unit - V

**Data: Distribution**: Stem and Leaf Plot, Histograms, Density Function, Data Distribution - Normal Distribution, other Distributions, Random Number Generation and Control, Sampling; Shapiro-Wilk Test for Normality, Kolmogorov-Smirnov Test; Quantile-Quantile Plots; Adding a Straight Line to a QQ Plot

**Introduction to Graphical Analysis**: Box-whisker Plots, Basic Boxplots, Customizing Boxplots, Horizontal Boxplots, Scatter Plots, Basic Scatter Plots, Adding Axis Labels, Plotting Symbols, Setting Axis Limits, Pairs Plots, Line Charts, Line Charts Using Numeric Data, Line Charts Using Categorical Data; Pie Charts; Cleveland Dot Charts; Bar Charts; Single-Category Bar Charts; Multiple Category Bar Charts;

**( 9 hrs)**

#### Text Book:

[1]. Mark Gardner, “Beginning R: The Statistical Programming Language”, 1<sup>st</sup> Ed, 2017, Wiley [2].

Garret G, “Hands on Programming with R”, 2<sup>nd</sup> Edition, 2016, O’Reilly Publications **Reference**

#### Books:

[1]. Selva Prabhakaran, "Mastering R Programming", 1<sup>st</sup> Ed, 2017, PAKT Publishers [2]. Richard Cotton, "Learning R", 2<sup>nd</sup> Edition, 2016, O'Reilly Publications [3]. Nina Zumal, John Mount, "Practical Data Science with R", 1<sup>st</sup> Ed, 2016, Dreamtech Press [4]. David Wilkins, "Learn R Programming", 1<sup>st</sup> Edition, 2017, PAKT Publishers [5]. Jared Leander, "R for Everyone", 1<sup>st</sup> Edition, 2016, Pearson Education [6]. Collin Gillespe, Robin Lovelace, "Efficient R programming", 2<sup>nd</sup> Edition, 2016, O'Reilly [7]. Hadley Wickham, "R Packages", 1<sup>st</sup> Edition, 2016, O'Reilly Publishers [8]. Larry a Pace, "Beginning R – Introduction to Statistical Programming", 1<sup>st</sup> Edition, Apress [9]. Omar Trejo Navarro, "R Programming by Example", 2<sup>nd</sup> Ed, 2016, PAKT Publishers [10]. Tony Fischetti, "Data Analysis with R". 3<sup>rd</sup> Edition, 2017, PAKT Publishers

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### **D 105.1 RDBMS WITH ORACLE LAB**

**Total No. of Lectures : 90 Total Marks : 75 [ L – T – P – S ] No. of Labs / Week : 3 Credits : 3  
[ 0 – 1 - 3 – 0 ]**

**Learning Objectives:** To develop database handling, data manipulation and data processing skills through SQL & PL/SQL, which will help students to develop data centric computer applications; This lab course will understand the Business data and process the Business data and yield the results and give real good insights on the data

**Learning Outcomes:** At the end of the course, the candidate will be able to learn • Create databases using popular database management system products • Solve problems by constructing database queries using the Structured Query Language • Develop insights into future data management tool and technique trends

#### **RDBMS with ORACLE Lab**

- [1]. Overview of RDBMS, Introduction to Postgre SQL
- [2]. Start, stop and restart PostgreSQL database
- [3]. Introduction of SQL- DDL, DML, DTL, Basic Data Types
- [4]. Create Database, Select Database, Drop Database
- [5]. Create Table, Drop Table, Insert Query, Select Query
- [6]. Operators, Expressions, Where Clause, AND & OR Clauses
- [7]. Update Query, Delete Query, Like Clause, Limit Clause
- [8]. Order By, Group By, With Clause, Having Clause, Distinct Keyword [9]. Constraints, Joins, Unions Clause, NULL Values, Alias Syntax
- [10]. Alter Command, Truncate Table, Transactions Locks, Sub Queries, Autoincrement, Privileges
- [11]. Functions: Date & Time,String Functions, Aggregate Functions
- [12]. Postgre SQL Interface: C/C++ / Java/PHP/Python
- [13]. Synonym – introduction, Create, synonym as alias for table & view, drop
- [14]. Sequence- Introduction, alter sequence, drop

- [15]. View- Introduction, types, alter , drop
- [16]. Index - Introduction, types, alter, drop
- [17]. Primary introduction to DBA-User create, alter User, Grant, Revoke [18]. Report writer using SQL Title, Btitle, skip, pause, column, SQL, Break on, computer sum [19]. PL/SQL - Introduction of PL/SQL, Advantages of PL/SQL, Support of SQL, Executing PL/SQL
- [20]. PL/SQL character set & Data Types
- [21]. PL/SQL blocks Attribute % type, %rowtype, operators
- [22]. Control structure Condition – if Interactive- loop, for, while Sequential – goto
- [23]. Procedures- Definition, creating, Parameter
- [24]. Function-Definition, creating, Parameter
- [25]. Cursor- types
- [26]. Database Triggers- Syntax, parts of triggers ,Types of triggers, enabling & disabling triggers

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### **D 106.1 BUSINESS EXCEL and R LAB**

**Total No. of Practicals : 90 Total Marks : 75 [ L – T – P – S ] No. of Labs / Week : 3 Credits : 3 [ 0 – 1 - 3 – 0 ]**

**Learning Objectives:** This Lab course will help the student to learn the fundamentals of Data Science applied along with various statistical Techniques. The course will be learnt with the use of R, which will help the student to do Data Analysis in a deeper sense

**Learning Outcomes:** This course provides majors with the skills needed to utilize statistical techniques for addressing quantitative, data-based problems in fields such as biological and social sciences, engineering and technology, business and finance, law, and health and education. Students will be able to learn

- statistical reasoning and inferential methods
- statistical modeling and its limitations
- interpreting and communicating the results of a statistical analysis
- data analysis using statistical computing tools and software
- probability and the mathematical foundations of statistics

#### **Business Excel and R Lab**

- [1]. Introduction, Uses of Excel, New functions and features of excel 2013. [2]. Getting started with excel: Opening a blank or new workbook, general organization. [3]. Highlights and main functions: Home, Insert, page layout, formulas. [4]. Highlights and main functions: Data, review, view, add-ins.
- [5]. Using the Excel help function.
- [6]. Customizing the Quick Access Toolbar.
- [7]. Creating and Using Templates.
- [8]. Working with Data: Entering, Editing, Copy, Cut, Paste, Paste Special.
- [9]. Formatting Data and Using the Right Mouse Click.

- [10]. Saving, Page Setup, and Printing.
- [11]. Using Headers and Footers.
- [12]. Manipulating Data, using Data Names and Ranges, Filters and Sort and Validation Lists.
- [13]. Data from External Sources.
- [14]. Using and Formatting Tables.
- [15]. Basic Formulas and Use of Functions.
- [16]. Data Analysis Using Charts and Graphs.
- [17]. Managing, Inserting, and Copying Worksheets.
- [18]. Securing the Excel Document (Protect Cells and Workbook).
- [19]. Advanced Formulas and Functions.
- [20]. Advanced Worksheet Features.
- [21]. Advanced Data Analysis using PivotTables and Pivot Charts.

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### **D 107.1 BUSINESS COMMUNICATION**

**Total No. of Lectures : 30 Total Marks : 50 [ L – T – P – S ] No. of Lectures / Week :  
3 Credits : 2 [ 2 – 2 – 0 – 0 ]**

**Learning objective :** Learners should be able to:

- speak confidently with any speakers of English, including native speakers, ▪
- speak effortlessly in different contexts – informal and formal,
- ‘think on feet’ even in difficult circumstances,
- hold interesting and meaningful conversations with others, including strangers, and ▪
- listen to others with utmost attention.

#### **Unit –I**

**Personal Communication:** Day-to-day conversation with family members, neighbours, relatives, friends on various topics, context specific – agreeing/disagreeing, wishing, consoling, advising, persuading, and expressing opinions, arguing.

**(6 hrs)**

#### **Unit –II**

**Social Communication:** Telephone calls (official), colleagues in the workspot, discussing issues (social, political, cultural) clubs (any social gathering), answering questions, talking about films, books, news items, T.V. programmes, sharing jokes. **(6 hrs)**

#### **Unit –III**

**Group/Mass Communication:** Group discussion (brainstorming ), debate, panel discussion, anchoring/master of ceremony, welcome address, proposing vote of thanks, introducing speakers, conducting meetings, making announcements, Just-a-minute (JAM), Block and tackle, shipwreck, spoof, conducting quiz, negotiations, oral reports.

**(6 hrs)**

#### **Unit –IV**

**Integrated Speaking & Presentation Skills:** Listening to speak (any radio programme/lecture), reading to speak, writing to speak, watching to speak, (any interesting programme on TV) Reading aloud any text/speech, lecturing, PowerPoint presentation, impromptu, Interviews of different kinds (one to one, many to one, stress interview, telephonic

interview).

(6 hrs)

### Unit -V

**Employability & Corporate Skills:** Interview skills – Types of interview, preparation for interview, mock interview. Group Discussion –Communication skills in Group Discussion, Structure of GD, GD process, successful GD techniques, skills bought out in GD – leadership and co-ordination. Time management and effective planning – effective time management, time management techniques, relationship between time management and stress management. Stress management – causes and effect, coping strategies; Decision making and Negotiation skills, People skills, Team work, development of leadership qualities.

(6 hrs)

#### Reference Books:

1. Richard Denny, “Communication to Win”; 1<sup>st</sup> Ed, 2008, Kogan Page India Pvt. Ltd.
2. Sanjay Kumar, PushpLatha, “Communication Skills”, 1<sup>st</sup> Ed, 2011, Oxford University Press
3. Courtland L. Bovee, John. V. Thill, “Business Communication Today”, 2<sup>nd</sup> Ed, 2007, Pearson
4. Lesikar, Marie, E, Flatley, Rentz, N Pande.”Business Communication”, 3<sup>rd</sup> Ed, 2012, Mcgraw Hill
5. R.C.Sharma, Krishna Mohan,”Business Correspondence and Report Writing”, 1<sup>st</sup> Ed, 2009, Mcgraw Hill
6. Shirley Taylor, V.Chandra, “Communication for Business”, 1<sup>st</sup> Ed, 2008, Pearson
7. HorySankar Mukherjee, “Business Communication’, 2<sup>nd</sup> Ed, 2009, Oxford University Press

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### II Semester

#### D 101.2 : PYTHON FOR DATA ANALYSIS

**Total No. of Lectures : 45 Total Marks : 100 [ L – T – P – S ] No. of Lectures / Week :**

**4 Credits : 4 [3 – 1 - 0 - 2 ]**

**Learning Objectives:** The objective of this course is to make the students: •

- Describe the core syntax and semantics of Python programming language. •
- Discover the need for working with the strings and functions.
- Illustrate the process of structuring the data using lists, dictionaries, tuples and sets. •
- Indicate the use of regular expressions and built-in functions to navigate the file system. •
- Infer the Object-oriented Programming concepts in Python.

**Learning Outcomes:** At the end of this course students will be able

- To learn how to design and program Python applications, use lists, tuples, and dictionaries in Python programs.
- To learn how to identify Python object types, use indexing and slicing to access data in Python programs.
- To learn how to build and package Python modules for reusability and to read and write files in Python.
- To learn how to use Python for Data Analytics and get the insights of Data • To learn how to use exception handling in Python applications for error handling.

### Unit I

**Introduction to Python:** Installation and Working with Python, Understanding Python

variables, basic operators, blocks. Declaring and using Numeric data types: int, float, complex, using string data type and string operations, defining list and list slicing, Use of Tuple data type.

**(9 hrs)**

## **Unit II**

**Program Flow Control & Functions:** Conditional blocks using if, else and elif, for loops in, for loop using ranges, use of while loops in python, Loop manipulation using pass, continue, break and else. Organizing python codes using functions, organizing python projects into modules, importing own module as well as external modules, Understanding Packages.

**(9 hrs)**

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## **Unit III**

**String, List, Dictionary & File handling:** Understanding in-built string methods, List manipulation, and Dictionary manipulation. Programming using string, list and dictionary in built functions. Reading files in python, writing files in python, Understanding read and write functions, manipulating file pointer using seek, Programming using file operations. **(9 hrs)**

## **Unit IV**

**OO Programming & Regular Expressions:** Concept of class, object and instances, constructor, class attributes and destructors, Inheritance, overlapping and overloading operators, Adding and retrieving dynamic attributes of classes. Pattern matching and searching, Power of pattern searching using regex in python, Pattern finding programs using regular expression.

**(9 hrs)**

## **Unit V**

**Exception Handling & Database Interaction:** Avoiding code break using exception handling, Safe guarding file operation using exception handling, Handling and helping developer with error code. SQL Database connection using python, Creating and searching tables, Reading, storing and updating information on database.

**(9 hrs)**

**Text Books:**

[1]. R. Nageswara Rao, "Core Python Programming", 2<sup>nd</sup> Edition, 2018, Dreamtech Press. [2].

Jason Rees, "Python Programming: A Practical Introduction To Python Programming For Total Beginners Paperback", 2019, Independent Publication.

#### **Reference Books:**

[1]. Eric Matthes, "Python Crash Course, 2nd Edition: A Hands-On, Project-Based Introduction to Programming", 2019, No Starch Press.

[2]. Zed A. Shaw, "Learn Python 3 the Hard Way", 2017, Addison Wesley. [3]. John M Zelle, "Python Programming: An Introduction to Computer Science", 2016, Ingram short title; Third edition.

[4]. David Beazley, Brian K. Jones, "Python Cookbook: Recipes for Mastering Python 3, 2013, O'Reilly 3rd Edition.

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### **D 102.2 : MARKETING AND HR ANALYTICS**

**Total No. of Lectures : 45 Total Marks : 100 [ L - T - P - S ] No. of Lectures / Week : 4 Credits : 4 [ 3 - 1 - 0 - 2 ] Learning Objectives:**

- To understand the terms and terminologies of predictive modeling.
- To study the various predictive models, their merits, demerits and application. • To get exposure to various analytical tools available for predictive modeling. • Introduces the principles and strategic concepts of marketing analytics. • Understand cost concepts (Total Hours, fixed, variable); profit margins, and lifetime value of the customer.
- Get a overview to understand the benefits and objectives of quantitative marketing.

**Learning Objectives:** Students who complete this course will be able to • Have a high- level understanding of the benefits and objectives of marketing analytics. • Apply metrics -driven techniques to improve marketing decisions.

- Understand best practices through case studies.
- Learn by doing through hands-on computer spreadsheet models and metric • Design and analyze appropriate predictive models.& apply statistical tools for analysis **Unit - I**

**Overview of Marketing Strategy** - Relationship with Corporate Vision, Mission and Objectives. Market-led strategic management.

**Strategic Marketing analysis** – Identification of attractive markets, Industry business analysis and sustaining competitive advantage.

**(9 hrs)**

**Unit - II**

**Introduction to Marketing Analytics :** Market Insight; Market sizing and trend analysis.

**Market Segmentation:** Market segmentation; Segment identification, analysis, and strategy, Competitive analysis- Competitor identification, analysis and strategy.

**Business Strategy and Operations:** Business Strategy; Analytics-based strategy selection; Business Operations; Forecasting, predictive analytics, and data mining. **(9 hrs) Unit - III**

**Product, Service and Price Analytics:** Product and Service Analytics; Conjoint analysis and product/service metrics, Price Analytics; Pricing techniques and assessment. **Distribution and**

**Promotional Analytics:** Distribution Analytics; Analytics-based channel evaluation and selection; Promotion Analytics; Promotion budget estimation and allocation. **(9 hrs)**

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#### **Unit - IV**

**HR Analytics :** Analytic Capabilities, Analytic Value Chain, Analytic Model, Training Value Measurement Model; Go-to-Market Models – Assessment, Developmental Experiences, Financial Connections, Sample Case, Focusing on the Purpose, Present-Day Needs, use of Human Capital Analytics, Turning Data into Information, Three Value Paths, Preparing for an Analytics, Ten Steps for an Analytics Unit, Structure and Team Building

**Dealing with the C Level -** Breaking Through, Research, Recruiting a Sponsor or Champion, Making the Sale, Working with Consultants and Coaches, Designing and Delivering Reports, Making an Impact, Process Management.

**(9 hrs)**

#### **Unit - V**

**Predictive Analytics:** Determine the Key Performance Indicators, Analyze and Report the Data, Relationships, Optimization, and Predictive Analytics, Predictive Analytics, Interpreting the Results, Predicting the Future, Structural Equation Modeling

**Predicting the Future of Human Capital Analytics -** What Does the Future Look Like, Bringing It All Together, Predictive Analytics for HR. **(9 hrs)**

#### **Text Books:**

- [1]. Stephan Sorger, “Marketing Analytics: Strategic Models and Metrics”, 1st Edition, vCreate Space Independent Publishing Platform
- [2]. Jac Fitz-enz, John Mattox, “Predictive Analytics for Human Resources”, 1<sup>st</sup> Edition , 2014, Wiley

#### **Reference Books:**

- [1]. Stephan Sorger, “Marketing Planning: Where Strategy Meets Action”, 1st Edition, Prentice Hall PTR,

- [2]. Cesar A.Brea, “Pragmalytics : Practical approaches to the Marketing analytics in the Digital Age”,1st Edition, iUniverse
- [3]. Alex Guazzelli, Wen-Ching Lin, Tridivesh Jena, James Taylor, “PMML in Action Unleashing the Power of Open Standards for Data Mining and Predictive Analytics”, 2nd Edition, 2012, Create Space Independent Publishing Platform,2012.
- [4]. Ian H. Witten, Eibe Frank , “Data Mining: Practical Machine Learning Tools and Techniques”, Morgan Kaufmann Series in Data Management Systems, 3<sup>rd</sup> Edition, 2011, Morgan Kaufmann.
- [5]. Eric Siegel , “Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die”, 1st Edition, 2013, Wiley.

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### **D 103.2: SOCIAL MEDIA ANALYTICS FOR BUSINESS**

**Total No. of Lectures : 45 Total Marks : 100 [ L - T - P - S ] No. of Lectures / Week : 4 Credits : 4 [ 3 - 1 - 0 - 2 ] Learning Objectives:** The course covers concepts and techniques for retrieving, exploring, visualizing, and analyzing social network and social media data, website usage, and clickstream data. Students learn to use key metrics to assess goals and return on investment, perform social network analysis to identify important social actors, subgroups, and network properties in social media.

**Learning Outcomes:** Upon successful completion of this course, the student will be able to: •

- Apply multiple quantitative and qualitative methods
- Understand sources and limitations of web-based data
- Perform social network analysis to identify important social actors, subgroups and network properties in social media sites such as Twitter, Facebook, and YouTube • Use appropriate information visualization technique to gain insights into large datasets • Apply best practices in Search Engine Optimization

#### **Unit - I**

**Social Media Analytics:** Understanding social media, Social media analytics, Getting started with R, Data types, Data analytics, Machine learning, Text analytics

**Social Graph:** Delving into social data, Understanding the process, working environment, getting the data, Analyzing the data, visualizing the data, Getting started with the toolset. **(9 hrs)**

#### **Unit - II**

**Social Data – Connecting, Capturing, Cleaning:** APIs in a nutshell, authentication techniques,

Parsing API outputs, Basic cleaning techniques, MongoDB to store and access social data, MongoDB using Python

**Uncovering Brand Activity, Popularity and Emotions on Facebook:** Facebook brand page, Project planning, Analysis, Keywords, Noun phrases, Detecting trends in time series, Uncovering emotions.

**Twitter Analytics:** Understanding Twitter, Scope and process, Getting the data, Revisiting analytics, workflow, Sentiment analysis, Customized sentiment analysis, Trend analysis, Sentiment analysis, Follower graph analysis.

**(9 hrs)**

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### **Unit - III**

**Campaign and Consumer Reaction Analytics on Youtube – Structured and Unstructured:**

Scope and process, Getting the data, Data pull, Data processing, Data analysis. **Foursquare:** Foursquare – the app and data, Category trend analysis, Recommendation engine – let's open a restaurant, The sentimental rankings, Venue graph, Challenges for Foursquare data analysis

**Analyzing Social Collaboration – Social Coding with Github:** Scope and process, Getting the data Environment setup, Understanding GitHub, Accessing GitHub data, Data pull, Data processing, Data analysis, Analyzing repository activity, Analyzing repository trends, Analyzing language trends

**(9 hrs)**

### **Unit - IV**

**Flickr Data Analysis:** A Flickr-ing world, Accessing Flickr's data, Understanding Flickr data, Understanding interestingness – similarities, Challenges

**Scrapping and Extracting Conventional Topics on Internet Forums:** Scope and process, Getting the data, Data pull and pre-processing, Data analysis

**Pintrest through Network Analysis of User Interest:** Scope and process, Getting the data, Data pull and pre-processing, Data analysis. **(9 hrs) Unit - V**

**Social Data Analytics at Scale Spark and Amazon Services:** Different scaling methods and platforms, Topic models at scale, Spark on the Cloud and Amazon Elastic MapReduce. **News –**

**Collective Social media:** News data – news is everywhere, Sentiment trend analysis, Topic modeling, Summarizing news articles, Challenges to news data analysis **(9 hrs)**

#### **Text Books :**

[1]. Siddhartha Chatterjee, Michal Krystianczuk, “Python Social Media Analytics - Leverage the power of Python to collect, process, and mine deep insights from social media data “, 1<sup>st</sup>

- Ed, 2017, PACKT
- [2]. Raghav Bali, Dipanjan Sarkar, Tushar Sharma, "Learning Social Media Analytics with R", 2017, PACKT

**References:**

- [1]. Sharan Kumar Ravindran, "Mastering Social Media Mining with R", 1st Edition, 2016, PACKT
- [2]. Marshall Sponder, "Social Media Analytics", 2<sup>nd</sup> Edition, 2015, Wiley Publications
- [3]. Alex Gonsalves, "Social Media Analytics Strategy: Using Data to Optimize Business Performance", 1<sup>st</sup> Edition, 2016, Elsevier Publishers
- [4]. Chuck Hemann, Ken Burbary, "Digital Marketing Analytics: Making Sense of Consumer Data in a Digital World", 1<sup>st</sup> Edition, Pearson
- [5]. Marshall Sponder, "Social Media Analytics: Effective Tools for Building, Interpreting, and Using Metric", 1<sup>st</sup> Edition, 2015, Pearson International
- [6]. Kohirkar Ganis, "Social Media Analytics", 2<sup>nd</sup> Edition, 2015, Wiley International

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**D 104.2 PYTHON FOR DATA ANALYSIS LAB**

**Total No. of Practicals : 90 Total Marks : 75 [ L - T - P - S ] No. of Labs / Week : 3 Credits : 3 [ 0 - 1 - 3 - 0 ]**

**Learning Objectives:** This Lab course enables students to acquire programming skills in core Python, to acquire Object Oriented Skills in Python and develop the skill of designing Graphical user Interfaces in Python also develop the ability to write database applications in Python.

**Learning Outcome:** Upon completion of the subject, students will be able to • Design real life situational problems and think creatively about solutions of them. • Apply a solution clearly and accurately in a program using Python.

• Apply the best features of mathematics, engineering and natural sciences to program real life problems

**Python for Data Analysis Lab Exercises:**

1. Running instructions in Interactive interpreter and a Python Script.
2. Write a program to purposefully raise Indentation Error and correct it.
3. Scientific problem-solving using decision making and looping.
4. Simple programming for one dimensional and two-dimensional arrays.
5. Python Programming to explore string functions.
6. Utilizing 'Functions' in Python
7. Find mean, median, mode for the given set of numbers in a list.
8. Write a function dups to find all duplicates in the list.
9. Write a function unique to find all the unique elements of a list.
10. Write function to compute gcd, lcm of two numbers
11. Demonstrate the use of Lists, Dictionaries.
12. Write a program to implement Turtle.
13. Building a Classical Data Structure using Python Programming.

14. Implement Searching Operations: Linear and Binary Search.
15. To sort the 'n' numbers using: Selection and Insertion Sort.
16. Find the most frequent words in a text read from a file.
17. Demonstrate Exceptions in Python.
18. Simulate elliptical orbits and bouncing ball using Pygame
19. Create a new program to input text and print
20. Write a program using print that, when run, prints out a tic-tac-toe board.
21. Using a for loop, write a program that prints out the decimal equivalents of  $1/2$ ,  $1/3$ ,  $1/4$ ...  $1/10$ .
22. Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero. What should your program do if the user inputs a negative number? As a programmer, you should always consider "edge conditions" like these when you program! (Another way to put it- always assume the users of your

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program will be trying to find a way to break it! If you don't include a condition that catches negative numbers, what will your program do?)

23. Write a program using a for loop that calculates exponentials. Your program should ask the user for a base base and an exponent exp, and calculate base<sup>exp</sup>.
24. Write a method fact that takes a number from the user and prints its factorial.
25. Write a method rand divis 3 that takes no parameters, generates and prints a random number, and finally returns True if the randomly generated number is divisible by 3, and False otherwise. For this method we'll use a new module, the random module. At the top of your code, underneath import math, add the line import random.
26. Write a method roll dice that takes in 2 parameters - the number of sides of the die, and the number of dice to roll - and generates random roll values for each die rolled. Print out each roll and then return the string
27. Write a function roots that computes the roots of a quadratic equation. Check for complex roots and print an error message saying that the roots are complex.
28. Drawing Rectangles: To display a rectangle, you need to specify two points: the upper left corner and the bottom right corner. Remember our y-axis is flipped. Run your program and make sure that the rectangle appears on the screen. Try changing the color and width of the outline of the rectangle. Look at the setOutline and setWidth methods.
29. Drawing a Digital Clock: In dig clock.py, create a class called DigitalClock that has attributes hour, minute, second and pos, and a draw method. The attributes store the time in military time, i.e. 3:30pm will be hour = 15, minute = 30, second = 23 and the position - the upper left corner of the rectangle face.
30. Drawing the car: Create a wheel class. Derive a class for a car from it. Be sure that wheel.py and car.py are saved in the same directory; this will enable you to use your definition of Wheel instead of redefining it. The car will contain 3 attributes: two Wheel

objects and one Rectangle object (the body of the car) that is horizontal and whose bottom corners correspond to the centers of the wheels.

**Note :** Facilitator can modify / add more exercises according to the academic need

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### **D 105.2 MARKETING AND SOCIAL MEDIA ANALYTICS LAB**

**Total No. of Practicals : 90 Total Marks : 75 [ L - T - P - S ] No. of Labs / Week : 3**

**Credits : 3 [ 0 - 1 - 3 - 0 ]**

**Learning Objectives:** This subject enables students to

- master the basics in business intelligence (BI), data mining (DM), and knowledge discovery in databases;
- learn the role that software tools/applications play in BI and DM, with emphasis on industrial case studies and practical applications;
- Have an overall understanding of the major issues and applications in business intelligence and data mining, including a basic grasp of the algorithm classes and best practices for building successful BI projects

**Learning Outcome:** Upon completion of the subject, students will be able

- to • examine the concepts of data warehousing and OLAP;
- apply the concepts of BI and DM techniques for clustering, association, and classification; • understand the operation procedures of BI projects in an organization; • select appropriate DM tools and methods to manipulate and achieve data; • apply DM concepts for formulating business strategies and programs to enhance business intelligence.

#### **Business Intelligence Laboratory exercises**

- [1] Experiment dealing with elementary concepts in Statistics . Calculate Probability and Conditional Probability for given data set ( with discrete attributes and continuous attributes) and vizualise them.
- [2] Gain insight for running pre- defined decision trees and explore results using MS OLAP Analytics.
- [3] To Perform various PL/SQL commands in Oracle 11g
- [4] To perform multi dimensional data model using SQL queries e.g: Star, Snowflake, Fact Constellation schemas.

[5] Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of multidimensional cubes.

[6] To perform various OLAP operations such as Slice, dice, roll up, drill up, pivot etc. [7]

To perform Text mining on the given data warehouse.

[8] To perform Correlation ship analysis between for the given data set. [9] Publish cognos cubes to a business intelligence portal. Metadata & ETL Lab: The objective of the lab exercises is to implement metadata import agents to pull metadata from leading business intelligence tools and populate a metadata repository. [10] Import metadata from specific business intelligence tools and populate a meta data repository.

[11] Publish metadata stored in the repository

[12] Load data from heterogenous sources including text files into a pre-defined warehouse schema.

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[13] Using Teradata Warehouse Miner – Create mining models that are executed in SQL [14] Design a data mart from scratch to store the credit history of customers of a bank. Use this credit profiling to process future loan applications.

[15] Design and build a Data Warehouse using bottom up approach titled 'Citizen Information System'. This should be able to serve the analytical needs of the various government departments and also provide a global integrated view.

[16] To perform attribute relevance analysis on the given data.

[17] To perform the information gain for a particular attribute in the given data. [18] To perform the experiment to predict the class using the Bayesian Classification. [19] To find out a weight or bias updating using the Back Propagation Neural Network. [20] To perform various Data Mining algorithms on the given database using Clementine. [21] To perform data Mining using Weka tool.

[22] Experiment with any Classification method.

[23] To perform Data Mining using Ms-Excel Mining Tool.

[24] Experiment with the Apriori Association Mining Algorithm

[25] Perform Market basket analysis with a given data set.

[26] Experiment with data set using any Clustering algorithm.

[27] Data Analysis- Getting to know the Data(Using ORANGE,WEKA)

- Parametric – Means, T-Test, Correlation
- Prediction for numerical outcomes - Linear regression
- Correlation analysis
- Preparing data for analysis
- Pre-processing techniques

[28] Data Mining(Using ORANGE,WEKA or any open source data mining tool) •

Implement clustering algorithm

- Implement classification using
- Decision tree
- Back propagation

[29] Web Analytics(Using Rapid Miner or any open source web mining tool) •

Visualization methods

- Study of web mining tool kits
- Categorization and clustering of web data(Using CARROT)

**Note :** Facilitator can modify/ add more exercises according to the academic need

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### **D 106.2 FOUNDATIONS OF ENTREPRENURESHIP**

**Total no of lectures: 36 Total marks: 100 [L - T - P -S] No of lectures / week: 4 Credits: 2**

**[3 - 1 - 0 - 3]**

**About the Course:** This course is the first of a two-part entrepreneurship development curriculum from Wadhvani Foundation. It is aimed at empowering you with an entrepreneurial mindset and business skills to enhance your job prospects, help you develop intrapreneurship skills, and get you started on the entrepreneurship journey. You will also learn about the risks and rewards in choosing entrepreneurship as a career option.

This is not a theoretical course – you will actually start your venture and build it as you progress through this course. The course follows the “Watch – Think – Do – Explore – Collaborate” pedagogy in a highly experiential learning format. Every lesson has one or more videos/animations to help you understand and master key entrepreneurship concepts. The videos have been interspersed with knowledge check questions at strategic points – these will help you reflect on the concepts presented, and internalize them. You also get to experience entrepreneurship through the activities and assignments provided throughout the course. Additionally, if you want to dig deeper and learn more, read through the reference materials provided.

You will start this course by discovering yourself and your entrepreneurial style. You will then identify a problem “worth” solving, delve into the problem to understand it better through Design Thinking principles, generate ideas to solve that problem using Brainstorming, and go on to develop your Business Model.

1. **Self-Discovery** : Finding your flow, Effectuation, Principles of Effectuation, Class Activity – Take stock of your means; Case Study on Effectuation, Entrepreneurial Style – Entrepreneurial Style Introduction, Different Entrepreneurial Styles, Class Activity – Entrepreneurial Style Quiz; Master Class – Team Formation, Student Handout – Form Teams and Assign Roles – Process Flow, Form Teams and assign roles – Framework. Case Study – Entrepreneurial Journey
2. **Opportunity Discovery** – Identify Problems worth Solving, Class Activity – Identifying Problems worth Solving; Design Thinking – Introduction to Design Thinking, Value of Design Thinking, Design Thinking Process, Student Activity – Applying Design Thinking, Case studies; Look for Solutions – Brainstorming Concept, Class Activity – Brain Storming. Case Studies
3. **Customer and Solution** – Customers and Markets; Customer Vs Consumer, Types of Start ups, Class Activity – Customer Vs Consumer; Market Types; Identify your Customer

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- Segments and Niche – Segmentation and Targeting, Identify your customer segment, Niche Marketing, Class Activity – Find your Niche; Identify Jobs, Pains and Gains and Early Adopters – Value Proposition Design, Introduction and Concept; Customer Segment Concept and Example; Class Activity – Customer Jobs, Pains and Gains; Identify your Early adopters, Creating Personas. Craft your Value Proposition – Value Proposition and assessing Fit, Value Proposition Examples, Student Activity – Craft my value proposition; Outcome driven innovation – Class activity on Outcome driven Innovation; Present your value proposition Canvas (VPC). Case studies.
4. **Business Model** – Business Models, Tesla Case study, Lean Approach, Identifying the problem, solution and Customer segments to the venture; Observe / Research Business Models; Capture your Business Model; Business Models, Sketching the Lean Canvas; Lean Canvas Template, Case Studies – Airbnb, Facebook, Starbucks; Risks and Assumptions, Tips to prioritize the Risks and Assumptions, Identifying the Riskiest Assumptions; Pitch your Business Model; Case Studies.
  5. **Validation** – Blue Ocean Strategy, Blue Ocean Strategy Example; Plot the strategy Canvas, Build your Solution Demo and conduct Solution Interviews; Class Activity – Build your Solution Demo Mock ups; Problem Solution Fit; Building an MVP -MVP How to build a start up, Difference between Solution Demo and MVP, Class Activity – Identify your MVP and Build it; Tips for prototyping and MVP, Class Activity – Compile your results from MVP interviews; Present your MVP
  6. **Money** – Cost Structure, Basic Financial Template, Class Activity – Estimate your Costs; Pricing; Revenue Streams; Class Activity – Identify your Secondary Revenue Stream, Estimate your revenue and Price; Profitability Checks; Bootstrapping – Sources and Uses

of Funds; Case Studies on Bootstrap Finance; Student activity – Identify Sources and use of funds; Practice Pitching; Case Studies – How to Bootstrap and get initial funding for the company; Best Practices for pitching with investors.

7. **Team** - Shared Leadership, Adopting Shared Leadership Student Activity – Adopting Shared Leadership, Shared Leadership and Team Building; Hiring & Fitment, Team Role and Responsibilities – Identifying Co-Founders and Hiring a Team; Student Activity – Identify Job roles for Hiring. Practice Pitching; Collaboration Tools and Techniques.
8. **Marketing Sales** - Positioning and Branding – What is Branding, Create Brand Strategy, Creating your Positioning statement; Channels, Selecting your Channels, Sales Planning – Why Customers wont Buy? -Introduction, Switching Costs, Psychological Biases, How Customers Buy – Patterns; Customer Acquisition, Make your Sales Plan and Sales Pitch; Selling Skills – One to One Selling Skills,
9. **Support** – Project Management, Project Tracking, List of Required Registrations, Compliance Checklist, Interviewing Entrepreneurs and Business Owners; Why Compliance; Types of Organizations and setting up; Business Structures and Legal

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Entities; Different Legal Entities- A comparative note; Getting Started with your Venture – How to get help to get started. Case Studies

**TextBook:**

- [1]. Robert D. Hisrich, Mathew J. Manimala, Michael P. Peters, Dean A. Shepherd,  
“Entrepreneurship, 6<sup>th</sup> Edition, 2013, Tata McGraw Hill Publishers
- [2]. Rajeev Roy, “Entrepreneurship”, 2<sup>nd</sup> Edition, 2011, Oxford University Press

**Reference Books:**

- [1]. C B Gupta, N P Srinivasan, “Entrepreneurship Development in India”, 1<sup>st</sup> Ed, 2013, Sultan Chand
- [2]. Bruce R Barrianger, “Entrepreneurship: Successfully Launching New Ventures”, 3<sup>rd</sup> Ed, 2011, Pearson
- [3]. Arya Kumar, “Entrepreneurship: Creating and Leading an Entrepreneurial Organization”, 2012, Pearson
- [4]. D F Kuratko, Rao, “Entrepreneurship: A South Asian Perspective”, 1<sup>st</sup> Ed, 2012, Cengage Learning
- [5]. N V R Naidu, T Krishana Rao, “Management and Entrepreneurship”, 1<sup>st</sup> Ed, 2008, IK International
- [6]. Jack m Kaplan, “Patterns of Entrepreneurship”, 1<sup>st</sup> Edition, 2007, Wiley India

**D107.2 : PROJECT WORK**

**Total Marks : 200 Final Viva : 100 [ L - T - P - S ] Internal Assessment : 100 Credits : 6 [ 0 - 4 - 4 - 4 ]**

The purpose of a thesis is to enable the student to develop deeper knowledge, understanding, capabilities and attitudes in the context of the programme of study. The thesis offers the opportunity to delve more deeply into and synthesise knowledge acquired in previous studies. The overall goal of the project report is for the student to display the knowledge and capability required for independent work as a PGDCA.

**Learning objectives** for a Project work are based on the objectives for PGDCA has Specific learning outcomes: for the student to demonstrate:

- Considerably more in-depth knowledge of the major subject/field of study, including deeper insight into application of IT.
- Deeper knowledge of methods in the major subject/field of study.
- The capability to use a holistic view to critically, independently and creatively identify, formulate and deal with complex issues.

- The capability to plan and use adequate methods to conduct qualified tasks in given frameworks and to evaluate this work.
- The capability to create, analyse and critically evaluate different technical/architectural solutions.
- The capability to critically and systematically integrate knowledge.
- The capability to clearly present and discuss the conclusions as well as the knowledge and arguments that form the basis for these findings in written and spoken English.
- The capability to identify the issues that must be addressed within the framework of the specific thesis in order to take into consideration all relevant dimensions of sustainable development.
- A consciousness of the ethical aspects of research and development work.

The same formulated learning objectives apply for theses encompassing 6 Credits (Hec). The course must be considerably more ambitious with respect to the scientific level or technical/architectural realisation. For example, the objective could be to author a scientific article as the result of the research or to further develop a technical solution for mass production and market introduction.

### **Guidelines for Project development**

#### **I. Background:**

- Every student is required to carry out Project work under the supervision of a faculty member of the department.
- The internal supervisor shall monitor progress of the student continuously. ▪ A candidate is required to present the progress of the work time to time to the guide. ▪ There will a final presentation of the Project work at the end of the semester. ▪ The course Project is one that involves requirement analysis, feasibility analysis, Database design coding, testing, implementation and maintenance.
- The Project should be an Application of knowledge and techniques learnt in theoretical classes for developing the s/w for real problems.

#### **II. Motivation:**

- Overview of the product design process and its relationship to the development of Web based products and services has to be studied.
- Generate at least 10 market opportunities consistent with the course project guidelines ▪ Using the interviewing, pick one of your opportunities and interview at least one “customer” about their “customer needs” for your opportunity.

- Translate your interview notes into “needs” statements using the process and rules. ▪ Identify a well executed Web-based promotional site, product or service that could be developed using Open source tools / web programming.
- The titles and descriptions of market opportunities that (1) you are passionate about (2) meet the project guidelines (3) you believe can be refined and prototyped over the course.
- Identify at least two different organizational schemes.
- Sketch the site hierarchy for each of the organizational schemes that you identified ▪ Select an organizational structure and draw the corresponding site hierarchy for your project idea using a computer online drawing package. (Smart Draw)
- Match technical specifications to each element of your information architecture. ▪ List the data that you will need for your project and identify the sources of that data.

 ***Submit a full specification document (no more than 15 pages including figures) for your mini-project.***

 ***Submit a project plan with dates, deliverables, and job assignments. Prepare your project plan and submit it as a Microsoft Excel file or as a PDF file.***  ***Submit a one page sheet that includes a product name, an associated domain name that is open and available, and a graphical logo for your product.***

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 ***Submit a one-page screen dump of your product home page incorporating the product name and graphical logo.***

 ***You need not actually purchase/reserve your domain name, but verify that the name is available in the .com space.***

 ***Submit in a single MS Word or PDF file, a semi-colon separated list of 20 email addresses that we can email about the roll-out of our online products. In the interest of reaching a wide audience, please do 10 consider reaching out to classmates at other academic institutions. Please try to avoid including names of individuals who are already familiar with your products and/or processes in order to provide a fresh look at the product pages.***

 ***Identify one aspect of your site design that you could evaluate using A/B testing.-- Draft the text and interfaces required to implement the two versions. --- Define hypotheses or expectations for evaluating results.***

 ***Based upon five days of user feedback and user log analysis***  
***- Identify opportunities for architecture redesign***

- *Analyze navigation paths*
- *High/low traffic content*
- *Strategies for promoting low traffic content*

### III. Project Guidelines

You are developing a web-based product or service. The definition of a “web-based product or service” is quite broad and includes retailing, financial services, healthcare, public service, etc. Additional constraints on your project:

- Free to users
- This is a desktop or laptop/notebook browser-based product or service • You already have legal access to all content (images, catalog information, narratives, etc.) in electronic form.
- The product or service neither collects nor retains any personal or otherwise individually identifiable information about the user (e.g. no cookies, no user registration, etc.)
- All content conforms to one of a maximum of five page templates.
- No use of proprietary algorithms (whether implemented or not)
- Web-enabled product or service for the target consumers. This is not, for example, a corporate website for public relations.
- Design and deploy a desktop or laptop/netbook browser-based product or service. Plans to extend your service to the wireless medium are acceptable, but the demonstration must rely upon desktop or laptop/netbook browsers.
- You must design the Information Architecture backbone that drives the user experience (e.g. this is not a Facebook app, etc.)

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- Use of open source or publicly exported Web services such as the Amazon API or WordPress blogging is permitted.
- Language specifications are optional (e.g. PHP, Perl, Python, Ruby, C++, etc.)

Key milestones and deliverables for the mini-project are detailed further in the syllabus.

However, your mini-project will include:

- A name
- A concept description
- A hierarchy of user needs beginning with those that are explicitly addressed • A set of design specifications including an information architecture and page templates. • Electronic copies of all content (images, catalog information, narratives, etc. as well as boilerplate for About, Contact, and Privacy)
- Any programming language-specific specifications.

### IV. Project Proposal (Synopsis) Structure:

Mini Project proposal should be prepared in **consultation with the guide**. It should clearly state the objectives and environment of the proposed Project to be undertaken. Ensure to include the following items while submitting your Project synopsis. Mini Project synopsis may contain 10-20 pages and sequence of contents strictly should be in the following

order:

Cover and Title page

Synopsis Approval Performa duly filled and signed by the student

- 1) Index.
- 2) Acknowledgement.
- 3) Introduction and objective of the Mini Project.
- 4) Analysis (Feasibility Study, DFD 0 Level, 1- Level and 2 Level/ER Diagram etc). 5) H/W and S/W Requirement.
- 6) Table and Structure, Number of Modules, Detail of Modules, Data Structure. 7) Types of Reports.
- 8) Scope of future application.

#### **V. Communication of Synopsis Approval**

The candidate has to submit the Synopsis to the Project coordinator, which will be scrutinized by a panel of experts (Faculties). The Dean of the Faculty will release a list of approved synopsis. A list of approved synopsis will be put on the notice board of the Institute as per the dates mentioned in the activity schedule. In case of non approval, the suggestions for reformulating the Project synopsis will be communicated to the student. Students can resubmit the modified synopsis to Project Coordinator Department as per the specified time given in activity schedule.

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#### **VI. Project Report Structure.**

The Project should be prepared in consultation with the guide and may contain 100-150 pages (including coding). Project Report should strictly follow the points given below: 1)

Cover and Title page

2) Synopsis Approval Certificate/Company Certificate

3) Index

4) Acknowledgement

5) Certificate of Originality

6) Introduction/Aims and Objective

7) System Analysis

7.1 Identification of Need

7.2 Preliminary Investigation

8) Feasibility Study

8.1 Technical Feasibility

8.2 Economic Feasibility

8.3 Operational Feasibility

9) Analysis (Feasibility Study, DFD 0 Level, 1- Level and 2 Level/ER Diagram, and Data

structure, Table structure etc)

- 10) S/W Engineering. Paradigm applied
- 11) S/W & H/W Requirement Specification
- 12) System Design
- 13) Screen Shots
- 14) Coding
- 15) Validation Checks
- 16) Implementation and Maintenance
- 17) Testing (Testing techniques and Testing strategies)
- 18) System Security measures
- 19) Various types of Reports/Modules
- 20) Pert Chart/Gantt Chart
- 21) Future scope of the Mini Project
- 22) Bibliography/References/Glossary
- 23) Original Copy of the Approved Synopsis

## VII. Formatting of Mini Project

- The entire Mini Project report should be nicely composed and presented. • Students should use only A4 / Letter (8.27 x 11.69 inches) size paper. • Students should leave at-least 3.00 mm margin from all edges of paper. • The Project report should be nicely typed in good word processor and should avoid spellings and grammatical mistakes.
- Students should use one side of paper for printing.
- The Project should be Hardbound and double spacing should be preferred.

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- Along with the Project report contents and source code, students are required to follow the points given below.
- **Cover Page** – The cover page sample is provided Training & Placement Cell, the format should be strictly followed.
- **Letter of Authentication** - To be submitted by students declaring that the Project Report is the original work of student and no reward had been attained for same Project ever before. Students are advised not to **COPY** the Project report from other students.
- **Authorization from Organization / Institute/ University/ where such Project have been implemented** - With certificate showing the student name, Project name with future recommendations of organization if any.
- **Certificate from Project Guide** - Certificate from the Project Guide certifying the Project work done under his/her guidance along with course, student name & Project details complete in all respects.
- If the student feels to add on any other topics as per the demand of the Project or want to include the functionalities as per the SDLC or the Software Engineering model used, that can be done and included in the Mini Project Report.
- The Mini Project report must include all the components as per the SDLC (Software

Development Life Cycle).

- It is highly recommended to follow the approaches of Software Engineering methodology.
- Design documents should be reviewed properly.
- Testing should have been taken at various levels followed by acceptance test based on SRS and user manual.
- Students are advised to implant and present the alternative methods and techniques reviewed during the Project phases.
- Project should not be close copy or resemblance of commercial / freely available software from Internet or market.
- Students should avoid concept introduction of various SE / SAD terminologies

### **VIII. Important Points while Submitting Mini Project Report**

- The cover page must be hard bound in **Black Color; with Gold Embossing**. • The size of the report would depend on the Mini Project undertaken. However it must be 100 to 120 typed pages (Double space) on A4 size paper.
- All the students are required to use the uniform font and format (except in heading and subheadings) throughout the text of the report.
- The Mini Project report must accompany a certificate authenticating the originality of the work done in the prescribed format from the Guide.

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- Each student will make Two copies of Project report in the recommended format. One copy is to be submitted to the Project Coordinator of the Department of IT and students will keep one copy of the Project for their further reference in future.
- Each student is required to make a copy of Mini Project in a USB /CD and submit along with his/her Project report.
- There should not be any deviation from formats of the project supplied by the Training & Placement Dept of AIMIT.
- In case students require any letter from the Institute for doing a Project in any organization (Only the R&D Labs Government / Private / Public Sector Undertakings / NGO etc/; not the IT Companies), they can get a "Project Trainee" letter attached with this document attested by the Director/Executive Director/CRC of the Institute.
- Submission of Project should reach the institute at-least one month prior to start of term end examinations.
- The Project report should accompany various supporting documents as described in the

guidelines. It is mandatory to submit the synopsis for the Project chosen.

- Along with this, student should also keep the soft copy of the Project and the Project report, Power Point Slides ready for the viva-voce and presentation at the time of Viva Voice by the Internal and External Examiners.

### IX. Submission of a Project Report

Only one Copy of the Project report in bound form is to be submitted to the Project Coordinator of Department of IT, AIMIT. Another copy of the Project Report must be retained by the student which should be produced before the examiner at the time of the Viva-voce.

### X. Project Evaluation

Project Report shall be evaluated by Internal and External examiners at the end of the semester. However there will be continuous monitoring of the Project progress report during the semester and distribution of marks shall be as follows

Subject Code	Subject Title	Seminar	Final Evaluation of the Mini Project Work					Total
D 107.2	Project Work	Presentation & Viva	*	*	*	*	Viva	
			*	*	*	*		
		100	20	20	20	20	20	200

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