AMITY UNIVERSITY
RAJASTHAN

AMITY INSTITUTE OF INFORMATION TECHNOLOGY (AIIT)

MASTER OF SCIENCE (DATA SCIENCE)

(M.Sc.(D.S.)

Programme Code: 121177

Duration – 2 Years Full Time

Programme Structure
and
Curriculum & Scheme of Examination

2021-23
(Choice Based Credit System)

AMITY UNIVERSITY
RAJASTHAN

PREAMBLE

Amity University aims to achieve academic excellence by providing multi-faceted education to students and encourage them to reach the pinnacle of success. The University has designed a system that would provide rigorous academic programme with necessary skills to enable them to excel in their careers.

This booklet contains the Programme Structure, the Detailed Curriculum and the Scheme of Examination. The Programme Structure includes the courses (Core and Elective), arranged semester wise. The importance of each course is defined in terms of credits attached to it. The credit units attached to each course has been further defined in terms of contact hours i.e. Lecture Hours (L), Tutorial Hours (T), Practical Hours (P). Towards earning credits in terms of contact hours, 1 Lecture and 1 Tutorial per week are rated as 1 credit each and 2 Practical hours per week are rated as 1 credit. Thus, for example, an L-T-P structure of 3-0-0 will have 3 credits, 3-1-0 will have 4 credits, and 3-1-2 will have 5 credits.

The Curriculum and Scheme of Examination of each course includes the course objectives, course contents, scheme of examination and the list of text and references. The scheme of examination defines the various components of evaluation and the weightage attached to each component. The different codes used for the components of evaluation and the weightage attached to them are:

Components	Codes	Weightage (%)
Case Discussion/ Presentation/ Analysis	C	05 - 10
Home Assignment	H	05 - 10
Project	P	05 - 10
Seminar	S	05 - 10
Viva	V	05 - 10
Quiz	Q	05 - 10
Class Test	CT	10 - 15
Attendance	A	05
End Semester Examination	EE	50

It is hoped that it will help the students study in a planned and a structured manner and promote effective learning. Wishing you an intellectually stimulating stay at Amity University.

July, 2021

PROGRAMME LEARNING OUTCOME (PLO)

MASTER OF SCIENCE(DATA SCIENCE) (M.Sc.(D.S.)

PLO-1 Develop in depth understanding of the key technologies in data science and business analytics: data mining, machine learning, visualization techniques, predictive modeling, and statistics.

PLO-2 Demonstrating practical, hands-on experience with programming languages and tools through lab exercise and project.

PLO-3 Apply data science concepts and methods to solve problems in real-world contexts and will communicate these solutions effectively

PLO-4 Utilize knowledge in a broad range of methods based on statistics and informatics and can use these for data management, analysis and problem solving.

SKILL DEVELOPMENT DETAILS WITH CREDITS OF M.Sc.(D.S.)

Sr. No.	Sem	Skill Development	credit	Employability	Credit	Entrepreneurship	Credit	Total Nos.	Total Credit
1	I	2	4	2	4	2	4	**6**	**12**
2	II	3	7	NIL	NIL	NIL	NIL	**3**	**7**
3	III	2	4	NIL	NIL	2	4	**4**	**8**
	Total	**7**	**15**	**2**	**4**	**4**	**8**	**13**	**27**

SKILL DEVELOPMENT SUBJECTS IN M.SC.(D.S.) PROGRAMME

sem	name	code	Credit
I	Data Science -I	MDS103	3
I	Data Science -I Lab	MDS123	1
II	Data Science-II with R	MDS202	3
II	Data Science-II with R Lab	MDS222	1
II	Data Engineering	MDS203	3
III	Natural Language Processing	MDS303	3
III	Natural Language Processing Lab	MDS323	1

Employability			
sem	**name**	**code**	**Credit**
I	Programming with Python	MDS102	3
I	Programming with Python Lab	MDS122	1

Entrepreneurship			
sem	**name**	**code**	**Credit**
I	Data Warehousing and Mining	MDS104	3
I	Data Warehousing and Mining-Lab	MDA124	1
III	Machine Learning and Deep Learning	MDS302	3
III	Machine Learning and Deep Learning Lab	MDS322	1

PROGRAMME STRUCTURE CREDITS SUMMARY
Master of Science (Data Science) (M.Sc.(DS)-2021

	Credits PG (2 years/ 4 Semesters)							
Semester	CC	DE	VA	OE	EVS	NTCC	ANDP	Total
I	15	0	04	0	0	01	02	22
II	11	07	04	03	0	04	02	31
III	11	07	04	03	0	08	02	35
IV	0	0	0	0	0	25	0	25
Total	37	14	12	06	0	38	06	113

Core Courses	CC
Domain Electives	DE
Value Added Course	VA
Open Electives	OE
Environmental Science	EVS
Project Work (Non Teaching Credit Course)	NTCC
Anandam Project	ANDP

PROGRAMME STRUCTURE SUBJECTWISE CATEGORY SUMMARY
Master of Science (Data Science) (M.Sc.(DS)-2021

	Courses/Subjects for PG (2 years/ 4 Semesters) M.Sc.(DS) Programme							
Semester	CC	DE	VA	OE	EVS	NTCC	ANDP	Total
I	07	0	06	0	0	01	01	15
II	05	06	06	01	0	01	01	20
III	05	06	06	01	0	03	01	22
IV	0	0	0	0	0	02	0	02
Total	17	12	18	02	0	7	03	59

Core Courses	CC
Domain Electives	DE
Value Added Course	VA
Open Electives	OE
Environmental Science	EVS
Project Work (Non Teaching Credit Course)	NTCC
Anandam Project	ANDP

PROGRAMME STRUCTURE

2021-2023

FIRST SEMESTER

Sr. No.	Course Title	Category	Lecture	Tutorial	Practical	Total Credits
Core Courses						
MDS101	Probability and Statistical structures	CC	2	1	-	3
MDS102	Programming with Python	CC	2	1	-	3
MDS103	Data Science -I	CC	2	1	-	3
MDS104	Data Warehousing and Mining	CC	2	1	-	3
MDS122	Programming with Python Lab	CC	-	-	2	1
MDS123	Data Science -I Lab	CC	-	-	2	1
MDS124	Data Warehousing and Mining-Lab	CC	-	-	2	1
Non-Teaching Credit Course (NTCC)						
MDS151	Report on Workshop / Social Work	NTCC	-	-	-	1
AND001	Anandam	ANDP	-	-	-	2
VALUE ADDED COURSES (VAC)						
BCS111	Communication Skills-I	VA	1	-	-	1
BSS111	Behavioural Science-I (Self Development and Interpersonal Skills)	VA	1	-	-	1
FLT111 FLG111 FLS111 FLC111	Foreign Language French German Spanish Chinese	VA	2	-	-	2
Total						**22**

SECOND SEMESTER

Sr. No.	Course Title	Category	Lecture	Tutorial	Practical	Total Credits
Core Courses						
MDS201	Linear Algebra and Matrices	CC	2	1	-	3
MDS202	Data Science-II with R	CC	2	1	-	3
MDS203	Data Engineering	CC	2	1	-	3
MDS222	Data Science-II with R Lab	CC	-	-	2	1
MDS223	Data Engineering Lab	CC	-	-	2	1
DOMAIN ELECTIVES (DE)						
Elective-I (Without Lab) select anyone 1						
MDS231	Business Analytics	DE	2	1	-	3
MDS232	Pattern Recognition	DE				
Elective-II (With Lab) select anyone 1						
MDS233	Image Analytics	DE	2	1	-	3
MDS234	Data Visualization	DE				
MDS243	Image Analytics Lab	DE	-	-	2	1
MDS244	Data Visualization Lab	DE				
Open Elective						
	Open Elective	OE	2	1	-	3
Non-Teaching Credit Course (NTCC)						
MDS250	Minor Project	NTCC	-	-	-	4
AND002	Anandam	ANDP	-	-	-	2
VALUE ADDED COURSES (VAC)						
BCS211	Communication Skills-II	VA	1	-	-	1
BSS211	Behavioural Science-II (Behavioural Communication and Relationship Management)	VA	1	-	-	1
FLT211 FLG211 FLS211 FLC211	Foreign Language French German Spanish Chinese	VA	2	-	-	2
Total						**31**

THIRD SEMESTER

Sr. No.	Course Title	Category	Lecture	Tutorial	Practical	Total Credits
Core Courses						
MDS301	Optimization Techniques	CC	2	1	-	3
MDS302	Machine Learning and Deep Learning	CC	2	1	-	3
MDS303	Natural Language Processing	CC	2	1	-	3
MDS322	Machine Learning and Deep Learning Lab	CC	-	-	2	1
MDS323	Natural Language Processing Lab	CC	-	-	2	1
DOMAIN ELECTIVES (DE)						
Elective-I (Without Lab) select anyone						
MDS331	Big Data For Managers	DE	2	1	-	3
MDS332	Data Science And AI For Managers	DE				
Elective-II (With Lab) select anyone						
MDS333	Artificial Intelligence	DE	2	1	-	3
MDS334	Big Data & Analytics using R	DE				
MDS343	Artificial Intelligence Lab	DE	-	-	2	1
MDS344	Big Data & Analytics using R LAB	DE				
Open Elective						
	Open Elective	OE	2	1	-	3
Non Teaching Credit Course (NTCC)						
MDS350	Minor Project	NTCC	-	-	-	4
MDS351	Report on Paper Presentation in Conference	NTCC	-	-	-	1
MDS352	Summer Internship Project	NTCC	-	-	-	3
AND003	Anandam	ANDP	-	-	-	2
VALUE ADDED COURSES (VAC)						
BCS311	Communication Skills	VA	1	-	-	1
BSS311	Behavioural Science-III (Leading Through Teams)	VA	1	-	-	1
FLT311 FLG311 FLS311 FLC311	Foreign Language French German Spanish Chinese	VA	2	-	-	2
	TOTAL					**35**

FOURTH SEMESTER

S. No.	Course Title	Category	Tutorial (T) Hours Per Week	Practical (P) Hours Per Week	Total Credits
Non Teaching Credit Course (NTCC)					
Elective	**Select any ONE**				
MDS460	Project Work	NTCC	-	-	25
MDS461	Internship	NTCC			
	TOTAL				**25**

PROBABILITY AND STATISTICAL STRUCTURES

Course Code	L	T	P/FW	CREDITS
MDS101	2	1	-	3

Course Objective:

This course introduces core programming basics—including data types, control structures, algorithm development, and program design with functions—via the Python programming language. The course discusses the fundamental principles of Object-Oriented Programming, as well as in-depth data and information processing techniques. Students will solve problems, explore real-world software development challenges, and create practical and contemporary applications.

Course Contents:

Module-I

Introduction to Python- features and basic syntax, interactive shell, editing, saving, and running a script. The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; understanding error messages; Conditions, boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); short-circuit (lazy) evaluation

Module-II

Strings and text files; manipulating files and directories; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file.
String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hexadecimal numbers

Module-III

Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries. Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Recursive functions.

Module-IV

Simple graphics and image processing: “turtle” module; simple 2d drawing - colors, shapes; digital images, image file formats, image processing; Simple image manipulations with 'image' module - convert to bw, greyscale, blur, etc.

Module-V

Classes and OOP: classes, objects, attributes and methods; defining classes; design with classes, data modeling; persistent storage of objects; inheritance, polymorphism, operator overloading; abstract classes; exception handling, try block

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text & References:

Textbook: *Fundamentals of Python: First Programs ,* Author: Kenneth Lambert , Publisher: Course Technology, Cengage Learning, 2012

PROGRAMMING WITH PYTHON

Course Code	L	T	P/FW	CREDITS
MDS102	2	1	-	3

Course Objective:

This course introduces core programming basics—including data types, control structures, algorithm development, and program design with functions—via the Python programming language. The course discusses the fundamental principles of Object-Oriented Programming, as well as in-depth data and information processing techniques. Students will solve problems, explore real-world software development challenges, and create practical and contemporary applications.

Course Contents:

Module-I

Introduction to Python- features and basic syntax, interactive shell, editing, saving, and running a script. The concept of data types; variables, assignments; immutable variables; numerical types; arithmetic operators and expressions; understanding error messages; Conditions, boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); short-circuit (lazy) evaluation

Module-II

Strings and text files; manipulating files and directories; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file.
String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hexadecimal numbers

Module-III

Lists, tuples, and dictionaries; basic list operators, replacing, inserting, removing an element; searching and sorting lists; dictionary literals, adding and removing keys, accessing and replacing values; traversing dictionaries. Design with functions: hiding redundancy, complexity; arguments and return values; formal vs actual arguments, named arguments. Recursive functions.

Module-IV

Simple graphics and image processing: “turtle” module; simple 2d drawing - colors, shapes; digital images, image file formats, image processing; Simple image manipulations with 'image' module - convert to bw, greyscale, blur, etc.

Module-V

Classes and OOP: classes, objects, attributes and methods; defining classes; design with classes, data modeling; persistent storage of objects; inheritance, polymorphism, operator overloading; abstract classes; exception handling, try block

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text & References:

Textbook: *Fundamentals of Python: First Programs ,* Author: Kenneth Lambert , Publisher: Course Technology, Cengage Learning, 2012

DATA SCIENCE – I

Course Code	L	T	P/FW	CREDITS
MDS103	2	1	-	3

Course Objective: The course will help the students to understand the basics of data science and various related techniques which they can use to develop their data science applications for solving real world problems.

Course Contents

Module-I

Data science definition. Data science benefit our society, Data science relation to other domains, Data science application areas, Data science challenges, Various Data science tools and programming platforms for developing data science applications, Role of data scientist, Data science growing market.

Module-II

Various types of databases and datasets such as structured, unstructured, graph, etc., Data related challenges today. Multimedia data, social media data, biological data, sensor data, etc. Different dataset with different challenges.

Module-III

Introduction to R and its history. Advantages of R, Install R Programming Language & R Studio, Various data science packages (machine learning, string manipulation, data visualization) in R and their application area. Various domain-specific datasets available in R, Various data repositories, public and private data repositories.

Module-IV

Companies Using the R Programming language, Commercial market of R programming, In-memory computation in R and its benefits, Parallel and distributed programming computation using R, Package inclusion and industry programming practices. CRAN and various benefits of it, Future prospects of R programming.

Module-V

Machine learning, Supervised and unsupervised machine learning, semi-supervised machine learning, reinforcement learning. Various sub branches of supervised (classification, regression) and unsupervised machine learning (clustering and dimensionality reduction), Training and testing data, Differences between machine learning and statistics

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text and References:

- Hadley Wickham, and Garrett Grolemund. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 1st Edition. O'Rielley
- Brett Lantz. Machine Learning with R: Expert techniques for predictive modeling, 3rd Edition. Packt Publishing.
- Peter Bruce, Andrew Bruce. Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python (2020). O'Rielley Publishing.

DATA WAREHOUSING AND MINING

Course Code	L	T	P/FW	Credits
MDS104	2	1	-	3

Course Objective:

Both data warehousing and data mining are advanced recent developments in database technology which aim to address the problem of extracting information from the overwhelmingly large amounts of data which modern societies are capable of amassing. Data warehousing focuses on supporting the analysis of data in a multidimensional way. Data mining focuses on inducing compressed representations of data in the form of descriptive and predictive models. Course gives an in-depth knowledge of both the concepts.

Course Contents:

Module I: Data Warehousing

Introduction to Data Warehouse, its competitive advantage, Data warehouse vs Operational Data, Things to consider while building Data Warehouse

Module II: Implementation

Building Data warehousing team, Defining data warehousing project, data warehousing project management, Project estimation for data warehousing, Data warehousing project implementation

Module III: Techniques

Bitmapped indexes, Star queries, Read only tablespaces, Parallel Processing, Partition views, Optimizing extraction process

Module IV: Data Mining

From Data ware housing to Data Mining, Objectives of Data Mining, the Business context for Data mining, Process improvement, marketing and Customer Relationship Management (CRM), the Technical context for Data Mining, machine learning, decision support and computer technology.

Module V: Data Mining Techniques and Algorithms

Process of data mining, Algorithms, Data base segmentation or clustering, predictive Modeling, Link Analysis, Data Mining Techniques, Automatic Cluster Detection, Decision trees and Neural Networks.

Module VI: Data Mining Environment

Case studies in building business environment, Application of data ware housing and Data mining in Government, National Data ware houses and case studies.

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text & References:

Text:

- Data Warehousing, Data Mining & OLAP, Alex Berson, Stephen J. Smith, Tata McGraw-Hill Edition 2004.
- Data Mining: Concepts and Techniques, J. Han, M. Kamber, Academic Press, Morgan Kanf man Publishers, 2001
- Data Ware housing: Concepts, Techniques, Products and Applications, C.S.R. Prabhu, Prentice Hall of India, 2001.

References:

- Mastering Data Mining: The Art and Science of Customer Relationship Management, Berry and Lin off, John Wiley and Sons, 2001.
- Data Mining", Pieter Adrians, Dolf Zantinge, Addison Wesley, 2000.
- Data Mining with Microsoft SQL Server, Seidman, Prentice Hall of India, 2001.

PROGRAMMING WITH PYTHON LAB

Course Code	L	T	P/FW	CREDITS
MDS122	-	-	2	1

1. Installing Python and configuring environment.
2. To display and find the size of all data types in Python.
3. To show the use of loops
4. To work with different operators including lazy operators.
5. Working with strings operations.
6. Writing and reading to/from a file.
7. To perform operations on list.
8. To perform operations on tuple.
9. To perform operations on dictionary.
10. Working with functions including recursive ones.
11. To perform manipulation with image files.
12. To perform operations on images using turtle module.
13. To show OOP features in Python like encapsulation, inheritance etc.

DATA SCIENCE – I LAB

Course Code	L	T	P/FW	CREDITS
MDS123	-	-	2	1

Course Objective: The course will help the students to learn the basics of R programming and various related techniques with the help of practical. The Knowledge gained here can be used to develop a solid base in R which they can use further to develop their data science applications for solving real world problems.

Course Contents

1. Write a program using R to declare a vector, matrix, dataframes, etc.
2. Write a program using R to read and write a dataframe to a .csv and .txt files. Also use various R function on the dataframe
3. Write a program using R to manipulate a dataframe (add and delete rows & columns, update dataframe values, rename columns, change data types, etc.)
4. Write a program using R to show the usage of various R function on the dataframe
5. Write a program using R which uses various built-in R functions on the dataframe such as class, typeof, summary, str, etc.,
6. Write a programs using R to show for loop usage
7. Write programs using R to show for If statement usage
8. Write programs using R to show while and repeat loops usage
9. Write programs using R which uses various forms of Apply function like apply, lapply, sapply, etc.
10. Write a user defined function in R to find min and max from the list of given numbers
11. Write a user defined function in R without using built-in function to find largest and smallest number from the list of given numbers
12. Write a program using R which takes inputs from the user.

Text and References:

- Hadley Wickham, and Garrett Grolemund. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 1st Edition. O'Rielley
- Brett Lantz. Machine Learning with R: Expert techniques for predictive modeling, 3rd Edition. Packt Publishing.
- Peter Bruce, Andrew Bruce. Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python (2020). O'Rielley Publishing.

DATA WAREHOUSING AND MINING LAB

Course Code	L	T	P/FW	CREDITS
MDS124	-	-	2	1

Software Required: Informatics Tool, Cognos, Todd.

List of Programmes:

1. Write a program to implement text mining.
2. Write a program to implement web mining.
3. Write a program to develop snowflake schema.
4. Write a program to develop the tree schema with the help of binary tree.
5. Write a program to implement BFS and DFS with respect to 2-D modeling.
6. Write a program to implement the basic step of informatics tool.

Examination Scheme:

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

REPORT ON WORKSHOP/ SOCIAL WORK

Course Code	L	T	P	Credit
MDS 151	-	-	-	1

Objective: Conferences / Seminars / Workshop are good and efficient way to get to know other researchers through their work and also personally. The educational aspect can expose the students to new ways of conducting the business and help them to discover how to be more productive. They provide a great opportunity to network. Collaboration is the way to approach networking.

Rules and Regulations

- 2nd Year / 3rd Year Students for which the students and the faculty members can start preparations well in advance prior to the scheduled conference / seminar / workshop.
- The number of students going for any conference / seminar / workshop should be manageable.
- A proposal for the proposed conference / seminar / workshop should be drafted and presented to the HoI reflecting the following key points:
    - Entire activity plan
    - Route Map
    - What are the objectives for the students?
    - What they need to learn, do, and prepare before the conference / seminar / workshop?
    - List of prospective students with Contact Details
    - List of Faculty Coordinators with Contact Details
- After getting approval from the HoI, a note sheet should be prepared and all necessary permission and approval from the competent authorities should be obtained.
- The attention and co-operation of all students and parents are requested to attend the conference / seminar / workshop most effectively. Signing of the letter of Indemnity Bond (Consent-cum-Undertaking) is mandatory for all the parents of students going for conference / seminar / workshop in or outside Jaipur. Duly executed Indemnity Bond should be submitted to HoI Office at least 2 days prior to the visit, without which the accompanying Staff coordinator shall not permit the student to participate in the industrial visit
- The list of students participating in conference / seminar / workshop shall be handed over to the concerned HODs, Staff coordinators.
- Students should be present in formals.
- Students should carry the College Identity Cards during their journey.
- Discipline should be maintained during the conference / seminar / workshop. Any violation will be viewed very seriously.
- A report of the conference / seminar / workshop is to be submitted in 5 days time by students / faculty coordinators once the students are back.

The report to be prepared should reflect the following:-

- What happened at the conference / seminar / workshop the students attend and how does it relate in the best way to the preparations and the learning objectives.
- How do the students will use the outcome of conference / seminar / workshop after it is over?
- What will they gain from it and how can they set up activities that transfer the experience into learning?
- Evaluation parameters for the success of the experience of conference / seminar / workshop.

The layout guidelines for the Report:

1. File should be in the following specification:

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components:

- Front Page
- Table of Content
- Acknowledgement
- Student Certificate
- Company Profile (optional)
- Introduction
- Main Body
- References / Bibliography

ASSESSMENT OF THE INTERNSHIP FILE

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Report File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student's own work. It will also ensure regularity and meeting the delaines.

Examination Scheme:

Components	**V**	**S**	**R**	**FP**
Weightage (%)	20	20	20	40

V – Viva, S – Synopsis, FP – Final Presentation, R - Report

COMMUNICATION SKILLS-I

CODE	L	T	P/FW	CREDITS
BCS 111	1	-	-	1

Course Objective:

The Course is designed to give an overview of the four broad categories of English Communication thereby enhance the learners' communicative competence.

Course Contents:

Module I: Listening Skills

Effective Listening: Principles and Barriers
Listening Comprehension on International Standards

Module II: Speaking Skills

Pronunciation and Accent
Reading excerpts from news dailies & magazines
Narrating Incident; Story telling.
Extempore & Role Plays

Module III: Reading Skills

Vocabulary: Synonyms, antonyms, diminutives, homonyms, homophones
Idioms & phrases
Foreign words in English

Module IV: Writing Skills

Writing Paragraphs
Précis Writing
Letter writing
Coherence and structure
Essay writing

Module V: Activities

News reading
Picture reading
Movie magic
Announcements

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Working in English, Jones, Cambridge
- Business Communication, Raman –Prakash, Oxford
- Speaking Personally, Porter-Ladousse, Cambridge
- Speaking Effectively, Jermy Comfort, et.al, Cambridge

BEHAVIOURAL SCIENCE-I

(Self Development and interpersonal Skills)

CODE	L	T	P/FW	CREDITS
BSS 111	1	-	-	1

Course Objective:

This course aims at imparting an understanding of:
Self and the process of self exploration
Learning strategies for development of a healthy self esteem
Importance of attitudes and their effect on work behaviour
Effective management of emotions and building interpersonal competence.

Course Contents:

Module I: Understanding Self

Formation of self concept
Dimension of Self
Components of self
Self Competency

Module II: Self-Esteem: Sense of Worth

Meaning and Nature of Self Esteem
Characteristics of High and Low Self Esteem
Importance & need of Self Esteem
Self Esteem at work
Steps to enhance Self Esteem

Module III: Emotional Intelligence: Brain Power

Introduction to EI
Difference between IQ, EQ and SQ
Relevance of EI at workplace
Self assessment, analysis and action plan

Module IV: Managing Emotions and Building Interpersonal Competence

Need and importance of Emotions
Healthy and Unhealthy expression of emotions
Anger: Conceptualization and Cycle
Developing emotional and interpersonal competence
Self assessment, analysis and action plan

Module V: Leading Through Positive Attitude

Understanding Attitudes
Formation of Attitudes
Types of Attitudes
Effects of Attitude on
Behaviour
Perception

Motivation
Stress
Adjustment
Time Management
Effective Performance
Building Positive Attitude

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Towers, Marc: Self Esteem, 1st Edition 1997, American Media
- Pedler Mike, Burgoyne John, Boydell Tom, A Manager's Guide to Self-Development: Second edition, McGraw-Hill Book Company.
- Covey, R. Stephen: Seven habits of Highly Effective People, 1992 Edition, Simon & Schuster Ltd.
- Khera Shiv: You Can Win, 1st Edition, 1999, Macmillan
- Gegax Tom, Winning in the Game of Life: 1st Edition, Harmony Books
- Chatterjee Debashish, Leading Consciously: 1998 1st Edition, Viva Books Pvt. Ltd.
- Dr. Dinkmeyer Don, Dr. Losoncy Lewis, The Skills of Encouragement: St. Lucie Press.
- Singh, Dalip, 2002, Emotional Intelligence at work; First Edition, Sage Publications.
- Goleman, Daniel: Emotional Intelligence, 1995 Edition, Bantam Books
- Goleman, Daniel: Working with E.I., 1998 Edition, Bantam Books.

FRENCH

CODE	L	T	P/FW	CREDITS
FLT 111	2	-	-	2

Course Objective:

To familiarize the students with the French language

- with the phonetic system
- with the syntax
- with the manners
- with the cultural aspects

Course Contents:

Module A: pp. 01 to 37: Unités 1, 2, Unité 3 Objectif 1, 2

Only grammar of Unité 3: objectif 3, 4 and 5

Contenu lexical: Unité 1: Découvrir la langue française: (oral et écrit)

1. se présenter, présenter quelqu'un, faire la connaissance des autres, formules de politesse, rencontres
2. dire/interroger si on comprend
3. Nommer les choses

Unité 2: Faire connaissance

1.donner/demander des informations sur une personne, premiers contacts, exprimer ses goûts et ses préférences

2.Parler de soi: parler du travail, de ses activités, de son pays, de sa ville.

Unité 3: Organiser son temps

1. dire la date et l'heure

Contenu grammatical:

1. organisation générale de la grammaire
2. article indéfini, défini, contracté
3. nom, adjectif, masculin, féminin, singulier et pluriel
4. négation avec « de », "moi aussi", "moi non plus"
5. interrogation: Inversion, est-ce que, qui, que, quoi, qu'est-ce que, où, quand, comment, quel(s), quelle(s)
   Interro-négatif: réponses: oui, si, non
6. pronom tonique/disjoint- pour insister après une préposition
7. futur proche

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN

CODE	L	T	P/FW	CREDITS
FLG 111	2	-	-	2

Course Objective:
To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.
To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Introduction
Self introduction: heissen, kommen, wohnwn, lernen, arbeiten, trinken, etc.
All personal pronouns in relation to the verbs taught so far.
Greetings: Guten Morgen!, Guten Tag!, Guten Abend!, Gute Nacht!, Danke sehr!, Danke!, Vielen Dank!, (es tut mir Leid!),
Hallo, wie geht's?: Danke gut!, sehr gut!, prima!, ausgezeichnet!,
Es geht!, nicht so gut!, so la la!, miserabel!

Module II: Interviewspiel
To assimilate the vocabulary learnt so far and to apply the words and phrases in short dialogues in an interview – game for self introduction.

Module III: Phonetics
Sound system of the language with special stress on Dipthongs

Module IV: Countries, nationalities and their languages
To make the students acquainted with the most widely used country names, their nationalitie and the language spoken in that country.

Module V: Articles
The definite and indefinite articles in masculine, feminine and neuter gender. All Vegetables, Fruits, Animals, Furniture, Eatables, modes of Transport

Module VI: Professions
To acquaint the students with professions in both the genders with the help of the verb "sein".

Module VII: Pronouns
Simple possessive pronouns, the use of my, your, etc.
The family members, family Tree with the help of the verb "to have"

Module VIII: Colours
All the color and color related vocabulary – colored, colorful, colorless, pale, light, dark, etc.

Module IX: Numbers and calculations – verb "kosten"
The counting, plural structures and simple calculation like addition, subtraction, multiplication and division to test the knowledge of numbers.
"Wie viel kostet das?"

Module X: Revision list of Question pronouns
W – Questions like who, what, where, when, which, how, how many, how much, etc.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH

CODE	L	T	P/FW	CREDITS
FLS 111	2	-	-	2

Course Objective:
To enable students acquire the relevance of the Spanish language in today's global context, how to greet each other, how to present / introduce each other using basic verbs and vocabulary

Course Contents:

Module I
A brief history of Spain, Latin America, the language, the culture…and the relevance of Spanish language in today's global context.
Introduction to alphabets

Module II
Introduction to '*Saludos*' (How to greet each other. How to present / introduce each other).
Goodbyes (despedidas)
The verb *llamarse* and practice of it.

Module III
Concept of Gender and Number
Months of the years, days of the week, seasons. Introduction to numbers 1-100, Colors, Revision of numbers and introduction to ordinal numbers.

Module IV
Introduction to *SER* and *ESTAR* (both of which mean To Be).Revision of '*Saludos*' and '*Llamarse*'. Some adjectives, nationalities, professions, physical/geographical location, the fact that spanish adjectives have to agree with gender and number of their nouns. Exercises highlighting usage of *Ser* and *Estar*.

Module V
Time, demonstrative pronoun (Este/esta, Aquel/aquella etc)

Module VI
Introduction to some key AR /ER/IR ending regular verbs.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE

CODE	L	T	P/FW	CREDITS
FLC 111	2	-	-	2

Course Objective:
There are many dialects spoken in China, but the language which will help you through wherever you go is Mandarin, or Putonghua, as it is called in Chinese. The most widely spoken forms of Chinese are Mandarin, Cantonese, Gan, Hakka, Min, Wu and Xiang. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Show pictures, dialogue and retell.
Getting to know each other.
Practicing chart with Initials and Finals. (CHART – The Chinese Phonetic Alphabet Called "Hanyu Pinyin" in Mandarin Chinese.)
Practicing of Tones as it is a tonal language.
Changes in 3rd tone and Neutral Tone.

Module II
Greetings
Let me Introduce
The modal particle "ne".
Use of Please 'qing" – sit, have tea …….. etc.
A brief self introduction – Ni hao ma? Zaijian!
Use of "bu" negative.

Module III
Attributives showing possession
How is your Health? Thank you
Where are you from?
A few Professions like – Engineer, Businessman, Doctor, Teacher, Worker.
Are you busy with your work?
May I know your name?

Module IV
Use of "How many" – People in your family?
Use of "zhe" and "na".
Use of interrogative particle "shenme", "shui", "ma" and "nar".
How to make interrogative sentences ending with "ma".
Structural particle "de".
Use of "Nin" when and where to use and with whom. Use of guixing.
Use of verb "zuo" and how to make sentences with it.

Module V
Family structure and Relations.
Use of "you" – "mei you".

Measure words
Days and Weekdays.
Numbers.
Maps, different languages and Countries.

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation, I – Interaction/Conversation Practice

Text & References:

"Elementary Chinese Reader Part I" Lesson 1-10

LINEAR ALGEBRA AND MATRICES

Course Code	L	T	P/FW	Credits
MDS201	**2**	**1**	**-**	**3**

Course Objective:

The students will be able to:

1. Solve the given system of linear equations through matrices.
2. Verify whether the given set is a vector space or not. If So, determine its dimension.
3. Determine the matrix for the given linear transformation.
4. Predict ortho normal basis
5. Compute Eigen values, Eigen vectors and model to a quadratic form; and Construct a singular value decomposition for the given matrix
6. Perform diagonalization of a given matrix

Prerequisite: Nil

Module I

SYSTEM OF LINEAR EQUATIONS AND MATRICES: System of linear equations, Gauss – elimination, Elementary matrices and a method for finding inverse of a matrix.

Module II

VECTOR SPACES: Vector spaces and subspaces – Linear combination, Span, Linear independence and dependence - Null space, Column space, and Row space – Basis and dimension of a vector space – Rank and nullity.

Module III

LINEAR TRANSFORMATION: Introduction to linear transformations – General Linear Transformations – Kernel and range – Matrices of general linear transformation- Geometry linear operators-Change of basis

Module IV

EIGEN VALUES AND EIGEN VECTORS: Introduction to Eigen values- Diagonalizing a matrix- Orthogonal diagonalization-, Applications to differential equations- Positive definite matrices- Similar matrices –Quadratic forms.

Module V

INNER PRODUCT SPACES: Inner product, Length, angle and orthogonality – Orthogonal sets – Orthogonal projections – Inner product spaces – Orthonormal basis: Gram-Schmidt process – QR Decomposition.

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Reference Books

1. Howard Anton and Chris Rorres, “Elementary Linear Algebra”, Wiley, 2011.
2. David C. Lay, “Linear Algebra and its Applications“, Pearson Education, 2011.
3. Gilbert Strang, “Linear Algebra and its Applications”, Thomson Learning, 2009.
4. Steven J. Leon, “Linear Algebra with Applications”, Prentice Hall, 2006.

DATA SCIENCE – II WITH R

Course Code	L	T	P/FW	CREDITS
MDS202	2	1	-	3

Course Objective: The course will help the students to understand the data science and various related techniques which they can use to develop their data science applications for solving real world problems.

Course Contents

Module-I

Analyze data, mean, mode, data types, basic data analysis functions such as str, nrow, ncol, mean, mode, class, etc., Parametric and non-parametric data, Advantages of Parametric Tests, ANOVA, T-Test, F-test, Z-test, Wilcox-Test, Importance of them, Import and export of various types of data files in R. How to read web data, social media data. Basic data plotting.

Module-II

Missing values and their effects on data, Outliers and their effects on data, Importance of identifying missing values and outliers. Classical methods to identify missing values and outliers. Conditions to replace missing values and outliers, Conditions to delete missing values and outliers.

Module-III

Linear regression, multiple linear regression, non-linear regression, When to do linear and non-linear regression, Performance evaluation of regression results. Logistic regression, Analyze the prediction results using various statistics of confusion matrix such as accuracy, sensitivity, specificity, etc. Visualize confusion regression results.

Module-IV

Supervised learning: Classification and regression using Support Vector Machine, Random Forest, Neural Networks, Naive Bayes, and Decision Tress supervised machine learning algorithms. Performance evaluation and parameter tuning to improve results.

Module-V

Unsupervised Learning: K-Means Clustering, Density-Based Spatial Clustering of Applications with Noise (DBSCAN), Expectation–Maximization (EM) Clustering etc. Principal component Analysis. Determination of the number of clusters. Performance evaluation metrics such as Root-mean-square standard deviation (RMSSTD) of the new cluster, R-squared (RS), Dunn's Index (DI).

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text and References:

- Hadley Wickham, and Garrett Grolemund. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 1st Edition. O'Rielley
- Brett Lantz. Machine Learning with R: Expert techniques for predictive modeling, 3rd Edition. Packt Publishing.
- Peter Bruce, Andrew Bruce. Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python (2020). O'Rielley Publishing.

DATA ENGINEERING

Course Code	L	T	P/FW	Credits
MDS203	2	1	-	3

Course Objective: The course will help the students to understand the data, its properties and various related behaviors which they can use to develop their data science applications for solving real world problems.

Course Contents

Module-I
Concepts, processes, and tools for data engineering. To understand the modern data ecosystem. Role of the data engineers. Different properties and behaviors of data and its importance. Role of good quality data in machine learning model.

Module-II
Anomalies or outliers, Reasons that outliers may reduce machine learning model performance, Conditions to delete outlier observation and when to predict it, Two real-world cases studies to show why it is important to detect outliers?

Module-III
Missing values, Reason why they can reduce performance of machine learning model, Conditions when to delete missing observation and when to impute it, Two real-world cases studies to show importance to detecting missing values and to delete or impute them

Module-IV
Concept of dimensionality reduction. On what basis we select feature that needed to be removed. Reducing dimension somewhat solve big data problem. Dimensionality reduction may improve accuracy of a machine learning model. Feature extraction and its importance. Various tools and platforms for feature selection, extration and visualization.

Module-V

3 Real world case studies (Name)

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text and References:

- Rajesh Kumar Shukla et al. Data, Engineering and Applications: Volume 1. Springer; 1st ed. 2019 edition (7 May 2019)
- Rajesh Kumar Shukla et al. Data, Engineering and Applications: Volume 2. Springer; 1st ed. 2019 edition (7 May 2019)
- Brian Shive. Data Engineering: A Novel Approach to Data Design

DATA SCIENCE-II WITH R LAB

Course Code	L	T	P/FW	Credits
MDS222	-	-	2	1

Course Objective: The course will help the students to understand the data science and various related techniques which they can use to develop their data science applications for solving real world problems.

Course Contents

1. Write R program to perform various parametric and non-parametric test on the given data.
2. Write R program to perform linear, and multi-regression
3. Write R program to perform non-linear regression
4. Write R program to classify given dataset using SVM. Divide data into 70% training and 30% testing data
5. Write R program to classify given dataset using Naive Bayes. Divide data into 70% training and 30% testing data
6. Write R program to classify given dataset using Random Forest, and Neural Networks. Divide data into 70% training and 30% testing data.
7. Write R program to classify given dataset using C5.0. Divide data into 70% training and 30% testing data.
8. Write R program to improve the performance of machine learning algorithms
9. Write R program to visualize classification results through confusion matrix.
10. Write R program to perform clustering on a given the datasets. Divide data into 70% training and 30% testing data. Try to improve cluster performance.
11. Write R program to visualize clustering results through plots and charts.
12. Solve a real-world case study by apply appropriate machine learning algorithm

Text and References:

- Hadley Wickham, and Garrett Grolemund. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 1st Edition. O'Rielley
- Brett Lantz. Machine Learning with R: Expert techniques for predictive modeling, 3rd Edition. Packt Publishing.
- Peter Bruce, Andrew Bruce. Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python (2020). O'Rielley Publishing.

DATA ENGINEERING LAB

Course Code	L	T	P/FW	Credits
MDS223	-	-	2	1

Course Objective: The course will help the students to understand the data engineering, its properties and various related behaviors which they can use to develop their data science applications for solving real world problems.

Experiments

1. Write programs in R to find out various properties of datasets
2. Write programs in R to visualize the datasets
3. Write programs in R to detect outliers
4. Write programs in R to visualize outliers using plots
5. Write R program to remove and predict outliers
6. Write programs in R to detect missing values
7. Write programs in R to visualize missing value in a dataset using plots
8. Write R program to impute missing values
9. Write R program to find feature importance using PCA
10. Write R program to find feature importance using machine learning
11. Write R program to visualize predict results with and without feature selection
12. Write R program to extract new features from the dataset

BUSINESS ANALYTICS

Course Code	L	T	P/FW	Credits
MDS231	2	1	-	3

Course Objective:
This course provides an introduction to Business Intelligence, including the processes, methodologies, infrastructure, and current practices used to transform business data into useful information and support business decision-making. Business Intelligence requires foundation knowledge in data storage and retrieval, thus this course will review logical data models for both database management systems and data warehouses.

Course Contents:

Module I: Introduction to Business Intelligence
Introduction to digital data and its types- structured, semi-structured and unstructured, Introduction to OLTP and OLAP (MOLAT, ROLAP, HOLOAT), BI Definitions and Concepts, BI Framework, Data Warehousing concepts and its role in BI, BI Infrastructure Components- BI Process, BI Technology, BI Roles & Responsibilities, Business Applications of BI, BI best practices

Module II: Basics of Data Integration (Extraction Transformation Loading)
Concepts of data integration, needs and advantages of using data integration, introduction to common data integration approaches, Meta data- types and sources, Introduction to data quality, data profiling concepts and application, Introduction to ETL using Kettle

Module III: Data Introduction to Multi-Dimensional Data Modeling
Introduction to data and dimension modeling, multidimensional data model, ER Modeling VS multi-dimensional modeling, concepts of dimension , facts, cubes, attribute, hierarchies, star and snowflake schemas, introduction to business metrics and KPIs, creating cubes using Microsoft Exce.

Module IV: Basics of Enterprise Reporting
A typical enterprise, Malcom Baldrige- quality performance framework, balanced scorecard, enterprise dashboard, balanced scorecard VS enterprise dashboard, enterprise reporting using MS Access/ MS Excel, best practices in the design of enterprise dashboards.

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text & References:

- Fundamentals of Business Analytics – R. N. Prasad & Seema Acharya,
  Business Intelligence (2nd Edition), Efraim Turban, Ramesh Sharda, Dursun Delen, David King
- Delivering Business Intelligence with Microsoft SQL Server 2012, Brian Larson

PATTERN RECOGNITION

Course Code	L	T	P/FW	Credits
MDS 232	2	1	-	3

Course Objective:

This course will study state-of-the-art techniques for analyzing data. The goal is to extract meaningful information from feature data. This includes statistical and information theoretic concepts relating to machine learning, data mining and pattern recognition, with applications using MATLAB.

Course Contents:

Module I: Basics of Probability and Linear Algebra

Probability: independence of events, conditional and joint probability, Bayes theorem Random Processes: Stationary and non-stationary processes, Expectation, Autocorrelation, Cross-Correlation.

Linear Algebra: Inner product, outer product, inverses, eigen values, eigen vectors, singular values, singular vectors.

Module II: Decision Theory

Bayes Decision Theory : Minimum-error-rate classification. Classifiers, Discriminant functions, Decision surfaces. Normal density and discriminant functions. Discrete features.

Module III: Parameter Estimation Methods

Maximum-Likelihood estimation :Gaussian case. Maximum a Posteriori estimation. Bayesian estimation: Gaussian case. Unsupervised learning and clustering - Criterion functions for clustering. Algorithms for clustering: K-Means, Hierarchical and other methods. Cluster validation. Gaussian mixture models, Expectation-Maximization method for parameter estimation. Maximum entropy estimation. Hidden Markov Models (HMMs). Discrete HMMs. Continuous HMMs. Nonparametric techniques for density estimation. K-Nearest Neighbour method.

Module IV: Dimensionality reduction

Principal component analysis - it relationship to eigen analysis. Fisher discriminant analysis - Generalised eigen analysis. Eigen vectors/Singular vectors as dictionaries. Factor Analysis, Total variability space - a dictionary learning methods. Non negative matrix factorisation - a dictionary learning method.

Module V: Linear discriminant functions

Gradient descent procedures, Perceptron, Support vector machines - a brief introduction.

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text & References:

- R.O.Duda, P.E.Hart and D.G.Stork, Pattern Classification, John Wiley, 2001
- S.Theodoridis and K.Koutroumbas, Pattern Recognition, 4th Ed., Academic Press, 2009
- C.M.Bishop, Pattern Recognition and Machine Learning, Springer, 2006

IMAGE ANALYTICS

Course Code	L	T	P/FW	Credit
MDS233	2	1	-	3

Course Objective: The course will help the students to understand the basics of images and various techniques which can be implemented to analyze, classify, and segment a image.

Course Contents

Module-I
Various types of images (jpg, png, tiff, bitmap, etc) Different are various image parameters (pixels, dimensions, etc.). Video in terms of data. Application areas of image analytics and its importance and present state-of-the-art, Image Analysis Workflow.

Module-II
Read images in R, Convert image (colored, black & white) into dataset, Analyze the dataset, Convert video into image frames. Apply various functions on images (rotate, resize, blur, brightness, etc.), Various R packages for image manipulations.

Module-III
Image classification for colored and B&W images: Image classification using various supervised learning algorithms (SVM, Random Forests, Deep Learning, etc.). Performance evaluation of image classification model. Popular application areas.

Module-IV
Image Segmentation for colored and B&W images: Image segmentation using various supervised and unsupervised learning algorithms (SVM, Random Forests, Deep Learning, KMean, etc.). Performance evaluation of image classification model. Popular application areas.

Module-V
Two real world image analytics case studies such as face mask recognition, vehicle detection, etc.

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text and References:

- Hadley Wickham, and Garrett Grolemund. R for Data Science: Import, Tidy, Transform, Visualize, and Model Data 1st Edition. O'Rielley
- Brett Lantz. Machine Learning with R: Expert techniques for predictive modeling, 3rd Edition. Packt Publishing.
- Peter Bruce, Andrew Bruce. Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python (2020). O'Rielley Publishing.

DATA VISUALIZATION

Course Code	L	T	P/FW	Credits
MDS234	2	1	-	3

Course Objective:

This course is designed to provide students with the foundations necessary for understanding and extending the current state of the art in data visualization. By the end of the course, students will have gained: An understanding of the key techniques and theory used in visualization, including data models, graphical perception and techniques for visual encoding and interaction. Exposure to a number of common data domains and corresponding analysis tasks, including working on Python, R and Tableau.

Course Contents:

Module I: Data preparation and manipulation

Python and Jupyter notebook overview, Introduction to numpy; create arrays with numpy and Python; operations on multiple arrays and scalars; universal array functions in numpy; transpose arrays with numpy; import and export arrays. Introduction to Pandas – series, data frames, index Series and data frames in pandas, re-index, drop entry, data alignment, rank and sort data entries, summary statistics in pandas, dealing with missing data; reading and writing files.

Merge, concatenate and combining data frames, reshaping, pivoting, handling duplicates in data frame, mapping with pandas, replace, rename indexes in pandas, using bins, find outliers in your data with pandas, group by on data frames, group by on dictionary and series, aggregation, split-apply-combine technique, cross-tabulation in pandas

Module-II: Data Visualization in Python

Installing seaborn; create histograms using seaborn, KDE plots, combining plot styles, combine histograms, and rug plots, box and violin plots, regression plots, heat maps with seaborn.

Module-III: Data Visualization in R

introduction to R; ggplot2 foundations- geometries, facets, statistics, export plot; data wrangling- data transformation, grouping, piping, pivoting, transform and visualize data; exploratory data analysis- histogram and density plot, frequency polygon, area plot, bar plot; scatter plot, rug plot, bivariate distribution, boxplot, violin plot, matrix plots;

Module-IV: Advanced Data Visualization in R

Size and shape of points- facet wrap, facet grid, rmarkdown; pie chart, donut chart, time series visualization, waterfall chart, radar chart, parallel coordinates plot, heat map, mosaic plot; plot customization- themes, annotations and labels

Module-V: Visualization Techniques in Tableau

Domain padding and densification; data preparation using excel and custom SQL; viola chart; hexbin chart; advanced table calculations- addressing and partitioning; nested table calculations; sankey diagram- base sankey calculations, secondary calculations, nested table calculations; likert scale visualization - data preparation: lookups, cleaning, and pivoting, base likert calculations; dashboard layout techniques;

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

IMAGE ANALYTICS LAB

Course Code	L	T	P/FW	Credits
MDS243	-	-	2	1

Course Objective: The course will help the students to understand the basics of images and various techniques which can be implemented to analyze, classify, and segment a image.

Experiment

1. Read different types of images into R and check their parameters
2. Convert image to a dataframe, save image data into .csv file
3. Perform various image editing function like resize, scaling, rotating
4. Label images, and divide image data into train and test
5. Perform binary classification of images using SVM
6. Perform multiclass classification using Random Forest
7. Perform multiclass classification using Naïve Bayes
8. Visualize image classification results
9. Perform image segmentation using Decision tree.
10. Perform image segmentation using ANN.
11. Visualize image segmentation results
12. Various image editing tools.

DATA VISUALIZATION LAB

Course Code	L	T	P/FW	Credits
MDS 244	-	-	2	1

List of Programmes:

1. Operations with arrays using numpy.
2. operations on multiple arrays and scalars
3. Operations on data frames in pandas.
4. File reading and writing.
5. Using histogram and plots using seaborn.
6. Visualizing data using R: plots, transformation, grouping,
7. Implementing various plots in R, histogram, pivoting, bivariate distribution.
8. Implementing facet wrap and grid in R
9. Visualizing and working on time series data in R/ Python.
10. Visualizing and working on charts in Tableau.
11. likert scale visualization in Tableau.
12. dashboard layout techniques in Tableau.

MINOR PROJECT

COURSE CODE	L	T	P/FW	CREDIT UNITS
MDS250	-	-	-	4

GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.

Research is genuine exploration of the unknown that leads to new knowledge, which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page
Table of Contents
Acknowledgement
Student Certificate
Company Profile
Introduction
Chapters
Appendices
References / Bibliography

- **Title or Cover Page or Front Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

- **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

- **Acknowledgement**

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Student Certificate**

Given by the Institute.

- **Company Certificate & Profile**

This is a certificate, which the company gives to the students. A Company Profile corresponds to a file with company-specific data. Company data can be stored there and included in a booking when needed.

- **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Chapters**

All chapters and sections must be appropriately numbered, titled and should neither be too long nor too short in length.

The first chapter should be introductory in nature and should outline the background of the

project, the problem being solved, the importance, other related works and literature survey.

The other chapters would form the body of the report. The last chapter should be concluding

in nature and should also discuss the future prospect of the project.

- **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

- **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The File should fulfill the following ***assessment objectives:***

1. Writing a critical literature review
    - Search for literature
    - Summarizing and presenting the literature
    - Evaluating key content and theories

2. Collecting and analyzing research material
    - Choosing and designing research method
    - Conducting the research
    - Analyzing, sorting and classifying the data to make decision

3. Interpreting research method and draw conclusion
    - Findings
    - Recommendation

4. Assigning the theories and writing the project report
    - Structuring the project in accordance with the given style

5. Bibliography
    - This refer to the books, Journals and other documents consulting while working on the project

Examination Scheme:

Components	**MRP**	**V**	**S**	**FP**	**R**
Weightage (%)	20	20	20	20	20

MRP – Mid Report Presentation, V – Viva, S – Synopsis, FP – Final Presentation, R - Report

COMMUNICATION SKILLS-II

CODE	L	T	P/FW	CREDITS
BCS 211	1	-	-	1

Course Objective:
To enrich the understanding of English language and communication, structure, style, usage, and vocabulary for global business purposes.

Course Contents:

Module I: Fundamentals of Communication
Role and purpose of communication: *7 C's of communication*
Barriers to effective communication
Enhancing listening
Forms of Communication: one-to-one, informal and formal

Module II: Verbal Communication (Written)
Business Letter
Social correspondence
Writing resume and Job applications

Module III: Speaking skills
Conversational English
Guidelines to give an effective presentation
Activities to include:
Presentations by students
Just a minute

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Business Communication, Raman – Prakash, Oxford
- Textbook of Business Communication, Ramaswami S, Macmillan
- Speaking Personally, Porter-Ladousse, Cambridge

BEHAVIOURAL SCIENCE-II
(Behavioural Communication and Relationship Management)

CODE	L	T	P/FW	CREDITS
BSS 211	1	-	-	1

Course Objective:

This course aims at imparting an understanding of:
Process of Behavioural communication
Aspects of interpersonal communication and relationship
Management of individual differences as important dimension of IPR

Course Contents:

Module I: Behavioural Communication

Scope of Behavioural Communication
Process – Personal, Impersonal and Interpersonal Communication
Guidelines for developing Human Communication skills
Relevance of Behavioural Communication in relationship management

Module II: Managing Individual Differences in Relationships

Principles
Types of issues
Approaches
Understanding and importance of self disclosure
Guidelines for effective communication during conflicts

Module III: Communication Climate: Foundation of Interpersonal Relationships

Elements of satisfying relationships
Conforming and Disconforming Communication
Culturally Relevant Communication
Guideline for Creating and Sustaining Healthy Climate

Module IV: Interpersonal Communication

Imperatives for Interpersonal Communication
Models – Linear, Interaction and Transaction
Patterns – Complementary, Symmetrical and Parallel
Types – Self and Other Oriented
Steps to improve Interpersonal Communication

Module V: Interpersonal Relationship Development

Relationship circle – Peer/ Colleague, Superior and Subordinate
Initiating and establishing IPR
Escalating, maintaining and terminating IPR
Direct and indirect strategies of terminating relationship
Model of ending relationship

Module VI: End-of-Semester Appraisal

Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Vangelist L. Anita, Mark N. Knapp, Inter Personal Communication and Human Relationships: Third Edition, Allyn and Bacon
- Julia T. Wood. Interpersonal Communication everyday encounter
- Simons, Christine,Naylor,Belinda: Effective Communication for Managers,1997 1st Edition Cassell
- Harvard Business School, Effective Communication: United States of America
- Beebe, Beebe and Redmond; Interpersonal Communication, 1996; Allyn and Bacon Publishers.

FRENCH

CODE	L	T	P/FW	CREDITS
FLT 211	2	-	-	2

Course Objective:

- To enable the students to overcome the fear of speaking a foreign language and take position as a foreigner speaking French.
- To make them learn the basic rules of French Grammar.

Course Contents:

Module A: pp.38 – 47: Unité 3: Objectif 3, 4, 5. 6

Module B: pp. 47 to 75 Unité 4, 5

Contenu lexical: **Unité 3: Organiser son temps**

1. donner/demander des informations sur un emploi du temps, un horaire SNCF – Imaginer un dialogue
2. rédiger un message/ une lettre pour …

i) prendre un rendez-vous/ accepter et confirmer/ annuler

ii) inviter/accepter/refuser

3. Faire un programme d'activités

imaginer une conversation téléphonique/un dialogue

Propositions- interroger, répondre

Unité 4: **Découvrir son environnement**

1. situer un lieu
2. s'orienter, s'informer sur un itinéraire.
3. Chercher, décrire un logement
4. connaître les rythmes de la vie

Unité 5: s'informer

1. demander/donner des informations sur un emploi du temps passé.
2. donner une explication, exprimer le doute ou la certitude.
3. découvrir les relations entre les mots
4. savoir s'informer

Contenu grammatical:

1. Adjectifs démonstratifs
2. Adjectifs possessifs/exprimer la possession à l'aide de:
   i. « de » ii. A+nom/pronom disjoint
3. Conjugaison pronominale – négative, interrogative - construction à l'infinitif
4. Impératif/exprimer l'obligation/l'interdiction à l'aide de « il faut…. »/ «il ne faut pas… »
5. passé composé
6. Questions directes/indirectes

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- **le livre à suivre: Campus: Tome 1**

GERMAN

CODE	L	T	P/FW	CREDITS
FLG 211	2	-	-	2

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language.

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Introduction to Grammar to consolidate the language base learnt in Semester I

Course Contents:

Module I: Everything about Time and Time periods

Time and times of the day.

Weekdays, months, seasons.

Adverbs of time and time related prepositions

Module II: Irregular verbs

Introduction to irregular verbs like to be, and others, to learn the conjugations of the same, (fahren, essen, lessen, schlafen, sprechen und ähnliche).

Module III: Separable verbs

To comprehend the change in meaning that the verbs undergo when used as such

Treatment of such verbs with separable prefixes

Module IV: Reading and comprehension

Reading and deciphering railway schedules/school time table

Usage of separable verbs in the above context

Module V: Accusative case

Accusative case with the relevant articles

Introduction to 2 different kinds of sentences – Nominative and Accusative

Module VI: Accusative personal pronouns

Nominative and accusative in comparison

Emphasizing on the universal applicability of the pronouns to both persons and objects

Module VII: Accusative prepositions

Accusative propositions with their use

Both theoretical and figurative use

Module VIII: Dialogues

Dialogue reading: 'In the market place'

'At the Hotel'

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH

CODE	L	T	P/FW	CREDITS
FLS 211	2	-	-	2

Course Objective:
To enable students acquire more vocabulary, grammar, verbal phrases to understand simple texts and start describing any person or object in Simple Present Tense.

Course Contents:

Module I
Revision of earlier modules.

Module II
Some more AR/ER/IR verbs. Introduction to root changing and irregular AR/ER/IR ending verbs

Module III
More verbal phrases (eg, Dios Mio, Que lastima etc), adverbs *(bueno/malo, muy, mucho, bastante, poco).*
Simple texts based on grammar and vocabulary done in earlier modules.

Module IV
Possessive pronouns

Module V
Writing/speaking essays like my friend, my house, my school/institution, myself….descriptions of people, objects etc, computer/internet related vocabulary

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras

CHINESE

CODE	L	T	P/FW	CREDITS
FLC 211	2	-	-	2

Course Objective:
Chinese is a tonal language where each syllable in isolation has its definite tone (flat, falling, rising and rising/falling), and same syllables with different tones mean different things. When you say, "ma" with a third tone, it mean horse and "ma" with the first tone is Mother. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Practice reading aloud
Observe Picture and answer the question.
Tone practice.
Practice using the language both by speaking and by taking notes.
Introduction of basic sentence patterns.
Measure words.
Glad to meet you.

Module II
Where do you live?
Learning different colors.
Tones of "bu"
Buying things and how muchit costs?
Dialogue on change of Money.
More sentence patterns on Days and Weekdays.
How to tell time. Saying the units of time in Chinese. Learning to say useful phrases like – 8:00, 11:25, 10:30 P.M. everyday, afternoon, evening, night, morning 3:58, one hour, to begin, to end ….. etc.
Morning, Afternoon, Evening, Night.

Module III
Use of words of location like-li, wais hang, xia
Furniture – table, chair, bed, bookshelf,.. etc.
Description of room, house or hostel room.. eg what is placed where and how many things are there in it?
Review Lessons – Preview Lessons.
Expression 'yao", "xiang" and "yaoshi" (if).
Days of week, months in a year etc.
I am learning Chinese. Is Chinese difficult?

Module IV
Counting from 1-1000
Use of "chang-chang".
Making an Inquiry – What time is it now? Where is the Post Office?

Days of the week. Months in a year.
Use of Preposition – “zai”, “gen”.
Use of interrogative pronoun – “duoshao” and “ji”.
“Whose”??? Sweater etc is it?
Different Games and going out for exercise in the morning.

Module V
The verb “qu”
Going to the library issuing a book from the library
Going to the cinema hall, buying tickets
Going to the post office, buying stamps
Going to the market to buy things.. etc
Going to the buy clothes …. Etc.
Hobby. I also like swimming.
Comprehension and answer questions based on it.

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I” Lesson 11

OPTIMIZATION TECHNIQUES

Course Code	L	T	P/FW	Credits
MDS301	2	1	-	3

Course Objective:

Students will learn the tools and techniques of quantitative analysis outlined in the schedule, how and when to apply them, and practice application of those tools. Students completing this goal will be prepared to quantify a variety of policy problems for analysis and decision making. The syllabus includes Linear, Non-linear Programming, Transportation, Decision Theory and Project Management.

Course Contents:

Module I: Introduction of OR and Linear Programming

Basic Deification, Nature and Significance of OR, feature of OR Approach Application and Scope of OR, General Methods for Solving Or Models. General Structure of Linear Programming, Advantages and Limitations of Linear Programming, Application Areas of Linear Programming.

Linear Programming Solutions: Mathematical formulation of LPP, Standard form of LPP, Multiple Solution, Unbounded Solutions, Infeasible Solution of LPP.

Module II: Simplex Method

Maximization and Minimization Problem, Solution of LPP using Graphical method, Simplex Method, two Phase Method, Big M Method.

Module III: Duality in LPP

Dual Linear Programming Problem, Rules for Constructing the Dual from Primal, Feature of Duality

Module IV: Transportation Problem

Mathematical Model of Transportation Problem, Transportation Method, North West Corner Method, Linear Cost Method, Vogel's Approximation Method, Unbalanced Supply and Demand, Degeneracy Problem, Alternative Optional Solution, Maximization Transportation Problem..

Module V: Queueing Models

Markovian queues – Birth and Death processes – Single and multiple server queueing models (M/M/1 & M/M/S) – Little‟s formula – Queues with finite waiting rooms – Queues with impatient customers: Balking and reneging.

Module VI: Theory of Games

Two Person Zero-Sum Games, Pure Strategies, Game with Saddle Point, Games without Saddle Point, Rule of Dominance, Methods for Solving Problems without Saddle Point.

Module VII: Project Management

Basic Idea of PERT & CRM, Difference between PERT & CPM, PERT/CPM Network Components and Precedence Relationship Critical Path Analysis, Project Scheduling, Project Time-Cost, Trade-Off, Resource Allocation.

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text & References:

Text:

- Operations Research, J K Sharma, Macmillan Publication

References:

- Operations Research, H. A. Taha
- Operations Research, Kanti Swaroop, Macmillan Publication

MACHINE LEARNING AND DEEP LEARNING

Course Code	L	T	P/FW	Credits
MDS 302	2	1	-	3

Course Contents:

Module I: Regression, Classification and Clustering

Machine learning theory - ML vs. DL vs. AI – data preprocessing ; regression ; supervised learning techniques and un-supervised learning techniques (clustering) ; evaluation of models' performance; model selection; over-fitting, bagging and boosting, dimensionality reduction and feature selection. Bias - variance trade-off.

Module II: Deep Learning

Introduction to deep learning - neural network - binary classification - logistic regression - gradient descent - logistic regression gradient descent - deep net - the vanishing gradient problem - training a neural network

Module III: Model Tuning

Forward propagation in a deep network - forward and backward propagation - sigmoid vs. softmax - choosing learning rate and regularization penalty – grid search- parameters vs hyper-parameters; building an ANN;

Module IV – CNN

Basics of CNN ; convolution operation – ReLU – Pooling – flattening- full connection-softmax and cross-entrophy – building a CNN – Dimensionality Reduction- Principal Component Analysis - Linear Discriminant Analysis

Module IV – RNN

Basics of RNN; building a RNN - Vanishing Gradient Problem – Model Selection & Boosting - k-Fold Cross Validation - Grid Search - LSTMs

Examination Components

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text Books and References:

1. E. Alpaydin, Introduction to Machine Learning, Prentice Hall of India, 2006.

2. Tom M. Mitchell, Machine Learning, Mc Graw Hill, 2017

3. C. M. Bishop, Pattern Recognition and Machine Learning, Springer, 2010.

5. Simon O. Haykin, Neural Networks and Learning Machines, Pearson Education, 2016

NATURAL LANGUAGE PROCESSING

Course Code	L	T	P/FW	Credits
MDS303	2	1	-	3

Course Objective: The course will help the students to understand the basics of natural language processing and various techniques which can be implemented to analyze NLP data.

Course Contents

Module-I
Natural Language Processing, it importance and its significance now, Natural Language Processing Workflow (Lexical Analysis, Parsing, Semantic Analysis, Discourse Integration, Pragmatic Analysis), Components of NLP, Natural Language Understanding (analyzing, mapping), Natural Language Generation (Text planning, Sentence planning, Text Realization), Challenge of ambiguity

Module-II
Different data sources of Natural Language Processing, Natural Language Processing tools and packages, Social media data analysis (Twitter analysis), create Twitter Application development account, Various Twitter analysis package in R. Unwanted data in tweets, and social media posts. Understanding the psychology of the social media user.

Module-III
Sentiment analysis and behavioral analysis, NLP and Writing Systems, Implement NLP using machine learning and Statistic, Information retrieval & Web Search using NLP, Google, Yahoo, Bing, and other search engines base their machine translation technology on NLP machine learning models. Machine learning for reading text on a webpage, interpret its meaning and translate it to another language.

Module-IV
Document processing (word, pdf files, etc). Various R packages used for document processing. Reading and analyzing a document. Differentiating between various documents automatically with the help of machine learning. Visualizing the analyzed document results.

Module-V
Two real world Natural Language Processing case studies

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text and References:

- Julia Sigie. Text Mining with R: A Tidy Approach 1st Edition. O'Rielley Publications

MACHINE LEARNING AND DEEP LEARNING LAB

Course Code	L	T	P/FW	Credits
MDS322	-	-	2	1

List of Programmes:

1. To implement regression on any data set.
2. To apply few supervised learning algorithms to perform classification.
3. Apply different model evaluation techniques on above problem.
4. To apply few un-supervised learning algorithms to perform clustering.
5. Apply different model evaluation techniques on above problem.
6. To implement a dimensionality reduction technique on a suitable dataset.
7. To show bias- variance trade off graphically on any suitable dataset.
8. To perfrom binary classification using NN.
9. To perform logistic regression using NN.
10. To show the use of a sigmoid functions on dataset.
11. To show the use of a softmax functions on dataset.
12. Use grid search and hyper-parameter tuning on a NN.
13. To show the use of a ReLU functions on dataset.
14. To build/ train- test a CNN.
15. To show the use of PCA/ LDA on a dataset.
16. To build a RNN model
17. Implementing an LSTM

NATURAL LANGUAGE PROCESSING LAB

Course Code	L	T	P/FW	Credits
MDS323	-	-	2	1

Course Objective: The course will help the students to understand the basics of natural language processing and various techniques by practical, which can be implemented to analyze NLP data in real world applications.

Experiments

1. Make twitter app development account and activate it
2. Download tweets and #hastag data,
3. Clean tweet and write in a dataframe
4. Write R code to perform sentiment analysis of tweets dataset 1
5. Write R code to perform sentiment analysis of tweets dataset 1
6. Write R code, predicted sentiments from the tweeter dataset
7. Read documents such as word files, pdf files, etc
8. Design a document matrix
9. Count frequency of specific words in the documents

BIG DATA FOR MANAGERS

Course Code	L	T	P/FW	Credits
MDS331	2	1	-	3

<Syllabus to be framed by Amity Business School>

DATA SCIENCE AND AI FOR MANAGERS

Course Code	L	T	P/FW	Credits
MDS332	2	1	-	3

<Syllabus to be framed by Amity Business School>

ARTIFICIAL INTELLIGENCE

Course Code	L	T	P/FW	Credits
MDS333	2	1	-	3

Course Objective:

The primary objective of this course is to provide an introduction to the basic principles, techniques, and applications of Artificial Intelligence. The emphasis of the course is on teaching the fundamentals and not on providing a mastery of specific commercially available software tools or programming environments. Upon successful completion of the course, you will have an understanding of the basic areas of artificial intelligence search, knowledge representation, learning and their applications in design and implementation of intelligent agents for a variety of tasks in analysis, design, and problem-solving. You will also be able to design and implement key components of intelligent agents of moderate complexity in Python, or R, or Java and/or Lisp or Prolog and evaluate their performance. Graduate students are expected to develop some familiarity with current research problems and research methods in AI by working on a research or design project.

Course Contents:

Module I: Introduction

AI and its importance, AI Problem, Application area.

Module II: Problem Representations

State space representation, problem-reduction representation, production system, production system characteristics, and types of production system.

Module III: Heuristic Search Techniques

AI and search process, brute force search, depth-first search, breadth-first search, time and space complexities, heuristics search, hill climbing, best first search, A*, AO* algorithm, constraint satisfaction, and beam search.

Module IV: Knowledge Representation issues using predicate logic

Representation and mapping, knowledge representation mechanism, inheritable knowledge, Prepositional logic: syntax and semantics, First Order Predicate Logic (FOPL).

Module V: Expert System

Basic understanding of Fuzzy Logic, Artificial Neural Network, Perceptron, Natural Language Processing, Pattern Recognition, Robotics, LISP and Prolog. The role of Artificial intelligence in Biotechnology. Introduction to Bio-inspired computing.

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text & References:

Text:

- Artificial Intelligence – II Edition, Elaine Rich, Kevin Knight TMH.

References:

- Foundations of Artificial Intelligence and Expert Systems, V S Janakiraman, K Sarukesi, P Gopalakrishan, Macmillan India Ltd.
- Introduction to AI and Expert System, Dan W. Patterson, PHI.

BIG DATA & ANALYTICS USING R

Course Code	L	T	P/FW	Credits
MDS334	2	1	-	3

Course Objective: The course will help the students to understand the data, its properties and various related behaviors which they can use to develop their data science applications for solving real world problems.

Course Contents

Module-I
Introduction to Big Data & Big Data Challenges Preview, Limitations & Solutions of Big Data Architecture, Bigdata Concepts, Bigdata sources, climate data, multimedia data, social media data, youtube data, etc., and bigdata tools and platforms.

Module-II
Introduction to Hadoop, Apache, Pig, Hive, Flume, Sqoop, Zookeeper, Oozie, Spark, SAP HANA, Microsoft Azure, Cassandra, MongoDB, Google Big Query, Cloudera. Comparison between Hadoop, Spark, Cassandra, Mongo DB, etc., Parallel and distributive computing, their advantages and disadvantages, and differences.

Module-III
Big data strategies: Sample and Model, Chunk and Pull, Push Compute to Data. Hadoop and its elements, Hadoop distributed file system (HDFS) and its operations, HBase, Mapreduce (Splitter, Mapper , Shuffle, Reducer), Pig, Hive, YARN, R and Hadoop Integrated Programming Environment (RHIPE), Open source package RHadoop.

Module-IV
Tricks to handle Bigdata in R, Minimize copies of data, Process data in chunks, Compute in parallel, Leverage integers, Use efficient file formats and data types, Load only data you need, Minimize loops, Memory cleanup, R object deletion after usage.

Module-V
3 Real world case studies

Examination Scheme:

Components	C T	Assignment	P/V	Quiz	Attd	EE
Weightage (%)	15	10	10	10	5	50

Text and References:

- Simon Walkowiak, Big Data Analytics with R, Packt Publishing. (2016)
- Benjamin Bengfort and Jenny Kim., Data Analytics with Hadoop: An Introduction for Data Scientists 1st Edition. O'Reilley Publication.

ARTIFICIAL INTELLIGENCE LAB

Course Code	L	T	P/FW	Credits
MDS343	-	-	2	1

LIST OF PROGRAMS

1. Write a program to solve 8 queens problem
2. Solve any problem using depth first search.
3. Solve any problem using best first search.
4. Solve 8-puzzle problem using best first search
5. Solve Robot (traversal) problem using means End Analysis
6. Solve traveling salesman problem.

Books for Reference :

- Artificial Intelligence: A Modern Approach,. Russell & Norvig. 1995, Prentice Hall.
- Artificial Intelligence, Elain Rich and Kevin Knight, 1991, TMH.
- Artificial Intelligence-A modern approach, Staurt Russel and peter norvig, 1998, PHI.
- Artificial intelligence, Patrick Henry Winston:, 1992, Addition Wesley 3 Ed.,
- Introduction to prolog.

Examination Scheme:

Note: IA –Internal Assessment, EE- External Exam, PR- Performance, LR – Lab Record, V – Viva.

BIG DATA & ANALYTICS USING R LAB

Course Code	L	T	P/FW	Credits
MDS344	-	-	2	1

Course Objective: The course will help the students to understand the bigdata, its properties and various related behaviours. In this course student will learn how use to manage bigdata in real world problems.

Lab Experiments

1. Install and Read files using Hadoop
2. Perform various queries using pig and hive in Hadoop
3. Create Database & Collection in MongoDB
4. Write R program to reduce size of data by manipulating datatypes
5. Write R program to reduce size of data by removing insignificant data
6. Write R program to reduce memory usage by using memory efficiently

MINOR PROJECT

Course Code	L	T	P	Credit
MDS 350	-	-	-	4

GUIDELINES FOR PROJECT FILE

Research experience is as close to a professional problem-solving activity as anything in the curriculum. It provides exposure to research methodology and an opportunity to work closely with a faculty guide. It usually requires the use of advanced concepts, a variety of experimental techniques, and state-of-the-art instrumentation.

Research is genuine exploration of the unknown that leads to new knowledge, which often warrants publication. But whether or not the results of a research project are publishable, the project should be communicated in the form of a research report written by the student.

Sufficient time should be allowed for satisfactory completion of reports, taking into account that initial drafts should be critiqued by the faculty guide and corrected by the student at each stage.

The File is the principal means by which the work carried out will be assessed and therefore great care should be taken in its preparation.

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page
Table of Contents
Acknowledgement
Student Certificate
Company Profile
Introduction
Chapters
Appendices
References / Bibliography

- **Title or Cover Page or Front Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

- **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

- **Acknowledgement**

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Student Certificate**

Given by the Institute.

- **Company Certificate & Profile**

This is a certificate, which the company gives to the students. A Company Profile corresponds to a file with company-specific data. Company data can be stored there and included in a booking when needed.

- **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Chapters**

All chapters and sections must be appropriately numbered, titled and should neither be too long nor too short in length.

The first chapter should be introductory in nature and should outline the background of the

project, the problem being solved, the importance, other related works and literature survey.

The other chapters would form the body of the report. The last chapter should be concluding

in nature and should also discuss the future prospect of the project.

- **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

- **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based on the following criteria: the quality of the report, the technical merit of the project and the project execution. Technical merit attempts to assess the quality and depth of the intellectual efforts put into the project. Project execution is concerned with assessing how much work has been put in.

The File should fulfill the following ***assessment objectives:***

1. Writing a critical literature review
    - Search for literature
    - Summarizing and presenting the literature
    - Evaluating key content and theories

2. Collecting and analyzing research material
    - Choosing and designing research method
    - Conducting the research
    - Analyzing, sorting and classifying the data to make decision

3. Interpreting research method and draw conclusion
    - Findings
    - Recommendation

4. Assigning the theories and writing the project report
    - Structuring the project in accordance with the given style

5. Bibliography
    - This refer to the books, Journals and other documents consulting while working on the project

Examination Scheme:

Components	**MRP**	**V**	**S**	**FP**	**R**
Weightage (%)	20	20	20	20	20

MRP – Mid Report Presentation, V – Viva, S – Synopsis, FP – Final Presentation, R - Report

REPORT ON PAPER PRESENTATION IN CONFERENCE

Course Code	L	T	P	Credit
MDS 351	-	-	-	1

Objective: Conferences / Seminars / Workshop are good and efficient way to get to know other researchers through their work and also personally. The educational aspect can expose the students to new ways of conducting the business and help them to discover how to be more productive. They provide a great opportunity to network. Collaboration is the way to approach networking.

Rules and Regulations

- 2nd Year / 3rd Year Students for which the students and the faculty members can start preparations well in advance prior to the scheduled conference / seminar / workshop.
- The number of students going for any conference / seminar / workshop should be manageable.
- A proposal for the proposed conference / seminar / workshop should be drafted and presented to the HoI reflecting the following key points:
    - Entire activity plan
    - Route Map
    - What are the objectives for the students?
    - What they need to learn, do, and prepare before the conference / seminar / workshop?
    - List of prospective students with Contact Details
    - List of Faculty Coordinators with Contact Details
- After getting approval from the HoI, a note sheet should be prepared and all necessary permission and approval from the competent authorities should be obtained.
- The attention and co-operation of all students and parents are requested to attend the conference / seminar / workshop most effectively. Signing of the letter of Indemnity Bond (Consent-cum-Undertaking) is mandatory for all the parents of students going for conference / seminar / workshop in or outside Jaipur. Duly executed Indemnity Bond should be submitted to HoI Office at least 2 days prior to the visit, without which the accompanying Staff coordinator shall not permit the student to participate in the industrial visit
- The list of students participating in conference / seminar / workshop shall be handed over to the concerned HODs, Staff coordinators.
- Students should be present in formals.
- Students should carry the College Identity Cards during their journey.
- Discipline should be maintained during the conference / seminar / workshop. Any violation will be viewed very seriously.
- A report of the conference / seminar / workshop is to be submitted in 5 days time by students / faculty coordinators once the students are back.

The report to be prepared should reflect the following:-

- What happened at the conference / seminar / workshop the students attend and how does it relate in the best way to the preparations and the learning objectives.
- How do the students will use the outcome of conference / seminar / workshop after it is over?
- What will they gain from it and how can they set up activities that transfer the experience into learning?

- Evaluation parameters for the success of the experience of conference / seminar / workshop.

The layout guidelines for the Report:

1. File should be in the following specification:

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components:

- Front Page
- Table of Content
- Acknowledgement
- Student Certificate
- Company Profile (optional)
- Introduction
- Main Body
- References / Bibliography

ASSESSMENT OF THE PAPER PRESENTATION FILE

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Report File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student's own work. It will also ensure regularity and meeting the delaines.

Examination Scheme:

Components	**V**	**S**	**R**	**FP**
Weightage (%)	20	20	20	40

V – Viva, S – Synopsis, FP – Final Presentation, R - Report

SUMMER INTERNSHIP PROJECT

Course Code	L	T	P	Credit
MDS 352	-	-	-	3

GUIDELINES:
There are certain phases of every Intern's professional development that cannot be effectively taught in the academic environment. These facets can only be learned through direct, on-the-job experience working with successful professionals and experts in the field. The internship program can best be described as an attempt to institutionalize efforts to bridge the gap between the professional world and the academic institutions. Entire effort in internship is in terms of extending the program of education and evaluation beyond the classroom of a university or institution. The educational process in the internship course seeks out and focuses attention on many latent attributes, which do not surface in the normal classroom situations. These attributes are intellectual ability, professional judgment and decision-making ability, inter-disciplinary approach, skills for data handling, ability in written and oral presentation, sense of responsibility etc.

In order to achieve these objectives, each student will maintain a file (**Internship File**). The Internship File aims to encourage students to keep a personal record of their learning and achievement throughout the Programme. It can be used as the basis for lifelong learning and for job applications. Items can be drawn from activities completed in the course modules and from the workplace to demonstrate learning and personal development.

The File will assess the student's analytical skills and ability to present supportive evidence, whilst demonstrating understanding of their organization, its needs and their own personal contribution to the organization.

The **layout guidelines** for the Project & Seminar Report

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components
Front Page
Table of Content
Acknowledgement
Student Certificate
Company Profile (optional)
Introduction
Main Body
References / Bibliography

The File will include ***five sections*** in the order described below. The content and comprehensiveness of the main body and appendices of the report should include the following:

1. **The Title Page**--Title - An Internship Experience Report For (Your Name), name of internship organization, name of the Supervisor/Guide and his/her designation, date started and completed, and number of credits for which the report is submitted.
2. **Table of Content**--an outline of the contents by topics and subtopics with the page number and location of each section.
3. **Introduction**--short, but should include how and why you obtained the internship experience position and the relationship it has to your professional and career goals.
4. **Main Body**--should include but not be limited to daily tasks performed. Major projects contributed to, dates, hours on task, observations and feelings, meetings attended and their purposes, listing of tools and materials and their suppliers, and photographs if possible of projects, buildings and co-workers.
5. **References / Bibliography** --This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system

ASSESSMENT OF THE INTERNSHIP FILE

The student will be provided with the Student Assessment Record (SAR) to be placed in front of the Internship File. Each item in the SAR is ticked off when it is completed successfully. The faculty will also assess each item as it is completed. The SAR will be signed by the student and by the faculty to indicate that the File is the student's own work. It will also ensure regularity and meeting the delaines.

STUDENT ASSESSMENT RECORD (SAR)

1. **Range of Research Methods used to obtain information**

2. **Execution of Research**

3. **Data Analysis**
   - Analyse Quantitative/ Qualitative information
   - Control Quality

4. **Draw Conclusions**

Examination Scheme:

Components	**V**	**S**	**R**	**FP**
Weightage (%)	20	20	20	40

V – Viva, S – Synopsis, FP – Final Presentation, R - Report

COMMUNICATION SKILLS-III

CODE	L	T	P/FW	CREDITS
BCS311	1	-	-	1

Course Objective:
To initiate the learners with the basic mechanics of writing skills and facilitate them with the core skills required for communication in the professional world.

Course Contents:

Module I: Mechanics and Semantics of Sentences
Writing effective sentences
Style and Structure

Module II: Developing writing skills
Inter - office communication: Business Letter; E mails; Netiquette
Intra – office communication: Memos, Notices, Circulars, Minutes
Report Writing

Module III: Business Presentations
Planning, design and layout of presentation
Information Packaging
Audience analysis
Audio visual aids
Speaking with confidence
Case Studies

Examination Scheme:

Components	CT1	CT2	CAF	V	GD	GP	A
Weightage (%)	20	20	25	10	10	10	5

CAF – Communication Assessment File
GD – Group Discussion
GP – Group Presentation

Text & References:

- Krishnaswamy, N, Creative English for Communication, Macmillan
- Raman Prakash, Business Communication, Oxford.

BEHAVIOURAL SCIENCE-III (Leading Through Teams)

CODE	L	T	P/FW	CREDITS
BSS311	1	-	-	1

Course Objective:

This course aims to enable students to:

Understand the concept and building of teams

Manage conflict and stress within team

Facilitate better team management and organizational effectiveness through universal human values.

Course Contents:

Module I: Teams: An Overview

Team Design Features: team vs. group

Effective Team Mission and Vision

Life Cycle of a Project Team

Rationale of a Team, Goal Analysis and Team Roles

Module II: Team & Sociometry

Patterns of Interaction in a Team

Sociometry: Method of studying attractions and repulsions in groups

Construction of sociogram for studying interpersonal relations in a Team

Module III: Team Building

Types and Development of Team Building

Stages of team growth

Team performance curve

Profiling your Team: Internal & External Dynamics

Team Strategies for organizational vision

Team communication

Module IV: Team Leadership & Conflict Management

Leadership styles in organizations

Self Authorized team leadership

Causes of team conflict

Conflict management strategies

Stress and Coping in teams

Module V: Global Teams and Universal Values

Management by values

Pragmatic spirituality in life and organization

Building global teams through universal human values

Learning based on project work on Scriptures like Ramayana, Mahabharata, Gita etc.

Module VI: End-of-Semester Appraisal
Viva based on personal journal
Assessment of Behavioural change as a result of training
Exit Level Rating by Self and Observer

Examination Scheme:

Components	SAP	A	Mid Term Test (CT)	VIVA	Journal for Success (JOS)
Weightage (%)	20	05	20	30	25

Text & References:

- Organizational Behaviour, Davis, K.
- Hoover, Judhith D. Effective Small Group and Team Communication, 2002,Harcourt College Publishers
- LaFasto and Larson: When Teams Work Best, 2001, Response Books (Sage), New Delhi
- Dick, Mc Cann & Margerison, Charles: Team Management, 1992 Edition, viva books
- J William Pfeiffer (ed.) Theories and Models in Applied Behavioural Science, Vol 2, Group (1996); Pfeiffer & Company
- Smither Robert D.; The Psychology of Work and Human Performance, 1994, Harper Collins College Publishers

FRENCH

CODE	L	T	P/FW	CREDITS
FLT 311	2	-	-	2

Course Objective:

To provide the students with the know-how

- To master the current social communication skills in oral and in written.
- To enrich the formulations, the linguistic tools and vary the sentence construction without repetition.

Course Contents:

Module B: pp. 76 – 88 Unité 6

Module C: pp. 89 to103 Unité 7

Contenu lexical: **Unité 6: se faire plaisir**

1. acheter: exprimer ses choix, décrire un objet (forme, dimension, poids et matières) payer
2. parler de la nourriture, deux façons d'exprimer la quantité, commander un repas au restaurant
3. parler des différentes occasions de faire la fête

Unité 7: Cultiver ses relations

maîtriser les actes de la communication sociale courante (Salutations, présentations, invitations, remerciements)
annoncer un événement, exprimer un souhait, remercier, s'excuser par écrit.
caractériser une personne (aspect physique et caractère)

Contenu grammatical:

1. accord des adjectifs qualificatifs
2. articles partitifs
3. Négations avec de, ne…rien/personne/plus
4. Questions avec combien, quel…
5. expressions de la quantité
6. ne…plus/toujours - encore
7. pronoms compléments directs et indirects
8. accord du participe passé (auxiliaire « avoir ») avec l'objet direct
9. Impératif avec un pronom complément direct ou indirect
10. construction avec « que » - Je crois que/ Je pense que/ Je sais que

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- le livre à suivre: Campus: Tome 1

GERMAN

CODE	L	T	P/FW	CREDITS
FLG 311	2	-	-	2

Course Objective:

To enable the students to converse, read and write in the language with the help of the basic rules of grammar, which will later help them to strengthen their language**.**

To give the students an insight into the culture, geography, political situation and economic opportunities available in Germany

Course Contents:

Module I: Modal verbs

Modal verbs with conjugations and usage

Imparting the finer nuances of the language

Module II: Information about Germany (ongoing)

Information about Germany in the form of presentations or "Referat"– neighbors, states and capitals, important cities and towns and characteristic features of the same, and also a few other topics related to Germany.

Module III: Dative case

Dative case, comparison with accusative case

Dative case with the relevant articles

Introduction to 3 different kinds of sentences – nominative, accusative and dative

Module IV: Dative personal pronouns

Nominative, accusative and dative pronouns in comparison

Module V: Dative prepositions

Dative preposition with their usage both theoretical and figurative use

Module VI: Dialogues

In the Restaurant,

At the Tourist Information Office,

A telephone conversation

Module VII: Directions

Names of the directions

Asking and telling the directions with the help of a roadmap

Module VIII: Conjunctions

To assimilate the knowledge of the conjunctions learnt indirectly so far

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation

I – Interaction/Conversation Practice

Text & References:

- Wolfgang Hieber, Lernziel Deutsch
- Hans-Heinrich Wangler, Sprachkurs Deutsch
- Schulz Griesbach, Deutsche Sprachlehre für Ausländer
- P.L Aneja, Deutsch Interessant- 1, 2 & 3
- Rosa-Maria Dallapiazza et al, Tangram Aktuell A1/1,2
- Braun, Nieder, Schmöe, Deutsch als Fremdsprache 1A, Grundkurs

SPANISH

CODE	L	T	P/FW	CREDITS
FLS 311	2	-	-	2

Course Objective:
To enable students acquire knowledge of the Set/definite expressions (idiomatic expressions) in Spanish language and to handle some Spanish situations with ease.

Course Contents:

Module I
Revision of earlier semester modules
Set expressions (idiomatic expressions) with the verb *Tener*, *Poner, Ir*….
Weather

Module II
Introduction to *Gustar*…and all its forms. Revision of *Gustar* and usage of it

Module III
Translation of Spanish-English; English-Spanish. Practice sentences.
How to ask for directions (using estar)
Introduction to IR + A + INFINITIVE FORM OF A VERB

Module IV
Simple conversation with help of texts and vocabulary
En el restaurante
En el instituto
En el aeropuerto

Module V
Reflexives

Examination Scheme:

Components	CT1	CT2	C	I	V	A
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- Español, En Directo I A
- Español Sin Fronteras -Nivel Elemental

CHINESE

CODE	L	T	P/FW	CREDITS
FLC 311	2	-	-	2

Course Objective:
Foreign words are usually imported by translating the concept into Chinese, the emphasis is on the meaning rather than the sound. But the system runs into a problem because the underlying name of personal name is often obscure so they are almost always transcribed according to their pronciation alone. The course aims at familiarizing the student with the basic aspects of speaking ability of Mandarin, the language of Mainland China. The course aims at training students in practical skills and nurturing them to interact with a Chinese person.

Course Contents:

Module I
Drills
Dialogue practice
Observe picture and answer the question.
Introduction of written characters.
Practice reading aloud
Practice using the language both by speaking and by taking notes.
Character writing and stroke order

Module II
Measure words
Position words e.g. inside, outside, middle, in front, behind, top, bottom, side, left, right, straight.
Directional words – beibian, xibian, nanbian, dongbian, zhongjian.
Our school and its different building locations.
What game do you like?
Difference between “hii” and “neng”, “keyi”.

Module III
Changing affirmative sentences to negative ones and vice versa
Human body parts.
Not feeling well words e.g.; fever, cold, stomach ache, head ache.
Use of the modal particle “le”
Making a telephone call
Use of “jiu” and “cal” (Grammar portion)
Automobiles e.g. Bus, train, boat, car, bike etc.
Traveling, by train, by airplane, by bus, on the bike, by boat.. etc.

Module IV
The ordinal number “di”
“Mei” the demonstrative pronoun e.g. mei tian, mei nian etc.
use of to enter to exit
Structural particle “de” (Compliment of degree).
Going to the Park.
Description about class schedule during a week in school.

Grammar use of “li” and “cong”.
Comprehension reading followed by questions.

Module V
Persuasion-Please don’t smoke.
Please speak slowly
Praise – This pictorial is very beautiful
Opposites e.g. Clean-Dirty, Little-More, Old-New, Young-Old, Easy-Difficult, Boy-Girl, Black-White, Big-Small, Slow-Fast … etc.
Talking about studies and classmates
Use of “it doesn’t matter”
Enquiring about a student, description about study method.
Grammar: Negation of a sentence with a verbal predicate.

Examination Scheme:

Components	**CT1**	**CT2**	**C**	**I**	**V**	**A**
Weightage (%)	20	20	20	20	15	5

C – Project + Presentation
I – Interaction/Conversation Practice

Text & References:

- “Elementary Chinese Reader Part I, Part-2” Lesson 21-30

PROJECT WORK

Course Code	L	T	P	Credit
MDS460	-	-	-	25

GUIDELINES FOR PROJECT FILE

The end semester evaluation of the project work will be based on the report and a Viva-Voce Examination by a team consisting of the Faculty Guide and External Examiner(s) who are appointed depending on the chosen areas of specialization of the students. **The duration of fast track examination is 3 months and then student will allow to take 3 month project work as it will give students exposure for practical aspect and satisfactory completion of project work should be critiqued by the faculty guide and corrected by the student.**

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page
Table of Contents
Acknowledgement
Student Certificate
Company Profile
Introduction
Chapters
Appendices
References / Bibliography

- **Title or Cover Page or Front Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

- **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

- **Acknowledgement**

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Student Certificate**

Given by the Institute.

- **Company Certificate & Profile**

This is a certificate, which the company gives to the students. A Company Profile corresponds to a file with company-specific data. Company data can be stored there and included in a booking when needed.

- **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Chapters**

All chapters and sections must be appropriately numbered, titled and should neither be too long nor too short in length.

The first chapter should be introductory in nature and should outline the background of the project, the problem being solved, the importance, other related works and literature survey. The other chapters would form the body of the report. The last chapter should be concluding in nature and should also discuss the future prospect of the project.

- **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

- **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based as per the examination Scheme given below :

Examination Scheme:

Components	**MRP**	**V**	**S**	**FP**	**R**
Weightage (%)	20	20	20	20	20

MRP – Mid Report Presentation, V – Viva, S – Synopsis, FP – Final Presentation, R - Report

INTERNSHIP

Course Code	L	T	P	Credit
MDS461	-	-	-	25

GUIDELINES FOR PROJECT FILE

The end semester evaluation of the internship will be based on the report and a Viva-Voce Examination by a team consisting of the guide and External Examiner(s) who are appointed depending on the chosen areas of specialization of the students. **The duration of fast track examination is 3 months and then student will allow to take 3 month internship as it will give students exposure to industry for practical scenario and satisfactory completion of internship taking into account that initial Report/Project file should be critiqued by the faculty guide and corrected by the student.**

In general, the File should be comprehensive and include

- A short account of the activities that were undertaken as part of the project;
- A statement about the extent to which the project has achieved its stated goals.
- A statement about the outcomes of the evaluation and dissemination processes engaged in as part of the project;
- Any activities planned but not yet completed as part of the project, or as a future initiative directly resulting from the project;
- Any problems that have arisen that may be useful to document for future reference.

Report Layout

The report should contain the following components

1. File should be in the following specification

- A4 size paper
- Font: Arial (10 points) or Times New Roman (12 points)
- Line spacing: 1.5
- Top & bottom margins: 1 inch/ 2.5 cm
- Left & right margins: 1.25 inches/ 3 cm

2. Report Layout: The report should contain the following components

Front Page
Table of Contents
Acknowledgement
Student Certificate
Company Profile
Introduction
Chapters
Appendices
References / Bibliography

- **Title or Cover Page or Front Page**

The title page should contain the following information: Project Title; Student's Name; Course; Year; Supervisor's Name.

- **Table of Contents**

Titles and subtitles are to correspond exactly with those in the text.

- **Acknowledgement**

Acknowledgment to any advisory or financial assistance received in the course of work may be given.

- **Student Certificate**

Given by the Institute.

- **Company Certificate & Profile**

This is a certificate, which the company gives to the students. A Company Profile corresponds to a file with company-specific data. Company data can be stored there and included in a booking when needed.

- **Introduction**

Here a brief introduction to the problem that is central to the project and an outline of the structure of the rest of the report should be provided. The introduction should aim to catch the imagination of the reader, so excessive details should be avoided.

- **Chapters**

All chapters and sections must be appropriately numbered, titled and should neither be too long nor too short in length.

The first chapter should be introductory in nature and should outline the background of the project, the problem being solved, the importance, other related works and literature survey. The other chapters would form the body of the report. The last chapter should be concluding in nature and should also discuss the future prospect of the project.

- **Appendices**

The Appendix contains material which is of interest to the reader but not an integral part of the thesis and any problem that have arisen that may be useful to document for future reference.

- **References / Bibliography**

This should include papers and books referred to in the body of the report. These should be ordered alphabetically on the author's surname. The titles of journals preferably should not be abbreviated; if they are, abbreviations must comply with an internationally recognised system.

ASSESSMENT OF THE PROJECT FILE

Essentially, marking will be based as per the examination Scheme given below :

Examination Scheme:

Components	**MRP**	**V**	**S**	**FP**	**R**
Weightage (%)	20	20	20	20	20

MRP – Mid Report Presentation, V – Viva, S – Synopsis, FP – Final Presentation, R - Report