Dr. N.G.P.ARTS AND SCIENCE COLLEGE (Autonomous)

REGULATIONS 2019-20 for Under Graduate Programme

(Outcome Based Education model with Choice Based Credit System)

B.Sc. Computer Science with Data Analytics

(For the students admitted during the academic year 2019-20 and onwards)

Programme: B.Sc. Computer Science with Data Analytics

Eligibility

A candidate who has passed in Higher Secondary Examination with Computer Science or Mathematics as one of the subjects under Higher Secondary Board of Examination and as per the norms set by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the Academic Council, subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the **Bachelor of Computer Science with Data Analytics Degree Examination** of this College after a programme of study of three academic years.

Programme Educational Objectives

The Curriculum is designed to attain the following learning goals which students shall accomplish by the time of their graduation:

1. Work productively as successful Computer Professionals
2. Communicate effectively, practice professional ethics and incorporate societal needs in their professional endeavors
3. Engage in life-long learning and develop flexibility and competence to Adapt to changes in technology.

PROGRAMME OUTCOMES:

On the successful completion of the program, the following are the expected outcomes.

PO Number	PO Statement
PO1	Ability to apply knowledge of Computer Science and Mathematics to identify problems and model solutions
PO2	Ability to analyze large data sets in the context of real world problems and interpret results
PO3	Ability to Design, Implement and Evaluate solutions for computing problems
PO4	Ability to apply current techniques, skills and tools necessary for Data Analytics
PO5	Ability to exhibit soft skills and understand professional and social responsibilities.

Guidelines for Programmes offering Part I& Part II for Two Semesters:

Part	Subjects	No.of Papers	Credit	Semester No.
I	Tamil / Hindi / French/Malayalam	4	4 x 3 = 12	I to IV
II	English	4	4 x 3 =12	I to IV
III	Core (Credits 2,3,4)	23	72	I to VI
	Inter Departmental Course (IDC)	4	16	I to IV
	Discipline Specific Elective (DSE)	3	3 x 4 =12	V & VI
	Skill Enhancement Course(SEC)	4	2 x 3=6 2 x 2=4	III ,IV
	Lab on Project (LoP)	1	1	III to V
IV	Environmental Studies(AECC)	1	2	I
	Value Education (VE) (Human Rights) (AECC)	1	2	II
V	Extension Activity NSS / Sports / Department Activity	-	1	I to VI
TOTAL CREDITS			**140**	

CURRICULUM

B.SC. COMPUTER SCIENCE WITH DATA ANALYTICS

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
First Semester										
Part – I										
191TL1A1TA	Language - I	Tamil-I	5	-	-	3	25	75	100	3
191TL1A1HA		Hindi-I								
191TL1A1MA		Malayalam-I								
191TL1A1FA		French – I								
Part – II										
191EL1A1EA	Language - II	English – I	5	-	-	3	25	75	100	3
Part – III										
194DA1A1CA	Core – I	Problem Solving and Programming in C	4	1	-	3	25	75	100	4
194DA1A1CP	Core Practical - I	C Programming	-	-	4	3	40	60	100	2
194DA1A1CQ	Core Practical - II	Analytics with Excel	-	-	4	3	40	60	100	2
192MT1A1IF	IDC – I	Probability Theory	4	1	-	3	25	75	100	4
Part – IV										
193MB1A1AA	AECC - I	Environmental Studies	2	-	-	3	-	50	50	2
Total			**20**	**2**	**8**				**650**	**20**

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Second Semester										
Part – I										
191TL1A2TA	Language-I	Tamil-II	4	-	-	3	25	75	100	3
191TL1A2HA		Hindi-II								
191TL1A2MA		Malayalam-II								
191TL1A2FA		French – II								
Part – II										
191EL1A2EA	Language-II	English – II	4	-	-	3	25	75	100	3
Part – III										
194DA1A2CA	Core – II	Data Science with Python	4	1	-	3	25	75	100	4
194DA1A2CB	Core – III	Data Structures and Algorithms	4	1	-	3	25	75	100	4
194DA1A2CP	Core Practical- III	Python Programming	-	-	3	3	40	60	100	2
194DA1A2CQ	Core Practical- IV	Data Structures	-	-	3	3	40	60	100	2
192PY1A2IB	IDC – II	Digital Logic and Circuits	4	-	-	3	25	75	100	4
Part – IV										
196BM1A2AA	AECC – II	Human Rights	2	-	-	2	-	50	50	2
Total			**22**	**2**	**6**				**750**	**24**

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Third Semester										
Part – I										
191TL1A3TA	Language - I	Tamil-III	3	1	-	3	25	75	100	3
191TL1A3HA		Hindi-III								
191TL1A3MA		Malayalam-III								
191TL1A3FA		French – III								
Part – II										
191EL1A3EA	Language - II	English – III	4	-	-	3	25	75	100	3
Part – III										
194DA1A3CA	Core - IV	Computer Networks	4	-	-	3	25	75	100	4
194DA1A3CB	Core - V	Database Management Systems	4	-	-	3	25	75	100	4
192MT1A3IF	IDC - III	Applied Statistics	4	-	-	3	25	75	100	4
194DA1A3CP	Core Practical - V	Database Management Systems	-	-	3	3	40	60	100	2
194DA1A3SA	SEC - I Theory	R Programming	3	1	-	3	25	75	100	3
194DA1A3SP	SEC - II Practical	R Programming	-	-	3	3	40	60	100	2
	LoP	Lab on Project	-	-	-	-	-	-	-	-
Total			**22**	**2**	**6**	-	**230**	**570**	**800**	**25**
Extra Credits :										
194DA1A3GA	Generic Elective	Introduction to Data Analytics	2	-	-	3	-	100	100	2
191TL1A3AA	AECC – III	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A3AB		Advanced Tamil								
195CR1A3AA		Women's Rights								

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fourth Semester										
Part –I										
191TL1A4TA	Language – I	Tamil-IV	3	1	-	3	25	75	100	3
191TL1A4HA		Hindi-IV								
191TL1A4MA		Malayalam-IV								
191TL1A4FA		French – IV								
Part –II										
191EL1A4EA	Language – II	English – IV	4	-	-	3	25	75	100	3
Part - III										
194DA1A4CA	Core - VI	Java Programming	4	-	-	3	25	75	100	4
194DA1A4CB	Core -VII	Operating Systems	4	-	-	3	25	75	100	4
192MT1A4IF	IDC - IV	Discrete Mathematics	4	-	-	3	25	75	100	4
194DA1A4CP	Core Practical - VI	Java Programming	-	-	3	3	40	60	100	2
194DA1A4SA	SEC - III Theory	Next Generation Databases	3	1	-	3	25	75	100	3
194DA1A4SP	SEC - IV Practical	Next Generation Databases	-	-	3	3	40	60	100	2
		Total	**22**	**2**	**6**	-	-	-	**800**	**25**
Extra Credits :										
194DA1A4GA	Generic Elective	Introduction to Big Data	2	-	-	3	-	100	100	2
191TL1A4AA	AECC – IV	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A4AB		Advanced Tamil								
192PY1A4AA		General Awareness								

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fifth Semester										
194DA1A5CA	Core VIII	Software Engineering	5	-	-	3	25	75	100	4
194DA1A5CB	Core IX	Big Data Analytics	5	-	-	3	25	75	100	4
194DA1A5CC	Core X	Data Mining	4	-	-	3	25	75	100	4
194DA1A5CD	Core XI	Web Designing	4	-	-	3	25	75	100	4
194DA1A5CP	Core Practical VII	Big Data Analytics	-	-	4	3	40	60	100	2
194DA1A5CQ	Core Practical VIII	Web Designing	-	-	4	3	40	60	100	2
194DA1A5DA	DSE-I	Mobile Computing	4	-	-	3	25	75	100	4
194DA1A5DB		Artificial Intelligence								
194DA1A5DC		Social Media Analytics								
194DA1A5LA	LoP	Lab on Project	-	-	-	-	50	-	50	1
		Total	**22**	**-**	**8**	**-**	**-**	**-**	**750**	**25**

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Sixth Semester										
Part – III										
194DA1A6CA	Core - XII	Data Visualization	5	-	-	3	25	75	100	4
194DA1A6CV	Core - XIII	Project Work	-	-	5	3	50	50	100	4
194DA1A6DA	DSE – II	Cloud Computing	5	-	-	3	25	75	100	4
194DA1A6DB		Machine Learning								
194DA1A6DC		Business Intelligence								
194DA1A6DD	DSE – III	Data Privacy and Security	5	-	-	3	25	75	100	4
194DA1A6DE		Natural Language Processing								
194DA1A6DF		Predictive Analytics								
194DA1A6CP	Core Practical - IX	Data Visualization	-	-	5	3	40	60	100	2
194DA1A6CQ	Core Practical - X	Analytics Tools	-	-	5	3	40	60	100	2
Part-V										
194DA1A6XA		Extension Activity	-	-	-	-	50	-	50	1
		Total	**15**	**-**	**15**	-	-	-	**650**	**21**
		Grand Total							**4400**	**140**

DISCIPLINE SPECIFIC ELECTIVE

Students shall select the desired course of their choice in the listed elective course during Semesters V & VI

Semester V (Elective I)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194DA1A5DA	Mobile Computing
2.	194DA1A5DB	Artificial Intelligence
3.	194DA1A5DC	Social Media Analytics

Semester VI (Elective II)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194DA1A6DA	Cloud Computing
2.	194DA1A6DB	Machine Learning
3.	194DA1A6DC	Business Intelligence

Semester VI (Elective III)

List of Elective Courses

S. No.	Course Code	Name of the Course
1.	194DA1A6DD	Data Privacy and Security
2.	194DA1A6DE	Natural Language Processing
3.	194DA1A6DF	Predictive Analytics

Course Code	Course Name	Category	L	T	P	Credit
194DA1A1CA	**CORE-I : PROBLEM SOLVING AND PROGRAMMING IN C**	Theory	4	1	-	4

PREAMBLE:

The course introduces the basics of probability theory essential for their subsequent study of data analytics.

Syllabus Total Instruction Hrs : 60

UNIT - I [10h]

Problem Solving and Introduction to C: Introduction to Problem Solving- Defining and Analyzing the Problem - Algorithm - Flow Chart - Introduction to C Programming – Character Set – Tokens - Operators and Expressions – Data Input and Output

UNIT - II [12h]

Control Structures and Arrays: Control Statements –If and Switch statements - While Statement - Do While Statement – For Loop – Nested Loop - Break - Continue – Goto Statement Defining Array – One dimensional – two dimensional – Multi dimensional array.

UNIT - III [12h]

Strings and Functions: Defining a string – Initialization of Strings – Reading and Writing Strings – String Functions - Defining a function – Accessing a function – Function prototypes – Passing arguments to a function – Passing arrays to functions – Recursion – Storage classes

UNIT - IV [14h]

Pointers and Structures: Features of Pointers – Pointer Declaration – Arithmetic Operation with Pointers – Pointers and arrays – Pointers and Two-Dimensional arrays – Array of Pointers - Structures and Unions: Defining a Structure – Processing a Structure – Array of Structures - Structure within Structure – Pointers to Structures – Enumerated Data Type – Union.

UNIT - V [12h]

Files: Stream and File Types – Steps for File operations – File I/O – Structures Read and Write – Other File Function - Command Line Arguments – Dynamic Memory Allocation – malloc( ) - calloc( ) – free( ) – realloc( ).

Text Books :

1 Ashok N. Kamthane, "Computer programming", Pearson Education, 2007.

2 Deitel H. M. and Deitel P. J., "C How to Program", Prentice Hall, 2012.

References:

1 BrianW. Kernighan and Dennis M. Ritchie, "The C programming Language", 2006, Prentice- Hall

2 Byron S Gottfried, ―Programming with C‖, Schaums Outlines, Second Edition, Tata McGraw-Hill,2006.

Course Code	Course Name	Category	L	T	P	Credit
192MT1A1IF	**IDC – I PROBABILITY THEORY**	IDC – I	4	1	-	4

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Define and apply basic concepts and methods of probability theory	K2
CO2	Understand and use the properties of random variables	K2
CO3	Analyse and apply the properties of expectation	K4
CO4	Understand and apply Curve Fitting and Principle of Least Squares	K3
CO5	Define and apply basic concepts and methods of probability theory	K4

MAPPING WITH PROGRAMME OUTCOMES

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	M	M	M	M
CO3	S	S	S	M	M
CO4	S	M	S	M	S
CO5	S	S	M	S	S
S	**Strong**	**M**	**Medium**	**L**	**Low**

Course Code	Course Name	Category	L	T	P	Credit
192MT1A1IF	**IDC – I PROBABILITY THEORY**	IDC – I	4	1	-	4

UNIT - I [10h]

Probability : Basic terminology- Mathematical Probability- Statistical probability- Subjective Probability- Mathematical Tools- Some theorems on probability- Addition and Multiplication theorems on probability- Conditional probability-Independent events.

UNIT - II [12h]

Random variables: Introduction - Discrete and Continuous random variables - Distribution function-properties - Probability mass function, Probability density functions - Two Dimensional random Variable - Joint probability Mass function - Two dimensional distribution function - Joint probability distributions - marginal and conditional probability distributions - Independence of random variables.

UNIT - III [13h]

Mathematical Expectation: Introduction- Expected value of a random variable - Expected function a random variable-Properties of Expectation- Properties of Variance – Covariance - Addition and Multiplication theorems on expectations. Moments of Bivariate probability distributions - Conditional expectation and Conditional variance.

UNIT - IV [13h]

Moment Generating Functions: Cumulants –Properties of Cumulants-Characteristic Functions and their properties. – Theorems: Uniqueness theorems of Characteristic function-Hall-Bray theorem- Necessary and sufficient condition for independence of random variables in terms of characteristic function-Chebychev's Inequality -Weak law of large numbers.

UNIT - V [12h]

Curve Fitting and Principle of Least Squares: Fitting of curves of Straight line Second degree Parabola, Power curve and Exponential curves - Correlation and Regression Analysis.

Text Books :

1 Gupta, S.C and V.K.Kapoor.2007, “Fundamentals of Mathematical Statistics” ,S. Chand and Co. New Delhi.

2 Sheldon M.Ross, “Introduction to Probability Models”, Academic Press, 2014.

References:

1 Heinz Bauer, “ Probability Theory”, Walter de Gruyter

2 Saeed Ghahramani, “Fundamentals of Probability with Stochastic Processes”, Pearson Education, 2014.

Course Code	Course Name	
194DA1A1CP	**CORE PRACTICAL - I** **C PROGRAMMING LAB**	SEMESTER - I

Total Credits: 2
Total Instruction Hours: 4

CONTENTS

1 Simple programs to understand the concepts of data types.
2 Programs using conditional, control and repetition statements.
3 Defining and creating one and two dimensional arrays
4 Programs for Matrix operations
5 Programs to Work with pointers.
6 Programs to execute Functions (call by value and call by reference)
7 Programs for String manipulations.
8 Programs to test dynamic memory allocation functions
9 Programs to implement structures, unions and enumeration type.
10 Application Programs using file operations

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Course Code	Course Name	
194DA1A1CQ	**CORE PRACTICAL - II** **ANALYTICS WITH EXCEL LAB**	SEMESTER - I

Total Credits: 2
Total Instruction Hours: 4

Contents

1 Program using the function wizard
2 Programs using Simple frequencies with charts
3 Programs using VLookup, HLookup, Match, Countif, Text, Trim
4 Programs Using sort and filter
5 Programs for Means and standard deviation using pivot tables
6 Programs to Work with Macros
7 Programs for Comparative Data Analysis using Excel VBA
8 Programs for Trend Analysis using Excel VBA
9 Programs to analyze twitter data
10 Programs to create Dashboards

Course Code	Course Name	Category	L	T	P	Credit
191TL1A2TA	**தமிழ்த்தாள் - II**	Theory	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- **மொழிப் பாடங்களின் வாயிலாக தமிழரின் பண்பாடு, பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்**
- **கலை மற்றும் மரபுகளை அறியச் செய்தல்**
- **மாணவர்களின் படைப்பாக்கத் திறன்களை ஊக்குவித்தல்**

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	**வாழ்க்கைத்திறன்கள்** (Life Skills)- **மாணவனின் செயலாக்கத்திறனை ஊக்குவித்தல்**	K1,K2,K3
CO2	**மதிப்புக்கல்வி** (Attitude and Value education)	K2,K4
CO3	**பாட இணைச் செயல்பாடுகள்** (Co-curricular activities)	K2,K3,K4
CO4	**சூழலியல் ஆக்கம்** (Ecology)	K4
CO5	**மொழி அறிவு** (Tamil knowledge)	K5, K6

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	S	M	M	M	M
CO3	S	M	M	M	M
CO4	S	M	M	M	M
CO5	S	M	M	M	M

S Strong M Medium L Low

191TL1A2TA	தமிழ்த்தாள் - II	SEMESTER II

Total Credits: 3
Total Instruction Hours: 60 h

Syllabus

Unit I அற இலக்கியம் **12 h**

1. திருக்குறள்

அ.அறன் வலியுறுத்தல் (அ. எண்: 04)

ஆ.நட்பாராய்தல் (அ. எண்: 80)

இ.சான்றாண்மை (அ. எண்: 99)

ஈ.குறிப்பறிதல் (அ. எண்: 110)

2. மூதுரை - ஔவையார் (10 பாடல்கள் - 6,7,9,10,14,16,17,23,26,30)

Unit II அற இலக்கியம் **10 h**

1. நாலடியார் - அறிவுடைமை

2.பழமொழி நானூறு - வீட்டு நெறி

3. கார்நாற்பது - தோழி பருவங்காட்டி தலைமகளை வற்புறுத்திய பாடல்கள் (1முதல் - 18பாடல்கள்)

Unit III உரைநடை **10 h**

1. பெற்றோர்ப் பேணல் - திரு.வி.க.

2. உள்ளம் குளிர்ந்தது - மு.வரதராசனார்

3. சங்கநெறிகள் - வ.சுப.மாணிக்கம்

Unit IV உரைநடை **13 h**

1.பெரியார் உணர்த்தும் சுயமரியாதையும் சமதர்மமும் - வே. ஆனைமுத்து

2. வீரவணக்கம் - கைலாசபதி

3.மொழியும்நிலமும் - எஸ். ராமகிருஷ்ணண்

Unit V இலக்கிய வரலாறு, இலக்கணம் மற்றும் பயிற்சிப்பகுதி **15 h**

அ.இலக்கிய வரலாறு

1. பதினெண் கீழ்க்கணக்கு நூல்கள்

2. தமிழ் உரைநடையின் தோற்றமும் வளர்ச்சியும்

ஆ. இலக்கணம்

1. வழு, வழுவமைதி, வழாநிலை

இ. பயிற்சிப்பகுதி

1. நூல் மதிப்பீடு மற்றும் திரைக்கதை திறனாய்வு

2. தன்விவரக் குறிப்பு எழுதுதல்

Text Books

1 தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை மற்றும் அறிவியல் கல்லூரி (தன்னாட்சி) செய்யுள் மற்றும் உரைநடைத் திரட்டு. (முதல்பதிப்பு.) சென்னை: நியூ செஞ்சுரி புக்ஹவுஸ் (பி) லிட்.

References

1 பேராசிரியர் புலவர் இளவரசு, சோம. (ஜூலை2012). தமிழ் இலக்கிய வரலாறு. (எட்டாம் பதிப்பு) சென்னை: மணிவாசகர் பதிப்பகம்.

2 பேராசிரியர் முனைவர் பாக்கியமேரி (2013). இலக்கணம் இலக்கிய வரலாறு மொழித்திறன். (முதல் பதிப்பு) சென்னை பூவேந்தன் பதிப்பகம்.

3 தமிழ் இணையக் கல்விக்கழகம் <http://www.tamilvu.org/>

Course Code	Course Name	Category	L	T	P	Credit
191TL1A2HA	HINDI-II	Theory	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature
- To learn the techniques for expansion of ideas and translation process.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Apply the knowledge writing critical views on fiction	K3
CO4	Build creative ability	K3
CO5	Expose the power of creative reading	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	M	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

191TL1A2HA	HINDI-II	**SEMESTER II**

Total Credits: 3
Total Instruction Hours: 60 h

Syllabus

Unit I — 15 h

आधुनिकपद्य – शबरी(श्रीनरेशमेहता)

प्रकाशक: लोकभारतीप्रकाशन

पहलीमंजिल, दरबारीबिल्डिंग,

महात्मागाँधीमार्ग, इलाहाबाद**-211001**

Unit II — 15 h

उपन्यास: सेवासदन-प्रेमचन्द

प्रकाशक: सु मत्रप्रकाशन

204 लीलाअपार्ट्मेंट्स**, 15** हेस्टिंग्सरोड'

अशोकनगरइलाहाबाद**-211001**

Unit III — 15 h

अनुवादअभ्यास**-III (**केवलहिन्दीसेअंग्रेजीमें**)**

(पाठ**1 to 10)**

प्रकाशक: द क्षणभारतप्रचारसभाचेनैई**-17**

Unit IV — 15 h

पत्रलेखन: (औपचारिकयाअनौपचारिक)

Course Code	Course Name	Category	L	T	P	Credit
191TL1A2FA	FRENCH- II	Theory	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France
- To help the students to acquire Competency in translating simple French sentences into English and vice versa

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	K1
CO2	To learn the adjectives and the classroom environment in France	K2
CO3	Learn the Plural, Articles and the Hobbies	K3
CO4	To learn the Cultural Activity in France	K3
CO5	To learn the Sentiments, life style of the French people and the usage of the conditional tense	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

191TL1A2FA	FRENCH- II	**SEMESTER II**

Total Credits: 3
Total Instruction Hours: 60 h

Syllabus

Unit I – Super! 13 h

•Compétenc e Culturelle

L'égalitéhomme/femme

Compétence De communication

INTERACTION:

Exprimer des sentiments, exprimer la joie, le plaisir, le bonheur

- RÉCEPTION ORALE:

Comprendre un jeuradiophonique

- RÉCEPTION ÉCRITE:

Comprendre des announces

- PRODUCTION ÉCRITE:

Écrire des cartespostales •

Compétencegrammaticale

Les noms de professions masculine/feminine

- Le verb finir et less

Verbes du groupe

en-ir

- Le present de l'impératif
- Savoir(present)
- Le participle passé:

Fini, aimé, arrive, dit,écrit

- Quel(s), quelle(s)..:

InterrogatifetExclamatif

- À + infinitive
- Les articles: n,une,des

Unit II Quoi? 13 h

Compétenc e Culturelle

- Le 20 siécle:

Petitsprogrés Grand progrés

Compétence De communication

- INTERACTION:

Decrirequelque chose, unepersonne

- RECEPTION ORALE:

Comprendre un message publicitaire

- RÉCEPTION ÉCRITE:

Comprendre un déplianttouristique

- PRODUCTION

ÉCRITE: Écrire des petites announces

Compétence grammatical

- On
- Plus, moins
- Le verbealler:
- Present, impératif
- Aller + infinitife
- Le pluriel en –x

Unit III – Et aprés 12 h

Compétenc e Culturelle

Nouvelles du jour

Compétence De communication

INTERACTION:

Raconteur,situer un récitdans le temps

RÉCEPTION ORALE:

Comprendreune description

RÉCEPTION ÉCRITE:

Comprendre un test

PRODUCTION ÉCRITE:

écrire des cartespostales

Compétencegrammaticale

L'imparfait:: quel-Ques forms pour introduire le récit:Ilfaisait, il y avait, ilÉtait

Un peu, beaucoup, trop,Assez

Trés

Le verbevenir:

Présent, impératif

En Suisse, auMaroc, aux Etats-Unis

Unit IV Maisoui! 12 h

Compétenc e Culturelle

La génération des20-30 ans

Compétence De communication

INTERACTION:

Donner son opinion,

Expliquerpourquoi

RÉCEPTION ORALE:

Comprendre des informations à la radio

RÉCEPTION ÉCRITE:

Comprendre un texteinformatif

PRODUCTION ÉCRITE:

éncrire un mél de protestation

Compétencegrammaticale

Répondre, prendre:

Présent, impératif, part Passé

Parcequepourquoi

Tout/tous, toute/s

Tous/toutes les…

(répétition action)

Unit V Maisnon! 10 h

•Compétenc e Culturelle

De la ville à la campagne

Compétence De communication

INTERACTION:

Débat:: exprimerl'accord, exprimer le Désaccord

RECEPTION ORALE:

Comprendre un message sur un répondeurtéléphonique

RÉCEPTION ÉCRITE:

Comprendre un témoignage

PRODUCTION ECRITE: Rediger des petites Announces immobilieres

Compétencegrammaticale

Le verbedevoir:Present et participe passé

Le verbe vivre, present

Aller + infinitive

Venir+ infinitive

Etre pour/contre

Text Books

1 Marcella Di Giura Jean-Claude Beacco, AlorsINew Delhi – 110007:Goyal Publishers Pvt Ltd86, University Block Jawahar Nagar (Kamla Nagar).

Course Code	Course Name	Category	L	T	P	Credit
191TL1A2MA	MALAYALAM-II PROSE: NON-FICTION	Theory	4	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature.
- To learn the techniques for expansion of ideas and translation process.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories	K1
CO2	Understand the principles of translation work	K2
CO3	Apply the knowledge writing critical views on fiction	K3
CO4	Build creative ability	K3
CO5	Expose the power of creative reading	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

191TL1A2MA	MALAYALAM-II PROSE: NON-FICTION	**SEMESTER II**

Total Credits: 3
Total Instruction Hours: 60 h

Syllabus

Unit I 12 h

Biography

Unit II 12 h

Biography

Unit III 12 h

Travelogue

Unit IV 12 h

Travelogue

Unit V 12 h

Travelogue

Text Books

1. Unit III, IV &V:Pottakkadu,S.K. KappirikaludeNattil. Kottayam: D.C. Books.
2. Bhatathirippadu,V.T.KannerumKinavum. Kottayam: D.C. Books.

References

1. Dr. George,K.M.(). Jeevacharitrasahithyam. (Edn.) Kottayam: N.B.S.
2. Dr. NaduvattomGopalakrishnan.JeevacharitrasahithyamMalayalathil. Trivandrum:Kerala BhashaInstitute.
3. Dr. VijayalamJayakumar. AthmakathasahithyamMalayalathil. (Kottayam:N.B.S.
4. Prof. Ramesh Chandran.SancharasahithyamMalayalathil. (10 Edn.) Trivandrum: Kerala Bhasha Institute.

Course Code	Course Name	Category	L	T	P	Credit
191EL1A2EA	ENGLISH - II	Language - II	4	0	1	3

PREAMBLE

This course has been designed for students to learn and understand

- To experience the effect of dialogue, the brilliance of imagery and the magnificence of varied genres
- To strengthen the student's English vocabulary and understanding of English sentence structure
- To communicate effectively and acquire knowledge on the transactional concept of English language

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Interpret skills in communication and to shape their attitude	K2
CO2	Develop oral and written language skills in a business context	K3
CO3	Analyze to gain key strategies and expressions for communicating with professionals	K4
CO4	Inspect the knowledge to the corporate needs	K4
CO5	Formulate Inter and Intrapersonal skills	K6

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	S	S	S	S
CO3	M	S	S	S	M
CO4	S	S	M	S	M
CO5	S	S	S	S	M

S Strong M Medium L Low

191EL1A2EA	ENGLISH - II	SEMESTER II

Total Credits: 3
Total Instructions Hours: 60

Syllabus

Unit I Technical English 10

Communication: Process- Methods- Channels- Barriers of Communications

Phonetics: Basics of phonetics - Consonants and Vowel sounds - Pronunciation Guidelines- Problem Sounds and Differences in Pronunciation

Reading Skills: Skimming and Scanning- Reading Different Kinds of Texts- Types- Developing a Good Reading Speed

Writing Skills: Note- Making and note taking, Summarizing and Paraphrasing- Paragraph Writing: Structure and principles

Unit II Business English 11

Structure and Planning of Letters: Elements of Structure- Forms of Layout- Style- Importance and Steps for Planning- Writing Business Letters

Quotation, Order and Tender: Inviting - Sending Quotation letter - Placing Orders- Inviting Tenders

E-mail Correspondence: Structure- Procedure- Style- Guidelines- Jargon and Acronyms- Security Precaution

Seminar and Meetings: Introduction- Organizing a Seminar- Sample Brochure- Conducting and Participating in a Meeting

Unit III Professional English 14

Report Writing: Importance- Process- Types- Structure

Memo: Importance- Structure

Notice, Agenda and Minutes: Meeting- Notice- Agenda- Minutes: Preparation- Structure- Delivery

Brochures: Purpose- Audience- Qualities

Unit IV Employment Communication 11

Resume Writing : Elements of Resume - difference between CV and Resume - Writing Job Application Art of Conversation: Small Talk- Body Language- Principles of Good Conversation Interview: Organizational role- Goals- Types- Interview Process

Group Discussion: Importance- Features- Strategies- Barriers

Unit V Soft Skills 14

Self - Discovery and Goal Setting: Self - Discovery - What Comprises It?- Goals and Types- Benefits, Areas and Clarity of Goal Setting - Critical thinking

Positive Thinking (PT) and Attitude: Benefits of PT and Attitude- Develop Positive Attitude and Thinking- Drive out Negative Thinking and Attitude

Etiquettes and Manners: Home, Table and Business- Time Management: Nature and Characteristics- Objectives and Significance

Developing Emotional Intelligence (EI): Salient Features- Components of EI- Intrapersonal Development

Text Books

1 Prabha, Dr. R. Vithya & S. Nithya Devi. 2019. Sparkle. (1st Edn.) McGraw - Hill Education. Chennai.

2 Rizvi, Ashraf. M. 2018. Effective Technical Communication. McGraw - Hill Education, Chennai.

References

1 Ghosh, B.N. Editor. 2017. Managing Soft Skills for Personality Development. McGraw - Hill Education, Chennai.

2 Adams, Katherine L. and Gloria I. Galanes. 2018. Communicating in Groups- Applications and Skills. McGraw - Hill Education, Chennai.

3 Koneru, Aruna. 2017. Professional Communication. McGraw - Hill Education, Chennai.

4 Koneru, Aruna. 2011. English Language Skills. McGraw - Hill Education, Chennai.

5 Sharma, R.C. and Krishna Mohan. 2016. Business Correspondence and Report Writing. 5th Edn. McGraw - Hill Education, Chennai.

Course Code	Course Name	Category	L	T	P	Credit
194DA1A2CA	DATA SCIENCE WITH PYTHON	CORE II	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The technologies related to Data Science
- Major features of the Python Language
- Python libraries to solve problems

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the technologies related to Data Science	K2
CO2	Develop solutions to simple computational problems using Python	K5
CO3	Construct Python lists, tuples and dictionaries for representing compound data	K6
CO4	Develop solutions using Python NumPy	K5
CO5	Develop solutions using Pandas and demonstrate data visualization.	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	S	S	M	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	M

S Strong M Medium L Low

194DA1A2CA	CORE: DATA SCIENCE WITH PYTHON	**SEMESTER II**

Total Credits: 4
Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Data Science 10 h

Understanding Data: Introduction-Types of Data: Numeric - Categorical – Graphical - High Dimensional Data - Sources of Data: Time Series - Transactional Data - Biological Data - Spatial Data - Social Network Data- Data Science Components: Statistics - Mathematics - Programming Languages - Database - Machine Learning - Big data technology – Data Science Applications

Unit II Python Expressions and Loops 12 h

Introduction to Python - Values and Types - Operators - Expressions - Statements- Precedence of operators - Decision Statements - If - If Else Iteration : While – For - Break - Continue – Functions: Introduction : Parameters and arguments – Variable Scope – Return statement

Unit III Strings and Tuples 13 h

Strings - String slices- Immutability- String methods and operations –Lists: Creating lists - List operations - List methods – Passing list to a function - Sets: Creating sets- Set operations. Tuples: Creating Tuples - Operations on Tuples- Lists and tuple - Dictionaries: Creating Dictionaries - Operations and methods- Nested Dictionaries.

Unit IV NumPy 12 h

Introduction to NumPy - NumPy Datatypes - N Dimensional data structures: Creating NumPy arrays - Arrays from existing Data - Array manipulation: Transpose operations - Joining arrays - Splitting arrays - NumPy operations : Indexing and Slicing

Unit V Pandas and Data Visualization 13 h

Introduction: Series: Creating Series- Accessing Series - Data Frames: Creating frames- operations on rows and columns - GroupBy: Aggregation - Transformation - Filtration- Merging and Joining - Manipulating Dates - Data Visualization using matplotlib

Text Books

1. Ashok Namdev Kamthane, Amit Ashok Kamthane, (2018). Programming and Problem Solving with Python. (2nd Edn.) : McGraw Hill Education.
2. Davy Cielen, Arno D.B. Meysman, (2016). Introducing Data Science: Big Data, Machine Learning, and More Using Python Tools. (1stEdn.): DreamTech Press.

References

1. Mark Summerfield, (2009). Programming in Python. (3rd Edn.) : Pearson Education.
2. Wesley J. Chun, (2006). Core Python Programming. (2nd Edn.) : Pearson Education.
3. www.python.org,

Course Code	Course Name	Category	L	T	P	Credit
194DA1A2CB	DATA STRUCTURES AND ALGORITHMS	CORE III	4	1	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The design of algorithms and linear and non-linear data structures.
- The implementation of various sorting and searching techniques and their performance comparison
- The techniques to write efficient programs

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Compare different programming methodologies and Explain the analysis of algorithms	K2
CO2	Apply linear data structures like arrays, stacks and queues to solve problems.	K3
CO3	Construct linked list and its variants to solve problems	K5
CO4	Create programs using Trees and Graphs	K5
CO5	Select the appropriate techniques for searching and sorting	K6

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	M
CO2	S	M	S	M	M
CO3	S	M	S	M	M
CO4	S	S	S	M	M
CO5	S	S	S	S	M

S Strong M Medium L Low

194DA1A2CB	CORE : DATA STRUCTURES AND ALGORITHMS	**SEMESTER II**

Total Credits: 4
Total Instruction Hours: 60 h

Syllabus

Unit I Introduction and Algorithm Analysis 12 h

Introduction to Algorithms - Algorithmic Notations - Approaches to designing an algorithm : Top-Down – Bottom up – Top down Vs bottom up – Complexity of Algorithms - Primitive Data Structures - Arrays: Introduction-: Linear Arrays: Representation - Traversal - Insertion - Deletion - Two dimensional Arrays - Sparse Matrix

Unit II Stacks and Queues 12 h

Stacks : Array Representation of Stacks - Linked Representation of Stacks - Arithmetic Expressions - Polish Notation – Evaluation of Postfix Expression – Infix to Postfix Conversion - Queues : Representation of Queues - Linked Representation of Queues – Deques – Priority Queues

Unit III Linked List 11 h

Linked List: Introduction - Representation of Linked Lists in Memory- Traversing a Linked List - Memory Allocation - Garbage Collection - Insertion into a Linked List – Deletion from a Linked List – Header Linked Lists – Two way Lists - Polynomials: Representing Polynomials as Singly Linked Lists

Unit IV Trees 13 h

Introduction - Binary Trees: Definition – Representing Binary Trees in Memory – Traversing Binary Trees : Preorder - Inorder – Postorder - Graphs: Terminology – Directed Graphs - Sequential Representation of Graphs - Adjacency Matrix - Path Matrix

Unit V Sorting and Searching 12 h

Sorting : Introduction - Types of Sorting: Internal Sorting - External Sorting - Bubble Sort – Insertion Sort - Selection Sort - Quick sort – Merge Sort - Radix sort - Comparison of Sorting techniques - Searching : Linear Search - Binary Search

Text Books

1. Seymour Lipschutz, (2009). Data Structures. (5th Edn.) Tata McGraw-Hill Publishing Company Limited.

References

1. Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, (2002). Data structures and Algorithms. (2nd Edn.) : Pearson Education, Asia.
2. Yashwant Kanetkar, (2010). Data Structures Through C. (9th Edn.): BPB Publications.
3. Robert L Kruse, (2008). Data Structures and Program Design. (2nd Edn.) : Prentice Hall.

Course Code	Course Name	Category	L	T	P	Credit
192PY1A2ID	DIGITAL LOGIC AND CIRCUITS	IDC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basic concepts of number systems, conversion and binary coding
- The concepts of logic gates and Boolean algebra
- Basics of logic and sequential circuits

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Infer basics about various number systems	K2
CO2	Apply the concepts of logic gates	K3
CO3	Simplify circuit diagrams using Boolean algebra	K4
CO4	Build skill for constructing logic circuits	K3
CO5	Illustrate the working of different flip-flop circuits.	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	S	S
CO2	S	S	M	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	M	M	M	M	S

S Strong M Medium L Low

192PY1A2ID	IDC : DIGITAL LOGIC AND CIRCUITS	**SEMESTER II**

Total Credits: 4
Total Instruction Hours: 48 h

Syllabus

Unit I NUMBER SYSTEMS 8 h

Introduction: Decimal, Binary, Octal and Hexa Decimal Number Systems - Conversions - Binary arithmetic: addition, subtraction and multiplication – Complement Systems: 1's complement and 2's complement –negative numbers- Binary codes: Introduction - weighted – non weighted

Unit II LOGIC GATES 8 h

Logic Gates : OR, AND, NOT, NAND, NOR XNOR and XOR Gates - Logic Symbols- Logic Operators - Logical expression - Truth table - Basic, Universal and Exclusive gates- Conversion of Universal Gates to Basic Gates.

Unit III BOOLEAN ALGEBRA 8 h

Introduction to Boolean Algebra: Basic laws of Boolean algebra – logical addition and multiplication – Demorgan's theorems – two variable and three variable – reduction of expression: Sum of product Simplification – Product of Sum Simplification.

Unit IV COMBINATIONAL LOGIC CIRCUITS 12 h

Arithmetic Circuits and Combination Circuits: Introduction – Designing of a logic circuit –Adders - Half adder and Full adder – Subtractor – Half Subtractor and Full Subtractor - Parallel binary adder - decimal adder - Binary Coded Decimal adder - Encoder – Multiplexers – De-Multiplexers

Unit V SEQUENTIAL CIRCUITS 12 h

Storage Elements and Counters: Introduction Sequential Circuits – Latches - R-S Flip Flop – Clocked R-S Flip Flop - D Flip Flop – JK Flip Flop – T Flip Flop - Counter: Ripple Counter - Modulo N Counter -Shift registers: types - Parallel- in-Parallel-out- Parallel-in-Serial-out - Serial - in-Serial- out and Serial- in-Parallel-out.

Text Books

1. Donald D Leach, Albert Paul Malvino and Gautam Saha, (2010). Digital Principles and Applications. (8th Edn.) : Tata McGraw Hill Publishing Company Ltd.
2. M. Morris Mano, (2004). Digital Logic and Computer Design. (1stEdn.) Location: Pearson India.

References

1. M.Morris Mano. (2009). Computer System Architecture. (5th Edn.) : Pearson India.
2. Thomas L. Flyod, Digital Fundamentals. (10 Edn.) : Pearson India.
3. A. S. Sedra, K. C. Smith and A. N. Chandorkar. (2014). Microelectronic Circuits. (6th Edn.) :Oxford University Press.
4. Venugopal. (2011). Digital Circuits and Systems. (1st Edn.) : Tata McGraw Hill Publishing Company Ltd.

194DA1A2CP	CORE PRACTICAL III : PYTHON PROGRAMMING	**SEMESTER II**

Total Credits: 2
Total Instructions Hours: 36 h

S.No	Contents
1	Program to Implement Control statements in Python.
2	Program to Demonstrate String functions in Python.
3	Program to Implement Dictionary and Sets in Python
4	Programs to work with Python Tuples.
5	Program for operations on NumPy arrays.
6	Program to test math functions using NumPy
7	Pandas program for analysis using Pivot table
8	Program to query Dataframes using Pandas
9	Program for Customer Data Analysis
10	Program for Customer Data Visualization

Note : Eight Programs are Mandatory

194DA1A2CQ	CORE PRACTICAL IV : DATA STRUCTURES	**SEMESTER II**

Total Credits: 2
Total Instructions Hours: 36 h

S.No	Contents
1	Program for array manipulation.
2	Program to perform the following operations for Stack using array implementation. i.) Push ii.) Pop iii.) Display
3	Program to evaluate expressions using Stack
4	Program to convert infix expression to postfix expression using Stack.
5	Program to perform the following Queue operations i.) Insert ii.) Delete iii.) Display.
6	Program to perform addition of two polynomials using Linked list.
7	Program to implement Linear Search.
8	Program to implement Binary Search using recursion.
9	Program to Perform Bubble Sort.
10	Program to Perform Quick Sort.

Note : Eight Programs are Mandatory (using 'C')

Course Code	Course Name	Category	L	T	P	Credit
196BM1A2AA	AECC : HUMAN RIGHTS	AECC	2	-	-	2

PREAMBLE

This course has been designed for students to learn and understand

- To study how human values and personality traits help to develop the characteristics of each individual
- Understanding the moral values towards the enrichment of the society
- Identify the impact of ethics and values on the global development of the current scenario

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concept of human values, personality traits and character formation.	K2
CO2	Acquire the knowledge through value education towards national and global development.	K1
CO3	Introduce the basic concepts of conflict, emotions and adolescent emotions.	K1
CO4	Illustrate the techniques in therapeutic measures like yoga and meditation.	K2
CO5	Learn the concepts of human rights, rights for women and children and domestic violence.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	M	S	S	S
CO3	S	S	M	S	S
CO4	S	S	S	S	M
CO5	S	S	M	S	S

S – Strong M – Medium L – Low

196BM1A2AA	AECC : HUMAN RIGHTS	**SEMESTER II**

Total Credits: 2
Total Instruction Hours: 24 h

Syllabus

Unit I Introduction to human values 05 h

Concept of Human Values - Value Education Towards Personal Development - Aim of education and value education - Evolution of value oriented education - Concept of Human values - Types of values - Components of value education - Personal Development: Self analysis and introspection - Sensitization towards gender equality - Physically challenged - Intellectually challenged - Respect to age - Experience - Maturity - Family members - Neighbours - Co-workers - Character Formation towards Positive Personality: Truthfulness - Constructivity - Sacrifice - Sincerity - Self Control - Altruism - Tolerance - Scientific Vision.

Unit II Value education and Social values 05 h

Value Education Towards National and Global Development National and International Values: Constitutional or national values - Democracy - Socialism - Secularism - Equality - Justice - Liberty - Freedom and fraternity -Social Values - Pity and probity - Self control - Universal brotherhood - Professional Values - Knowledge thirst - Sincerity in profession - Regularity - Punctuality and faith - Religious Values - Tolerance - Wisdom - Character - Aesthetic values - Love and appreciation of literature and fine arts and respect for the same - National Integration and international understanding.

Unit III Global Development on Ethics and Values 04 h

Impact of Global Development on Ethics and Values: Conflict of cross-cultural influences - Mass media - Cross-border education - Materialistic values - Professional challenges and compromise - Modern Challenges of Adolescent Emotions and behave or Sex and spirituality: Comparison and competition - Positive and negative thoughts - Adolescent Emotions - Arrogance - Anger - Sexual instability - Selfishness - defiance.

Unit IV Yoga and Meditation 05 h

Therapeutic Measures: Control of the mind through - Simplified physical exercise - Meditation – Objectives - Types - Effect on body - Mind - Soul - Yoga – Objectives - Types - Asanas - Activities: Moralisation of Desires -Neutralisation of Anger - Eradication of Worries - Benefits of Blessings.

Unit V Human Rights and Rights of Women and Children 05 h

Human Rights - Concept of Human Rights – Indian and International Perspectives - Evolution of Human Rights - Definitions under Indian and International

documents - Broad classification of Human Rights and Relevant Constitutional Provisions - Right to Life - Liberty and Dignity - Right to Equality - Right against Exploitation - Cultural and Educational Rights - Economic Rights - Political Rights - Social Rights - Human Rights of Women and Children - Social Practice and Constitutional Safeguards - Female Foeticide and Infanticide - Physical assault and harassment - Domestic violence - Conditions of Working Women - Institutions for Implementation - Human Rights Commission - Judiciary - Violations and Redressel Violation by State - Violation by Individuals - Nuclear Weapons and Terrorism Safeguards.

References

1. Brain Trust Aliyar, 2008, Value Education for health, happiness and harmony. Vethathiri publications, Erode.
2. Grose. D. N, 2005, A text book of Value Education. Dominant Publishers and Distributors, New Delhi.
3. Yogesh Kumar Singh & Ruchika Nath, 2005, Value Education, P. H Publishing Corporation, New Delhi.
4. Venkataram & Sandhiya. N, 2001, Research in Value Education, APH Publishing Corporation, New Delhi.
5. Seetharam. R. (Ed), 1998, Becoming a better Teacher Madras Academic Staff College.
6. Brain Trust Aliyar, 2004, Value Education for Health, Happiness and Harmony. Vethathiri publications, Erode.
7. Swami Vivekananda, 2008, Personality Development. Advaita Ashrama, Kolkata.
8. Dey A. K, 2002, Environmental Chemistry. New Delhi – Vile Dasaus Ltd

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Third Semester										
Part – I										
191TL1A3TA	Language - I	Tamil-III	4	-	-	3	25	75	100	3
191TL1A3HA		Hindi-III								
191TL1A3MA		Malayalam-III								
191TL1A3FA		French – III								
Part – II										
191EL1A3EA	Language - II	English – III	4	-	-	3	25	75	100	3
Part – III										
194DA1A3CA	Core - IV	Computer Networks	4	-	-	3	25	75	100	4
194DA1A3CB	Core - V	Database Management Systems	4	-	-	3	25	75	100	4
192MT1A3IF	IDC - III	Applied Statistics	4	-	-	3	25	75	100	4
194DA1A3CP	Core Practical - V	Database Management Systems	-	-	3	3	40	60	100	2
194DA1A3SA	SEC - I Theory	R Programming	3	1	-	3	25	75	100	3
194DA1A3SP	SEC - II Practical	R Programming	-	-	3	3	40	60	100	2
	LoP	Lab on Project	-	-	-	-	-	-	-	-
Total			**23**	**1**	**6**	-	**230**	**570**	**800**	**25**

ourse Code	Course Name	Category	L	T	P	Credit
191TL1A3TA	தமிழ்த் தாள்– III	மொழி-I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாக தமிழரின் பண்பாடு , பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத்திறன்கள் (Life Skills) – மாணவனின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1,K2,K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2,K4
CO3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K2,K3,K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு(Tamil knowledge)	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	S	M	M	M	M
CO3	S	M	M	M	M
CO4	S	M	M	M	M
CO5	S	M	M	M	M

S Strong M Medium L Low

191TL1A3TA	பகுதி – 1 : தமிழ் தாள் : 3	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

1. காப்பியங்களின் தோற்றமும் வளர்ச்சியும்
2. சிலப்பதிகாரம் – மனையறம் படுத்த காதை
3. மணிமேகலை – வஞ்சிமாநகர் புக்க காதை

Unit II 10 h

1. கம்பராமாயணம் – கும்பகர்ணன் வதைப்படலம் (பா. எண் : 60 – 100)
2. பெரிய புராணம் – அதிபத்தநாயனார் புராணம்

Unit III 10 h

1.சிற்றிலக்கியங்களின் தோற்றமும் வளர்ச்சியும்

2.தமிழ்விடு தூது – தூதுப்பொருள்கள் மட்டும் 101 முதல் 112 வரை(12 கண்ணிகள்)

3.திருக்குற்றாலக்குறவஞ்சி – வசந்தவல்லி பந்தாடிய சிறப்பு (6: 4கண்ணிகள்)

4.கலிங்கத்துப்பரணி – களம் பாடியது (போர்க்களக் காட்சி –பா.எண்: 472–502)

Unit IV 10 h

1. நாடகங்களின் தோற்றமும் வளர்ச்சியும்
2. நாடகம் - ஔவை–ஆசிரியர் இன்குலாப்

Unit V 08 h

1. ‘பா’ வகைகள் : வெண்பா, ஆசிரியப்பா, கலிப்பா, வஞ்சிப்பா - பொது இலக்கணம் மட்டும்.
2. அணி: உவமையணி, உருவக அணி, இல்பொருள் உவமையணி விளக்கம், உதாரணம்.
3. சிறுகதை
4. அலுவலகம் சார்ந்த கடிதம்: விண்ணப்பங்கள், வேண்டுகோள், முறையீடு,

ஆ) வாசகர் கடிதம்: நாளிதழ், வானொலி, செய்தி ஊடகங்களுக்கு

விமர்சனம் எழுதுதல்.

Text Books

1 மொழிப்பாடம் - 2020, தொகுப்பு : தமிழ்த்துறை , டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி.

2 இன்குலாப் – 2017. ஒளவை (நாடகம்), அன்னம் வெளியீடு, சென்னை.

References

1 புலவர் சோம. இளவரசு - 2014. இலக்கிய வரலாறு , மணிவாசகர் பதிப்பகம் , சென்னை – 108,

2 பேராசிரியர் முனைவர் பாக்யமேரி – முதற் பதிப்பு 2013 , இலக்கணம் இலக்கிய வரலாறு மொழித்திறன், பூவேந்தன் பதிப்பகம், சென்னை.

3 இணையதள முகவரி : www.tamilvirtual.com

Course Code	Course Name	Category	L	T	P	Credit
191TL1A3HA	HINDI-III	Language - I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories.	K1
CO2	Understand the principles of translation work.	K2
CO3	Apply the knowledge writing critical views on fiction.	K3
CO4	Build creative ability.	K3
CO5	Expose the power of creative reading.	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

191TL1A3HA	HINDI-III	SEMESTER III

Total Credits: 03

Total Instruction Hours: 48 h

Syllabus

Unit I — 10 h

पद्य – काव्य पराशर (भोलानाथ)

(प्राचीन- कबीर, तुलसी, सुर, मीरा, आधुनिक- मैथिलीशरण गुप्त, अरूण कमल)

प्रकाशक: जवाहर पुस्तकालय

सदर बाजार, मथुरा

उत्तर प्रदेश - 281001

Unit II — 10 h

हिन्दी साहित्य का इतिहास: (साधारण ज्ञान)

आचार्य रामचन्द्र शुक्ल

लोकभारती प्रकाशन इलाहाबाद

Unit III — 10 h

अलंकार:अनुप्रास,यमक, श्लेष, वक्रोक्ति, उपमा,रूपक

प्रकाशक: विनोद पुस्तक मंदिर

आगरा - 282002

Unit IV — 10 h

संवाद लेखन

पुस्तक: व्याकरण प्रदिप - रामदेव

प्रकाशक: हिन्दी भवन 36 इलाहाबाद - 211024

Unit V — 08 h

अनुवाद अभ्यास-III (केवल हिन्दी से अंग्रेजी में)

(पाठ 10 to 20)

प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

Course Code	Course Name	Category	L	T	P	Credit
191TL1A3MA	MALAYALAM - III	Language - I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories.	K1
CO2	Understand the principles of translation work.	K2
CO3	Apply the knowledge writing critical views on fiction.	K3
CO4	Build creative ability.	K3
CO5	Expose the power of creative reading.	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

191TL1A3MA	MALAYALAM - III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

Kumaranasan

Unit II 10 h

Kumaranasan

Unit III 10 h

Kumaranasan

Unit IV 10 h

Kavyanchali Collection of Poems.

Unit V 08 h

Kavyanchali Collection of Poems.

Text Books

1 Chinthavishtayaya Sitha By Kumaranasan DC.Books Kottayam

2 Kavyanchali -Group of Authors DC.Books Kottayam

References

1 Kavitha Sahithya Charithram –Dr.M.Leelavathy Sahithya academy Thrissur.

Course Code	Course Name	Category	L	T	P	Credit
191TL1A3FA	FRENCH-III	Language - I	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression.
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France.
- To help the students to acquire Competency in translating simple French sentences into English and vice versa.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents.	K1
CO2	To learn the adjectives and the classroom environment in France.	K2
CO3	Learn the Plural, Articles and the Hobbies.	K3
CO4	To learn the Cultural Activity in France.	K4
CO5	To learn the Sentiments, life style of the French people and the usage of the conditional tense.	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

191TL1A3FA	FRENCH-III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **Excuses et vœux** 10 h

Compétence Culturelle : Convivialité - (lieux et société, - l'apéritif)

Compétence de Communication

- **INTERACTION ORALE:** Accueillir quelqu'un, s'excuser,remercier
- **RÉCEPTION ORALE**: Comprendre des announces enregistrées
- **RÉCEPTION ÉCRITE:** Compremdre une affiche
- **PRODUCTION ÉCRITE:** Écrire des cartes de vœux

Compétence Grammatical

Pronoms personnels toniques moi,je…;toi…tu - Pronoms personnels objets Me,te,le… - Lesverbsen-ercomme appeler,acheter - Lesadjectives possessives nos,vos,leurs

Unit II **Bravo et merci** 8 h

Communication et technologies (leportable, internet)

- **INTERACTION ORALE:** Interagir au téléphone , féliciter
- **RÉCEPTION ORALE:** Comperendre une emission à la radio
- **RÉCEPTION ORALE:** Comprendre une définition
- **PRODUCTION ECRITE:** Écrire des plaques commemoratives

Oui,que - Le passé composé - Le participe passé - J'ai eu,ella a été -

Longtemps,pendant …, de… à

Unit III **Faire et dire** 10 h

Jeunes : enquête

- **INTERACTION ORACE:** Demander de l'aide, donner des instructions
- **RÉCEPTION ORALE:** Comprendre un message enregistré
- **RÉCEPTION ÉCRITE :** Comprendre un article d'un magazine de consommateurs
- **PRODUCTION ÉCRITE :** Écrire un règlement

- du,de la (de l)',des,de

Unit IV **Faire ci ou faire ça** 10 h

Les vacances des Français

- **INTERACTION ORALE :** Proposer quelque chose,accepter,refuser
- **RÉCEPTION ORALE :** Comprendre une émission de cuisine
- **RECEPTION ÉCRITE :** Comprendre une brochure d'informations
- **PRODUCTION ÉCRITE :** Ecrire un'texte de promotion touristique

S'il y a du soleil : L'hypothèse (supposition, Condition) la préposition S i + indicatif Sinon… ou + indicatif - Sortir,partir - Quelques, plusieurs - Le long de - Au milieu de… - Au sommet de…

Unit V Dialogue writing 10 h

1. Au Restaurant
2. A la poste
3. A L' Aeroport
4. A La Gare
5. Chez Le Medecin

Text Books

1 Marcella Di Giura Jean-Claude Beacco, Alors II. Goyal Publishers Pvt Ltd 86, University Block ,Jawahar Nagar (Kamla Nagar), New Delhi – 110007

Course Code	Course Name	Category	L	T	P	Credit
191EL1A3EA	ENGLISH - III	Language II	4	0	0	3

PREAMBLE

This course has been designed for students to learn and understand

- The basics of English grammar and specific usage
- The importance of the vocabulary and use in different contexts
- The necessity of communication and composition writing skills

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn English grammar and its specific usage	K2
CO2	Know the methods of improving reading skills	K3
CO3	Understand the importance of speaking skills and developing it through various practices	K3
CO4	Comprehend the basic steps of reading and its necessity	K3
CO5	Acquire the writing skills and mandatory similar practices	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	S
CO2	S	S	S	S	S
CO3	M	M	S	M	S
CO4	S	S	S	S	M
CO5	M	S	M	S	S

S Strong M Medium L Low

191EL1A3EA	ENGLISH - III	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Basics of English 10 h

Phrasal verb - Notions and Conventional Idiomatic Expressions - One-Word Substitution - Word Formation - Homophones - Spelling - Sentence Completion – Sentence Pattern

Unit II Listening 08 h

Listening and Hearing - Principles of listening - Types of listening - incidental listening - active and effective listening - discriminative listening - critical listening - listening vs practice - Barrier to Listening - Guidelines for Improving Listening

Unit III Speaking 10 h

Monologues - Dialogue - Role Play - JAM (Just A Minute talk) - Debate - Public Speaking - Group Discussion - Interview - Showing Directions - Accent and Neutralization

Unit IV Reading 10 h

Mechanics of Reading - Types of Reading - Summarization - Paraphrasing - Analysis and Interpretation - Reading Comprehension – Reading with purpose and making predictions - Cloze Passage

Unit V Writing 10 h

Paraphrase Writing - Techniques and Methods of Paraphrasing - Precis Writing - Difference between Paraphrase and Precis - review writing - Hints Developing - Editorial Writing - Tabloid - Column Writing

Text Books

1. Bhatnagar R. P. 2013. English for Competitive Examinations. Macmillan Publishers, Chennai.
2. KoneruAruna. 2011. English Language Skills. McGraw Hill Education, Chennai.

References

1. Radhakrishna Pillai G. 2000. English for Success. Emerald Publishers, Chennai.
2. Gauri Mishra, Ranjana Kaul. 2016. Language Through Literature. Primus Books, New Delhi.
3. Miles Craven. 2008. Cambridge English Skills Real Listening and Speaking. First Edition, Cambridge University Press, India.
4. Teaching Adult: A Literary Resource Book. 2012. New Readers Press, New York, United States.

Course Code	Course Name	Category	L	T	P	Credit
194DA1A3CA	COMPUTER NETWORKS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The basic taxonomy of computer networks
- Major features of the OSI model
- The design issues and protocols

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the functions of each layer in OSI and TCP/IP model	K1
CO2	Explain the functions of Physical and Data Link layers and Presentation layer paradigms and Protocols.	K2
CO3	Understand the Network design issues	K2
CO4	Describe the Transport layer services	K1
CO5	Understand the Functions of Application Layer and explain the protocols.	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	M
CO2	S	M	S	M	M
CO3	S	M	S	M	M
CO4	S	M	S	M	M
CO5	S	M	S	M	M

S Strong M Medium L Low

194DA1A3CA	COMPUTER NETWORKS	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Computer Networks 09 h

Introduction : Components of Computer Networks – Data Representation – Distributed processing - Network criteria – Physical Structure – Categories of Networks – Interconnection of Networks – Protocols and standards – Standard organization – Network models – OSI Reference :The TCP/IP Reference model

Unit II Physical and Data Link Layer 10 h

Introduction – Network Topologies – Switching – Multiplexing – Transmission Medium: Guided medium: Twisted Pair – Coaxial –fiber optics – Wireless Transmission: Electromagnetic spectrum – Radio – Transmission – Microwave Transmission - Data Link Layer: Goals – Design Issues - Error Detection and Correction – Data Link Protocols – Sliding Window protocol

Unit III Network Layer 10 h

Introduction : Design Issues of Network Layer – Routing – Types of routing Algorithms: Optimality Principle – Shortest path – Flooding – Distance Vector – Hierarchical Routing – Link State routing – Congestion Control – The IP Protocol – IP Address: Subnets – CIDR – Internet control Protocols: IPV4 – IPV6

Unit IV Transport Layer 10 h

Introduction: TCP Basics – Service of Transport Layer – Service Primitives : Connection Establishment – Connection Release – Transmission Policy – Congestion control – UDP : Introduction - Inter Process Communication - Remote Procedure Call – Real time transport protocol

Unit V Application Layer 09 h

Domain Name System : DNS Name Space – Resource Records – Name Servers – Electronic Mail: Architecture and Service – User Agents – Message Formats – Message Transfer – World Wide Web: Architecture – Static Web page – Dynamic Web page –The Hyper Text Transfer Protocol

Text Books

1 Andrew S.Tanenbaum, (2010), "Computer Networks", (5th Edn.), Prentice Hall

2 Behrouz A.Forouzan, (2011),"Data Communication and Networks", (4thEdn.): Tata Mc Graw hill.

References

1 Larry L.Peterson, (2011).,"Computer Networks" (5th Edn.):Morgan Kaufman

2 Achyut Godbole, (2009),"Data Communication and Networks",(4thEdn.): Tata Mc Graw hill.

Course Code	Course Name	Category	L	T	P	Credit
194DA1A3CB	DATABASE MANAGEMENT SYSTEMS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The technologies related to databases
- Various types of data models
- Efficient database design

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals of databases	K2
CO2	Understand the various database models and apply relational operations	K3
CO3	Design databases using Normalization techniques	K6
CO4	Understand about storage Techniques	K2
CO5	Understand Transaction Management	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	M
CO2	S	M	S	L	M
CO3	M	S	M	S	M
CO4	S	S	L	M	M
CO5	L	S	M	S	M

S Strong M Medium L Low

194DA1A3CB	DATABASE MANAGEMENT SYSTEMS	SEMESTER III

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Database 09 h

Introduction to databases – Conventional file processing – Purpose of database system – Characteristics of database approach – Advantages of using DBMS – Database architecture – Data Abstraction and Models – Instances and Schema – Data Independence – Schema Architecture – Components of a DBMS – Database Languages – Database Manager – Database Administrator – Database Users

Unit II Relational Model 10 h

Introduction: Basic concepts – Relational Model Constraints and Database Schema – Basic SQL: Data Definition and Data Types – Specific constraints in SQL – Basic retrieval operations in SQL – Insert ,Update, Delete statements in SQL – Additional Features of SQL – Views in SQL – Schema change Statement in SQL

Unit III Database Design 10 h

Database design process – Relational Database Design – Relation Schema – Anomalies in a database – Functional dependencies – Axioms – Closure of a set of FD's - Minimal covers - Normal forms based on primary keys – Second Normal form, Third Normal form, Boyce–Codd Normal form – Properties of relational decomposition - Multi-valued dependencies – Fourth Normal form

Unit IV Data Storage 10 h

Introduction: Overview of Physical Storage – Magnetic disk and Flash Storage – RAID – Tertiary Storage – File Organization – Organization of Records in Files – Indexing and Hashing : Basic Concepts – Ordered Indices – B+ Tree Index Files – Static Hashing – Dynamic Hashing – Comparison of Indexing and Hashing

Unit V Transaction and Concurrency Control 09 h

Transaction Concept – Simple Transaction Model – Transaction Atomicity and Durability – Transaction Isolation – Serializability – Transaction Isolation and Atomicity- Transaction as SQL Statements - Concurrency Control: Lock Based Protocols – Timestamps-Based Protocols – Validation Based Protocols

Text Books

1 A.Silberchartz, H.F.Korth,(2006),"Database System concepts", (6th Edn.), Mc Graw Hill.

2 Elmasri Ramez and Navathe Shamkant.B,(2010), "Fundamentals of Database System Concepts", (6th Edn.), Addison Wesley.

References

1 Raghuram Krishnan, Johnanes Gehrke,(2011), "Database Management System", (3rd Edn.),Mc Graw Hill.

2 O`neil Patricand, O`neil Elizabeth,(2008), "Database Principles, Programming and Performance",(2nd Edn.), Margon Kaufmann Publishers Inc.

Course Code	Course Name	Category	L	T	P	Credit
192MT1A3IF	APPLIED STATISTICS	IDC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basic concepts of Sampling Theory
- Apply the concepts to solve the testing of hypothesis problems
- Concepts of Association of attributes in Chi-square tests

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Explain sampling theory and sampling errors	K1
CO2	Apply concept in test of significance	K2
CO3	Interpret association of attributes and their usage	K3
CO4	Examine the analysis of time series method	K3
CO5	Analyses concept of index number	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	S	M	S
CO2	L	S	S	M	S
CO3	L	M	S	M	M
CO4	M	S	M	S	S
CO5	M	S	M	S	S

S Strong M Medium L Low

192MT1A3IF	APPLIED STATISTICS	SEMESTER III

Total Credits: 4
Total Instruction Hours: 48 h

Syllabus

Unit I Sampling Theory 8 h

Finite and Infinite Population-Hypothetical and existent population-Census method-Sample method-Essentials of sampling- Method of sampling-Random ampling method-Non-Random sampling- Law of Statistical regularity- Law of Inertia of large numbers- Statistical errors- Absolute error- Relative and Reducing Sampling errors

Unit II Test of Significance 10 h

Introduction – Estimation- Point Estimation-Interval estimation-Confidence limit-Testing of Hypothesis-Null hypothesis- Alternative hypothesis-Level of significance- Critical region- Standard error- Test of significance of attributes-Sampling of attributes- Sampling of variable- Student t- distribution

Unit III Association of Attributes 10 h

Classification –Uses of Terms Positive and Negative classes- Number classes-Ultimate Class frequencies- Order of classes- Relationship-Determination of frequencies- Consistency of data- Types of association- Methods of determining association- Chi-square test-Degrees of freedom-Test of goodness of fit- Test of independence-Yate's correction

Unit IV Time Series Analysis 10 h

Definition of time series - Uses of Time series analysis- Time series models - Components of time series –Adjustment of time series data- Measurement of secular trend- Graphic method- Semi-Average method- Moving average method-Method of least square-Measurement of seasonal variation

Unit V Index Number 10 h

Definition of Index number– Characteristics- Uses- Types of index numbers-Problems of Construction of index numbers-Methods of constructing index numbers- Test of consistency of index number - Consumer price index number-Method of constructing consumer price index number

Note: Theory 20% and Problem 80%

Text Book

1 Pillai Bagavathy, R.S.N, 2016, "Statistics Theory and Practice", 14th Edition, Sultan Chand and Sons, New Delhi

References

1 Das, N.G, 2017, "Statistical Methods", Combined Edition (Volume I and Volume II, 16th Edition, TATA McGraw Hill Education, New Delhi .

2 Douglas C.Montgomery Geroge C.Runger, 2014, "Applied Statistics and Probability for Engineers", 6th Edition, John Wiley and Sons, New Delhi

3 Gupta, S.P, 2017, "Statistical Methods", 16th Edition, Sultan Chand and Sons, New Delhi

4 Gupta, S.C and Kapoor, V.K, 2017, "Fundamentals of Applied Statistics", Sultan Chand and Sons, New Delhi

194DA1A3CP	CORE PRACTICAL: DATABASE MANAGEMENT SYSTEMS	SEMESTER III

Total Credits: 2
Total Instructions Hours: 36 h

S.No	List of Experiments
1	Program to create a database to set various constraints.
2	Program to create a database and apply the Data Definition Language
3	Program in SQL Queries to Perform the Data Manipulation Language
4	Program to perform expression and Conditions.
5	Program to perform aggregate functions for database
6	Program to perform views, Synonyms and Sequence
7	Program to create and implement Views and Joins
8	Program to perform Cursors
9	Program to work with PL/SQL
10	Program to implement Triggers
11	Program for database design using ER Model
12	Program to Apply Normalization

Note: Ten Programs are Mandatory

Course Code	Course Name	Category	L	T	P	Credit
194DA1A3SA	R PROGRAMMING	SEC	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The technologies related to Statistics in R
- Major features of the R Programming
- R Visualization and graph to solve problems

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the Basics of R Programming	K2
CO2	Understand the control statements, loops and functions in R Programming	K2
CO3	Construct R data objects like Data Frames, Factors and Vectors	K3
CO4	Construct the Data and use R to prepare data for analysis	K3
CO5	Develop and Visualize the data with R's graphics	K6

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	M	S	M	M	S
CO3	S	M	S	S	M
CO4	S	S	L	L	S
CO5	M	L	S	S	M

S Strong **M** Medium **L** Low

194DA1A3SA	R PROGRAMMING	SEMESTER III

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to R 09 h

Evolution of R – Features of R – Design of the R System - Limitation of R – R Resources – Interactive Mode – Batch Mode – Entering Input – R Objects – Numbers – Attributes - Vectors - Matrices – Lists – Factors –Data Frames-Data In and Out of R – Dates and Times in R – Subsetting R Objects

Unit II Control Structures and Functions 10 h

Data Types-Variable – Operators if– if...else - Switch – For Loops – Nested For Loops – While Loops – Repeat Loops – Next – Break – Functions: Arguments – Return Values – Functions as a Arguments : Anonymous and Properties of Functions – Argument order and Named Arguments

Unit III Data Objects in R 10 h

Vectors - Adding and Deleting Vector Elements – Length of a vector – Matrices and Array as vectors – Common vector operations – Factors : Factors and Levels – Common functions used with Factors – Data Frames : Creating Data Frames – Merging Data Frames – Applying Functions to Data Frames

Unit IV Working with Data in R 10 h

Preparing Data: Combining Data Sets – Transformation :Reassigning Variables – Transform Functions – Applying functions to each elements of an object – Saving - Loading and Editing the Data : Entering Data – Importing data from a File – Exporting data Objects –Data Extract from CSV and Excel File

Unit V Data Visualization in R 09 h

R Graphics : Line Graph - Scatter Plot – Bar Charts – Pie Charts – Box Plots - Histogram - Customizing the Charts :Common Arguments to Chart Functions – Graphical Parameters - Basic Graphic Functions : Points – Lines – Curve – Text – Title – Legend – Box – Axis –R Statistics: Mean -Median- Mode-Linear Regression

Text Books

1. Joseph Adler,(2012), “R in a Nutshell”, (1st Edn.), O'Reilly Media, Inc
2. Roger D.Peng, (2015), “R Programming for Data Science” (1st Edn.), Lean Publishing.

References

1. Norman S. Matloff,(2011),"The Art of R Programming",(1st Edn.), Starch Press.
2. Sandip Rakshit,(2017)," R Programming For Beginners”,(1st Edn.), Mc Graw Hill,

194DA1A3SP	SEC PRACTICAL : R PROGRAMMING	SEMESTER III

Total Credits: 2
Total Instructions Hours: 36 h

S.No	List of Experiments
1	Program to Implement Control statements in R
2	Program to Demonstrate functions in R
3	Program to Perform simple Array operations in R
4	Program for Matrix operations in R
5	Program to implement String in R
6	Program to implement List operations in R
7	Program to create and Manipulation of Vector and Factors in R
8	Program to perform operations on Data Frame
9	Program to work with CSV files in R
10	Program to Create ,Customize and Saving Graphs and Charts in R
11	Program to perform customer segmentation Project in R
12	Program to perform Sentiment analysis in R

Note: Ten Programs are Mandatory

194DA1A3GA	INTRODUCTION TO DATA ANALYTICS	SEMESTER III

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Data 5 h

Data: Definition - Data Classification: Qualitative Data - Quantitative Data : Nominal - Ordinal - Interval - Ratio - Data Vs Information - Classification of information: Classification by characteristics - Classification by application- Classification by Management hierarchy - Data Collection Methods

Unit II Data Processing 5 h

Data Processing: Introduction - Data Processing Cycle - Methods of Data Processing: Batch Processing- Real Time Processing - On-line Processing - Distributed Processing - Files - Operations on files - File organization: Sequential - Indexed - Random

Unit III Database Management Systems 5 h

Introduction to Database- The Database Approach - Database Management Systems - Characteristics of Database Management Systems - Data Models - Schema - ER Model Basic Concepts - Introduction to Data Warehousing

Unit IV Data Analytics 5 h

Data Analytics: Related Technologies - Statistics - Mathematics - Programming Languages - Database - Machine Learning - Big Data Technology - Data Mining - Stages of the Data Mining Process - Data Visualization

Unit V Applications 4 h

Data Analytics Applications : Healthcare Sector - Entertainment and Media Industry - Hotel and Tourism Industry - Retail Sector - Social Media Analytics

Text Books

1 Maheshwari, 2017, " Data Analytics ", 1st Edition, McGraw Hill

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fourth Semester										
Part –I										
191TL1A4TA	Language – I	Tamil-IV	4	-	-	3	25	75	100	3
191TL1A4HA		Hindi-IV								
191TL1A4MA		Malayalam-IV								
191TL1A4FA		French – IV								
Part –II										
191EL1A4EA	Language – II	English – IV	4	-	-	3	25	75	100	3
Part - III										
194DA1A4CA	Core - VI	Java Programming	4	-	-	3	25	75	100	4
194DA1A4CB	Core -VII	Operating Systems	4	-	-	3	25	75	100	4
192MT1A4IF	IDC - IV	Discrete Mathematics	4	-	-	3	25	75	100	4
194DA1A4CP	Core Practical - VI	Java Programming	-	-	3	3	40	60	100	2
194DA1A4SA	SEC - III Theory	Next Generation Databases	3	1	-	3	25	75	100	3
194DA1A4SP	SEC - IV Practical	Next Generation Databases	-	-	3	3	40	60	100	2
		Total	**23**	**1**	**6**	-	-	-	**800**	**25**
Extra Credits :										
194DA1A4GA	Generic Elective	Introduction to Big Data	2	-	-	3	-	100	100	2
191TL1A4AA	AECC – IV	Basic Tamil	2	-	-	3	-	50	50	2
191TL1A4AB		Advanced Tamil								
192PY1A4AA		General Awareness								

Course Code	Course Name	Category	L	T	P	Credit
191TL1A4TA	பகுதி-1: தமிழ் - தாள்- IV	மொழி	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- மொழிப்பாடங்களின் வாயிலாகத் தமிழரின் பண்பாடு , பகுத்தறிவு ஆகியவற்றை அறியச் செய்தல்
- கலை மற்றும் மரபுகளை அறியச் செய்தல்
- மாணவர்களின் படைப்பாக்கத்திறன்களை ஊக்குவித்தல்

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	வாழ்க்கைத்திறன்கள் (Life Skills) – மாணவனின் செயலாக்கத்திறனை ஊக்குவித்தல்	K1,K2 & K3
CO2	மதிப்புக்கல்வி (Attitude and Value education)	K2,K4
CO3	பாட இணைச்செயல்பாடுகள் (Co-curricular activities)	K2,K3 & K4
CO4	சூழலியல் ஆக்கம் (Ecology)	K4
CO5	மொழி அறிவு (Tamil knowledge)	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	S	M	M	M	M
CO3	S	M	M	M	M
CO4	S	M	M	M	M
CO5	S	M	M	M	M

S Strong M Medium L Low

191TL1A4TA	பகுதி-1: தமிழ் - தாள்- IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **எட்டுத்தொகை** 10 h

1. இலக்கிய வரலாறு - எட்டுத்தொகை நூல்கள்
2. நற்றிணை – குறிஞ்சித் திணை

I.பா.எண் : 01 – கபிலர்

II.பா.எண் : 88 – நல்லந்துவனார்

III.பா.எண் : 102 – செம்பியனார்

2. குறுந்தொகை – முல்லைத்திணை

I.பா.எண் : 65 – கோவூர்கிழார்

II. பா.எண் : 167 – கூடலூர்கிழார்

மருதத்திணை

I.பா.எண் : 08 – ஆலங்குடி வங்கனார்

II.பா.எண் : 61 – தும்பிசேர்கீரனார்

III.பா.எண் :196 – மிளைக் கந்தன்

நெய்தல் திணை

I.பா.எண் : 57 – சிறைக்குடி ஆந்தையார்

Unit II **எட்டுத்தொகை** 08 h

1. கலித்தொகை – பாலைக்கலி

I.பா.எண் :9 – பெருங்கடுங்கோ

2. அகநானூறு – மருதத்திணை

I.பா.எண் : 86 – நல்லாவூர்கிழார்

குறிஞ்சித் திணை

I.பா.எண் :198 – பரணர்

2. புறநானூறு - I.பா.எண் : 188 – பாண்டியன் அறிவுடை நம்பி

II.பா.எண் : 192 – கணியன் பூங்குன்றனார்

III.பா.எண் : 279 – ஒக்கூர் மாசாத்தியார்

IV.பா.எண் : 312 – பொன்முடியார்

Unit III **பத்துப்பாட்டு** 10 h

1. இலக்கிய வரலாறு - பத்துப்பாட்டு நூல்கள்

2. பட்டினப் பாலை – கடியலூர் உருத்திரங் கண்ணனார்

Unit IV **புதினம்** 10 h

1. புதினத்தின் தோற்றமும் வளர்ச்சியும்
2. புதினம்

1.புத்துமண் –- சுப்ரபாரதிமணியன்

Unit V **இலக்கணம் மற்றும் திறனாய்வுப் பகுதி** 10 h

I.இலக்கணம்

1. அகத்திணை – அன்பின் ஐந்திணை - விளக்கம்
2. புறத்திணை – 12 திணைகள் - விளக்கம்

II.பயிற்சிப் பகுதி

புதினத் திறனாய்வு – கொங்கு வட்டாரப் புதினங்கள்

1. நாகம்மாள் – ஆர். சண்முகசுந்தரம்
2. மானாவாரி மனிதர்கள் – சூர்யகாந்தன்
3. ஈரம் கசிந்த நிலம் – சி. ஆர். ரவீந்திரன்
4. ஒண்டிக்காரன் பண்ணையம் – மா. நடராசன்

Note: பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது

Text Books

செய்யுள் திரட்டு - மொழிப் பாடம் - 2020- 21

1 தொகுப்பு: தமிழ்த்துறை, டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, வெளியீடு : நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 600 098.

2 சுப்ரபாரதிமணியன், முதற் பதிப்பு -2019, புத்துமண் புதினம் – நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை – 600 098. (Unit-IV)

References

1 பேராசிரியர் புலவர் சோம . இளவரசு, எட்டாம் பதிப்பு -2014, தமிழ் இலக்கிய வரலாறு - மணிவாசகர் பதிப்பகம், சென்னை – 600 108.

2 பேராசிரியர் முனைவர் பாக்கியமேரி , முதற் பதிப்பு - 2013 , இலக்கணம் - இலக்கிய வரலாறு - மொழித்திறன் -பூவேந்தன் பதிப்பகம், சென்னை-600 004.

3 தமிழ் இணையக் கல்விக்கழகம்.http://www.tamilvu.org/

Course Code	Course Name	Category	L	T	P	Credit
191TL1A4HA	Part- I : HINDI - Paper-IV	Language	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories.	K1
CO2	Understand the principles of translation work.	K2
CO3	Apply the knowledge writing critical views on fiction.	K3
CO4	Build creative ability.	K3
CO5	Expose the power of creative reading.	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

191TL1A4HA	Part- I : HINDI - Paper-IV	SEMESTER IV

Total Credits: 03

Total Instruction Hours: 48 h

Syllabus

Unit I — 10 h

नाटक – लडाई – सर्वेश्वरदयाल सक्सेना

प्रकाशक: वाणी प्रकाशन

21-A, दरियागंज

नई दिल्ली-110002

Unit II — 10 h

एकांकी: एकांकी पंचामृत – डॉ राम कुमार

(भोर और तारा छोड़कर)

प्रकाशक: जवाहर पुस्तकालय

सदर बाजार, मथुरा

उत्तर प्रदेश-281001

Unit III — 10 h

काव्य मंजरी- (डा मुन्ना तिवारी)

मैथिलीशरण गुप्त- मनुष्यता, जयशंकर प्रसाद- बीती विभावरी जागरी

सूर्यकान्त त्रिपाठी निराला- तोडती पत्थर और भिक्षुक

Unit IV — 10 h

सूचना लेखन

पुस्तक: व्याकरण प्रदिप – रामदेव

प्रकाशक: हिन्दी भवन 36 इलाहाबाद-211024

Unit V — 08 h

अनुवाद अभ्यास-III (केवल अंग्रेजी से हिन्दी में)

(पाठ 10 to 20)

प्रकाशक: दक्षिण भारत प्रचार सभा चेनैई -17

Course Code	Course Name	Category	L	T	P	Credit
191TL1A4MA	Part- I : MALAYALAM - Paper-IV	Language	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- To develop the writing ability and develop reading skill.
- To learn various concepts and techniques for criticizing literature, to learn the techniques for expansion of ideas and translation process.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the fundamentals of novels and stories.	K1
CO2	Understand the principles of translation work.	K2
CO3	Apply the knowledge writing critical views on fiction	K3
CO4	Build creative ability.	K3
CO5	Expose the power of creative reading.	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

191TL1A4MA	Part- I : MALAYALAM - Paper-IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I 10 h

Drama

Unit II 10 h

Drama

Unit III 10 h

Drama

Unit IV 10 h

Screen Play

Unit V 08 h

Screen Play

Text Books

1. Manju Poloru Penkutty, Screen Play By Kalavoor Ravikumar, Published by DC.Books, Kannur.
2. Lankalakshmi, Drama By C.N.Sreekandan Nair Published by D C.Books Kottayam

Course Code	Course Name	Category	L	T	P	Credit
191TL1A4FA	Part- I : **FRENCH-** Paper-IV	**Language**	**3**	**1**	**-**	**3**

PREAMBLE

This course has been designed for students to learn and understand

- To Acquire Competence in General Communication Skills – Oral + Written – Comprehension & Expression.
- To Introduce the Culture, life style and the civilization aspects of the French people as well as of France.

  To help the students to acquire Competency in translating simple French sentences into English and vice versa.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the Basic verbs, numbers and accents	K1
CO2	To learn the adjectives and the classroom environment in France	K2
CO3	Learn the Plural, Articles and the Hobbies.	K3
CO4	To learn the Cultural Activity in France	K3
CO5	To learn the Sentiments, life style of the French people and the usage of the conditional tense	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	M	S
CO3	S	M	S	M	S
CO4	S	M	S	M	S
CO5	S	M	S	M	S

S Strong M Medium L Low

191TL1A4FA	Part- I : FRENCH- Paper-IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I **Cœur et santé** 10 h

• Author du Couple	• INTERACTION ORALE: Exprimer son intérêt pour quelqu'un, exprimer l'affection • RECEPTION ORALE: Comprendre une chanson • RECEPTION ÉCRITE: Lire un horoscope • PRODUCTION ÉCRITE: Écrire une letter au courrier du cœur	• J'étais…L'imparfait(1) • Aussi brilliant que… • Le plus beau, le moins cher • Le verbe connaître

Unit II **Problémes problems** 10 h

• Le bénvolat	• INTERACTION ORALE: Interroger sur la tristesse, I'abattement, exprimer sa sympathie, rassurer • RÉCEPTION ORALE: Comprendre une interview à la radio • RECEPTION ÉCRITE: Comprendre un test de magazine • PRODUCTION ÉCRITE: Écrire une letter a un(e) amie	• Les pronoms indfinis rien, quelque chose • Le verbe crier • Du pluriel: eau, eu, al • Se soigner, s'excuser, se renseigner, s'appeler • La phrase ngative: ne… plus, ne… jamais, ne… rien, ne… personne

Unit III C'est qui? C'est comment? 10 h

• Les classes socials	INTERACTION ORALE: Décrire quelqu'un RECEPTION ORALE: Comprendre un bulletin météo RECEPTION ÉCRITE: Comprendre une courte interview PRODUCTION ÉCRITE: Écrire des notices biographiques	• Les adjectifs qualificatifs: Formes au masculin et au féminin • ll fait beau, il neige, il pleut… • Le verbe décrier • Les verbs en –indre • Les adjectifs possessifs féminins mon, ton, son devant voyelle ou h

Unit IV Et après? Et après 10 h

• La mémoire et l'histoire	• INTERACTION ORALE: Raconter une anecdote, une histoire, attire l'attention • RÉCEPTION ORALE: Comprendre une interview à la radio • RÉCEPTION ÉCRITE: Comprendre des faits divers • PRODUCTION ÉCRITE: Écrire une bréve	• L'imparfait(2) • Les verbs en – oir • Les pronoms démonstratifs ça et cela • Prés de… Loin de… • La forme passive

Unit V Dialogue writing 08 h

a) Les Courses
b) A La Banque
c) Ecole
d) Professions
e) Bijoux

Text Books

1. *Marcella Di Giura Jean-Claude Beacco,* **Alors II. Pages 88 – 162,** Goyal Publishers Pvt Ltd 86, University Block ,Jawahar Nagar (Kamla Nagar), New Delhi – 110007.
2. *French Made Easy by Rashmi Varma, Goodwill Publishing House, New Delhi* – 110 008.

Course Code	Course Name	Category	L	T	P	Credit
191EL1A4EA	ENGLISH- IV	LANGUAGE	4	-	-	3

PREAMBLE

This course has been designed for students to learn and understand

- The basics of English grammar and specific usages
- The importance of the vocabulary and use in different contexts
- The necessity of communication and composition writing skills

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn English grammar and its specific usage	K2
CO2	Know the ways of improving English language vocabulary	K3
CO3	Understand the importance of English language in competitive exams	K3
CO4	Acquire the basic needs of communication skills and methods	K3
CO5	Comprehend the composition writing and similar skills	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	M	S
CO2	S	S	M	M	S
CO3	S	S	S	M	M
CO4	S	M	M	S	S
CO5	M	S	M	S	S

S Strong M Medium L Low

191EL1A4EA	ENGLISH- IV	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Grammar 10 h

The use of correlatives - The perfect tense - appended questions - the infinitive - negative verbs - redundant conjunctions - use of make and do - fairly and rather

Unit II Vocabulary 10 h

Words and contextual uses - Synonyms - Antonyms - Add one out - inflectional - infix- telescoping - loanwords - British and American words - Thesaurus

Unit III Language Use 08 h

Spotting Errors - Words often confused - Reconstructing a Passage - Clause - Idioms and colloquialism - Language aptitude - Clipping

Unit IV Communication 11 h

Different Types of Asking - Oral rehearsal - Describing person, Diagram, Data, Table - Vote of thanks - Small talk - Refusal and Apology

Unit V Composition 09 h

General Essay writing - Mind map - Reviews - Title expansion - Creative writing - Content writing - Translation - Abstracting - Flash Fiction

Text Books

1. Wood F.T. 2010. A Remedial Grammar for Foreign Students. Macmillan Publishers, India. [Unit I and II]
2. Bhatnagar R.P. 2013. English for Competitive Examinations. 3rd Edition. Trinity Press, New Delhi. [Unit III, IV and V]

References

1. Radhakrishna Pillai G. 2000. English for Success. Emerald Publishers, Chennai.
2. Krishnaswamy N. 2000. Modern English a Book of Grammar Usage and Composition. Macmillan Publishers, India.
3. Arulselvi Evangelin. 2012. Teaching of Special English. Saratha Pathippagam, Chennai.
4. Rawdon Wyatt. 2008. Check Your Vocabulary for TOFEL. Macmillan Publishers, India.

Course Code	Course Name	Category	L	T	P	Credit
194DA1A4CA	JAVA PROGRAMMING	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Concepts of Java Programming
- Implement object-oriented design with Java
- Java Utilities, Packages and Applets

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Gain Knowledge about basic concepts of Java	K1
CO2	Understand the fundamental of object-oriented programming in Java	K2
CO3	Construct Arrays , Packages and Interfaces	K5
CO4	Apply the concepts of exception handling, multithreading and Files	K3
CO5	Develop interactive programs using applets and graphics	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	M	L
CO2	S	M	S	M	L
CO3	S	M	S	M	L
CO4	S	S	S	S	M
CO5	S	S	S	S	M

S Strong M Medium L Low

194DA1A4CA	JAVA PROGRAMMING	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Java Basics 8 h

Java Evolution: History - Features - Overview of Java Language: Introduction - Simple Java program - Java program structure - Java tokens - Java statements – Java Virtual Machine - Command Line Arguments- Data Types – Variables - Symbolic Constants – Operators and Expressions

Unit II Classes, Objects and Decision making 8 h

Introduction-If statements - Nesting of If…Else statements - The Else... If ladder – Switch statement - Conditional operator – Looping : Introduction - While statement - Do statement - For statement - Jumps in loops - Labeled loops – Classes - Objects – Methods

Unit III Arrays, Interfaces and Packages 12 h

One dimensional arrays- Two dimensional arrays – Strings - Vectors – Wrapper classes-Enumerated types – Annotations - Interfaces: Defining interfaces - Extending Interfaces-Implementing Interfaces - Accessing Interface variables - Packages: Using system packages-Naming conventions-Creating and Using Packages

Unit IV Multithreading, Exception Handling and Files 10 h

Creating threads - Extending a thread class - Stopping and blocking a thread - Life cycle of a thread -Thread exceptions - Inter thread communication – Exception Handling -I/O Files: Introduction - Concept of Streams - Stream classes - Byte stream and character stream classes - Using streams

Unit V Applet and Graphics Programming 10 h

Building applet code-Applet life cycle-Creating an executable applet-Applet tag-Adding applet to a HTML file - Running the applet-Passing parameters to applets - HTML tags - Displaying numeric values - User input - Event handling- Graphics: Graphics Class - Lines and Rectangles - Circles and Ellipses-Drawing Arcs and Polygons - Line Graphs -Bar charts

Text Books

1 E.Balaguruswamy, 2014, “Programming with Java A Primer”, 5th Edition, Tata McGraw Hill Publications

References

1 Paul deitel and Harvey Deitel,2015,"Java How to Program",10th Edition, Deitel& Associates Inc Publications

2 Herbert Schildt,2011,"JAVA-The Complete Reference",8th Edition Tata McGraw Hill Publications,

Course Code	Course Name	Category	L	T	P	Credit
194DA1A4CB	OPERATING SYSTEMS	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basic Concepts and Principles of Operating Systems
- Concepts of CPU Scheduling and Process Management
- Concepts of Memory and Storage Management

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the Concepts of Operating Systems and System calls	K1
CO2	Understand Process scheduling and Synchronization concepts	K2
CO3	Understand CPU Scheduling and Handling of Dead locks	K2
CO4	Analyze memory management and allocation policies	K4
CO5	Identifythe usageof storagemanagement	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	L
CO2	S	S	S	M	L
CO3	S	S	M	M	M
CO4	S	S	S	S	M
CO5	S	S	M	S	M

S Strong M Medium L Low

194DA1A4CB	OPERATING SYSTEMS	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction to Operating Systems 8 h

Introduction – Operating System Structure and Operations - Process Management - Memory Management - Storage Management - Protection and Security - Operating-System Services - User and Operating System Interface - System Calls - Types of System Calls - System Programs- Operating System Design and Implementation

Unit II Process Scheduling and Synchronization 10 h

Process Concept - Process Scheduling - Operations on Processes - Interprocess Communication- Communication in Client–Server Systems - Threads: Overview - Multicore Programming- Multithreading Models - Thread Libraries - Implicit Threading - Threading Issues - The Critical-Section Problem - Peterson's Solution - Synchronization Hardware - Mutex Locks - Semaphores

Unit III CPU Scheduling and Deadlocks 10 h

Basic Concepts - Scheduling Criteria - Scheduling Algorithms - Thread Scheduling - Multiple-Processor Scheduling - Real-Time CPU Scheduling - Deadlocks: System Model - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention -Deadlock Avoidance-Deadlock Detection - Recovery from Deadlock

Unit IV Memory Management 10 h

Main Memory: Background - Swapping - Contiguous Memory Allocation – Segmentation - Paging- Structure of the Page Table- Virtual Memory: Background - Demand Paging - Copy-on-Write- Page Replacement - Allocation of Frames – Thrashing – Memory-Mapped Files

Unit V Storage Management 10 h

Overview of Mass Storage Structure - Disk Structure - Disk Attachment - Disk Scheduling - Disk Management - Swap-Space Management - File Concept - Access Methods - File-System Mounting - File Sharing – Protection - File-System Structure - Case Study: Linux

Text Books

1 Silberschatz, Galvin, Gagne, 2013, "Operating System Concepts", 9th Edition, John Wiley & Sons

References

1 H.M. Deitel, P. J. Deitel and D. R. Choffnes, "Operating Systems", 2004, 3rd Edition, Pearson Education Publication

2 Achyut S.Godbole, "Operating Systems",2011, 3rd Edition, Tata McGraw Hill Publications

Course Code	Course Name	Category	L	T	P	Credit
192MT1A4IF	DISCRETE MATHEMATICS	IDC	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Concept of mathematical and logical operators
- Difference between relation and function
- Concepts of Boolean algebra and graph theory

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Discuss the Mathematical logical operators	K2
CO2	Explain the concept of relation and function	K3
CO3	Apply the application of Lattices through Boolean functions	K3
CO4	Apply the concept of Graphs in the construction of Trees	K3
CO5	Construct the finite state machines for various languages	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	M	S	S
CO3	S	S	S	M	S
CO4	S	S	S	S	S
CO5	S	M	S	S	S

S Strong M Medium L Low

192MT1A4IF	DISCRETE MATHEMATICS	SEMESTER IV

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Mathematical Logic 10 h

Statements and notation - Connectives - Statement formulas and truth tables - Logical capabilities conditional and biconditional - well-formed formulas - tautologies - equivalence of formulas - duality law - tautological implications - formulas with distinct truth tables - functionally complete sets of connectives - Other connectives - Normal forms.

Unit II Relations and Functions 10 h

Relations and ordering - Relations - properties - relation matrix and the graph of a relation - partition and covering of a set - equivalence relations - compatibility Relations - Composition - Partial ordering - Representation and associated terminology- functions -composition of functions - inverse functions - binary and n-ary operations - characteristic function of a set - Hashing functions.

Unit III Lattices and Boolean Algebra 10 h

Lattices as partially ordered sets - properties- lattices as algebraic systems - sublattices, direct product and Homomorphism -special lattices - Subalgebra direct product and Homomorphism - Boolean function - Boolean forms and free Boolean algebras - Values of Boolean expression and Boolean functions - Representation and Minimization of Boolean functions.

Unit IV Graph Theory 8 h

Basic concept of graph theory - Paths, reachability and connectedness - Matrix representation - Trees - storage representation and manipulation of graphs.

Unit V Grammars and Languages 10 h

Discussion of grammar - formal definition of a Language - notions of syntax analysis - Finite state Machines - introductory sequential circuits - equivalence of finite state machines - finite state acceptors and regular grammars.

Note: Theory 20% and problem 80%

Text Books

1 Tremblay J.P and Manohar R, 2004, "Discrete Mathematics Structures with Applications to Computer Science", McGraw Hill Education, New Delhi.

References

1 Veerarajan T, 2006, "Discrete Mathematics with Graph Theory and Combinatorics", McGraw-Hill Education, New Delhi.

2 Venketaramen MK, Sridharan N, Chandarasekaran N, 2003, "Discrete Mathematics" , The National publishing Company, Chennai.

3 Iyengar S.N, Chandrasekaran V.M. Venkatesh. K.A and Arunachalam P.S., 2003, "Discrete Mathematics ", Vikas Publishing House Pvt. Limited, New Delhi.

4 Babu Ram, 2010, "Discrete Mathematics" , Pearson Education , New Delhi

194DA1A4CP	CORE PRACTICAL: JAVA PROGRAMMING	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 36h

S.No	List of Experiments
1	Program topracticeOperators, Precedence and Data types
2	Program to implement classes, objects, methods and constructors
3	Program to implementcommand line arguments
4	Program to demonstrate types of exception handling
5	Program to implement the concept of Threading
6	Program to perform string manipulation functions
7	Program to illustrate access modifiers
8	Program to count the number of characters, words and lines in a text file
9	Program to draw different shapes in an Applet window
10	Program to perform mouse click operations

Note: Eight Programs are Mandatory

Course Code	Course Name	Category	L	T	P	Credit
194DA1A4SA	NEXT GENERATION DATABASES	SEC	3	1	-	3

PREAMBLE

This course has been designed for students to learn and understand

- Concepts of No-SQL Databases
- The types No-SQL databases
- The features of MongoDB

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describethe features of No-SQL Databases	K1
CO2	Develop programs using Document and Graph databases	K3
CO3	Experiment the features of column and key value databases	K4
CO4	Construct simple queries using MongoDB	K3
CO5	Apply advanced MongoDB features	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	M
CO2	S	S	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	M

S Strong M Medium L Low

194DA1A4SA	NEXT GENERATION DATABASES	SEMESTER IV

Total Credits: 3

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 8 h

Early Database Management Systems - Database revolutions: First, second and third generation - Big Data Revolution - Introduction to Sharding - Motivation for No-SQL Databases - CAP Theorem - Types of No-SQL Databases : Document Oriented - Columnar - Graph - Key-Value Pair

Unit II Document and Graph Databases 10 h

Introduction- Basic operation of document databases- XML and XML Databases: XML Tools and Standards- XML Databases - XML Support in Relational Systems - JSON Document Databases : Introduction - Data Models in Document Databases - MemBase and CouchBase - Graph Databases

Unit III Column and Key-Value Databases 10 h

Introduction – Data Warehousing Schemas- The Columnar Alternative- Column Database Architectures- In-Memory Databases- Distributed Database Patterns: Distributed Relational Databases- Non-Relational Distributed Databases- Sharding and Replication

Unit IV MongoDB 10 h

Introduction to MongoDB: Need for MongoDB - MongoDBVs Relational Database Management Systems – Data Types – MongoDB Query Language - Getting Data into MongoDB – Database Operations: Create – Update – Read – Delete - Querying

Unit V Advanced MongoDB 10 h

Indexing - Aggregation – Introduction to Map-Reduce Programming: Mapper - Reducer- Combiner – Partitioner - Searching – Sorting – Compression – Sharding- Comparison of Relational databases to new No-SQL stores - MongoDB - Cassandra - HBASE - Neo4

Text Books

1. Guy Harrison, 2015, “Next Generation Databases”, 1st Edition, Apress
2. Shakuntala Gupta Edward, Navin Sabharwal,"Practical Mongo DB",1st Edition,Apress

References

1. Adam Fowler,2015,"NoSQL for Dummies", 1st Edition, John Wiley & Sons
2. Ramez Elmasri and Shamkant Navathe,2011, "Fundamentals of Database Systems",6th Edition, Pearson

194DA1A4SP	SEC PRACTICAL: NEXT GENERATION DATABASES	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 36h

S.No	List of Experiments
1	Queries for basic commands in MongoDB
2	Perform CRUD operations in MongoDB
3	Apply Projection Commands in MongoDB
4	Perform Aggregation in MongoDB
5	MongoDB order with Sort() and Limit()
6	Perform Indexing in MongoDB
7	Perform MapReduce in MongoDB
8	Test MongoDB Utilities-Import and Export
9	MongoDB query to create a Backup and Restore the existing Database
10	Connecting Python with MongoDB

Note: Eight Programs are Mandatory

194DA1A4GA	GENERIC ELECTIVE: INTRODUCTION TO BIG DATA	SEMESTER IV

Total Credits: 2

Total Instruction Hours: 24 h

Syllabus

Unit I Data Explosion 4 h

Data: Definition - Data in digital age- Big Data: Introduction - Search Engine Data - Healthcare Data - Social Media Data - E-Commerce Data - Media and Entertainment Data - Real-time Data - Astronomical Data

Unit II Big Data 4 h

Definition - Big Data Vs Small Data - The Five V's: Volume - Velocity - Variety - Veracity - Value - Mining Big Data : Clustering - Classification - Decision Tree for Transactions - Data Visualization

Unit III Big Data Analytics 6 h

Big Data Analytics: Introduction - Tools for Data Analytics - Hadoop: Features - Hadoop Architecture - Hadoop Distributed File System - MapReduce - Map Function - Shuffle and Reduce Functions - Advantages

Unit IV Big Data Storage 6 h

Introduction-Moore's Law- ACID Properties- Storing Structured Data - Storing Un-Structured Data: Relational Database Management Systems - NoSQL databases for big data- Types of No-SQL Databases : Document Oriented - Columnar - Graph - Key-Value Pair

Unit V Applications 4 h

Application of Big Data : Healthcare - Advertising : Pay per click advertising- Targeted advertising- Recomender Systems - Big Data in Society: Smart Vehicle- Smart Homes - Smart Cities

Text Books

1 Dawn E. Holmes, 2017, "Big Data: A Very Short Introduction",1st Edition, Oxford

191TL1A4AA	பகுதி – 4 : அடிப்படைத்தமிழ் - தாள் : II (Basic Tamil)	SEMESTER IV

Total Credits: 2

Total Instruction Hours: 24 h

இளங்கலை 2019–20ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(10 மற்றும் 12 – ஆம் வகுப்பு வரை தமிழ் மொழிப்பாடம் பயிலாதவர்களுக்கு)

(பருவத் தேர்வு உண்டு)

அலகு : 1 12 h

நீதி நூல்கள்

I.ஆத்திசூடி - "அறம் செய விரும்பு" முதல் "ஔவியம் பேசேல்"வரை -12 பாடல்கள்

II.கொன்றைவேந்தன் - "அன்னையும் பிதாவும் முன்னறி தெய்வம்" முதல்

"எண்ணும் எழுத்தும் கண் எனத் தகும்" வரை -7 பாடல்கள்

III.திருக்குறள் - 6 பாடல்கள்

1. அகர முதல 1
2. மனத்துக் கண்.....34
3. இனிய உளவாக 100
4. தீயவை தீய பயத்தலான்.....202
5. கற்க கசடற 391
6. கண்ணொடு கண்ணினை.....1100

அலகு : 2 12 h

I. எளிய நீதிக்கதைகளும் வாழ்க்கை முறைகளும்

1. நீதிகாத்த மன்னன்
2. சிங்கமும் முயலும்
3. புத்திசாலி உழவனும் போக்கிரிப் பூதமும்
4. தேனீயும் புறாவும்
5. முயல் கூறிய தீர்ப்பு

II. தமிழகப் பண்பாடுகள்

1. தமிழர் விழாக்கள் - பொங்கல், ஆடிப்பெருக்கு
2. தமிழர் கலைகள் - தெருக்கூத்து, ஓவியம், சிற்பம்
3. தமிழர் விளையாட்டுகள்- ஏறுதழுவுதல், சடுகுடு

III . பயிற்சிப் பகுதி

1. படத்திற்கு ஏற்ற சொற்களை எழுதுதல்.
2. சொற்களைத் தொடராக்குதல்.
3. பொருத்துதல்,
4. உரையாடல் பகுதி

Note: பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது

வினாத்தாள் அமைப்பு முறை - மொத்த மதிப்பெண்கள் - 100

பகுதி – அ

சரியான விடையைத் தேர்வு செய்தல் 10x2=20

பகுதி – ஆ

சரியா? தவறா? தேர்ந்தெடுத்து எழுதுக . 10x2=20

பகுதி - இ

ஒரு பக்க அளவில் விடையளிக்க 03x20=60

குறிப்பு:

- அனைத்து அலகுகளில் இருந்தும் வினாக்கள் அமைதல் வேண்டும்
- பகுதி இ –க்கான வினாக்கள் இது அல்லது அது என்ற அடிப்படையில் அந்தந்த அலகுகளில் அமைதல் வேண்டும்

Text Books

1 அடிப்படைத்தமிழ் - 20-21. தொகுப்பு : தமிழ்த்துறை , டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட். சென்னை-600 098

References

1 ஒன்றாம் வகுப்பு பாடநூல் - தமிழ்நாடு அரசு பாடநூல் கழகம்

2 வலைதள முகவரி : http://tamilvu.org

191TL1A4AB	பகுதி – 4 : சிறப்புத்தமிழ் - தாள் : II (Advanced Tamil)	SEMESTER - IV

Total Credits: 2

Total Instruction Hours: 24 h

இளங்கலை 2019– 2020 ஆம் கல்வியாண்டு முதல் சேர்வோர்க்குரியது

(10 மற்றும் 12 – ஆம் வகுப்புகளில் தமிழ் மொழிப்பாடம் பயின்றவர்களுக்கு உரியது

(பருவத் தேர்வு உண்டு)

அலகு – 1 05 h

திருக்குறள்

I அறத்துப்பால்

1. இனியவை கூறல் - அதிகார எண் : 10
2. அடக்கமுடைமை - அதிகார எண் : 13

II பொருட்பால்

1. கல்வி - அதிகார எண் : 40
2. உழவு - அதிகார எண் : 104

III இன்பத்துப்பால்

1. தகையணங்குறுத்தல் - அதிகார எண் :109
2. பிரிவாற்றாமை - அதிகார எண் : 116

அலகு – 2 05 h

கட்டுரைத் தொகுப்பு

I நல்வாழ்வு - டாக்டர் மு.வரதராசன்

1. நம்பிக்கை
2. புலனடக்கம்
3. பண்பாடு

II இளைஞர்களின் ஒளிமயமான எதிர்காலத்திற்கு - கு.வெ. பாலசுப்பிரமணியம்

1. காலக்கணக்கு
2. நற்பழக்கமே செல்வம்

அலகு – 3 05 h

I காப்பியங்கள் - குறிப்பு எழுதுதல்

1. சிலப்பதிகாரம்
2. மணிமேகலை
3. கம்பராமாயணம்
4. பெரியபுராணம்

II ஊடகம் - காட்சி ஊடகங்கள்

1. தொலைக்காட்சி
2. திரைப்படம்
3. இணையம்
4. முகநூல்
5. கீச்சகம்
6. கட்செவி அஞ்சல்

அலகு – 4 05 h

இலக்கணம் - வழக்கறிதல்

1. இயல்பு வழக்கு
2. தகுதி வழக்கு

அலகு – 5 04 h

I படைப்பாற்றல் பகுதி

கவிதை,கட்டுரை எழுதச்செய்தல் - பொதுத் தலைப்பு

II பயிற்சிப் பகுதி

தமிழில் தட்டச்சு செய்தல் - யூனிகோடு எழுத்துருவில்.

Note: பயிற்சிப் பகுதியில் வினாக்கள் அமைத்தல் கூடாது

வினாத்தாள் அமைப்பு முறை - மொத்த மதிப்பெண்கள் - 100

பகுதி –அ

சரியான விடையைத் தேர்வு செய்தல் 10x2=20

பகுதி –ஆ

கோடிட்ட இடங்களை நிரப்புக 10x2=20

பகுதி –இ

இரண்டு பக்க அளவில் விடையளிக்க 4x15=60

குறிப்பு :

- அனைத்து அலகுகளில் இருந்தும் இரண்டு வினாக்கள் அமைதல் வேண்டும்
- பகுதி இ –க்கான வினாக்கள் இது அல்லது அது என்ற வகையில் அந்தந்த அலகுகளிலிருந்து அமைதல் வேண்டும்.

Text Books

1 சிறப்புத்தமிழ் 20-21. தொகுப்பு : தமிழ்த் துறை , டாக்டர் என்.ஜி.பி. கலை அறிவியல் கல்லூரி, நியூ செஞ்சுரி புக் ஹவுஸ்(பி) லிட். சென்னை- 600 098

References

1 பேராசிரியர் புலவர் சோம . இளவரசு, எட்டாம் பதிப்பு - 2014, தமிழ் இலக்கிய வரலாறு – மணிவாசகர் பதிப்பகம், சென்னை – 600 108.

2 பேராசிரியர் முனைவர் பாக்கியமேரி , முதற் பதிப்பு- 2013, இலக்கணம் - இலக்கிய வரலாறு - மொழித்திறன் -பூவேந்தன் பதிப்பகம், சென்னை-600 004.

3 வலைதள முகவரி : http://tamilvu.org

192PY1A4AA	AECC : GENERAL AWARENESS	SEMESTER IV

Total Credits: 2
Total Instructions Hours: 24 h

S.No	Contents
1	Current Events
2	General Science
3	Geography of India
4	Tamil and Other Literature
5	Inventions and Discoveries
6	Numerical and Mental Aptitude
7	Verbal and Non Verbal Reasoning
8	Socio- Culture and Heritage of India
9	Indian Economy and Political System
10	History of India and Freedom Struggle

References

1. Majid Hussain, Arrora N D, 2019, "General Studies -TNPSC Group -I ", G.K.Publications (P) Ltd. New Delhi
2. Aggarwal R S, 2014, "Verbal and Non Verbal Reasoning" S Chand & Company, New Delhi
3. Competition Success Review, Competitive Success Publisher, New Delhi
4. Pratiyogita Darpan, Pratiyogita Darpan Publishers, Agra.

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Fifth Semester										
194DA1A5CA	Core VIII	Software Engineering	5	-	-	3	25	75	100	4
194DA1A5CB	Core IX	Big Data Analytics	5	-	-	3	25	75	100	4
194DA1A5CC	Core X	Data Mining	4	-	-	3	25	75	100	4
194DA1A5CD	Core XI	Web Designing	4	-	-	3	25	75	100	4
194DA1A5CP	Core Practical VII	Big Data Analytics	-	-	4	3	40	60	100	2
194DA1A5CQ	Core Practical VIII	Web Designing	-	-	4	3	40	60	100	2
194DA1A5DA	DSE-I	Mobile Computing	4	-	-	3	25	75	100	4
194DA1A5DB		Artificial Intelligence								
194DA1A5DC		Social Media Analytics								
194DA1A5LA	LoP	Lab on Project	-	-	-	-	50	-	50	1
		Total	**22**	**-**	**8**	**-**	**-**	**-**	**750**	**25**

Course Code	Course Name	Category	L	T	P	Credit
194DA1A5CA	SOFTWARE ENGINEERING	CORE	5	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Software Process models.
- Phases of software development.
- Unified Modeling Language

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand software process models.	K2
CO2	Describe requirement elicitation methods	K3
CO3	Discuss software processes design techniques	K5
CO4	Analyze Testing Techniques.	K4
CO5	Design using UML diagrams..	K6

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	M	M
CO2	S	M	S	M	M
CO3	S	M	S	M	S
CO4	M	S	S	M	M
CO5	M	M	S	S	M

S Strong M Medium L Low

194DA1A5CA	SOFTWARE ENGINEERING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Process Models 12 h

Introduction to software Engineering- Software Process- Process Models : Prescriptive Process Models – The Waterfall Model - Incremental Model - Evolutionary Process Model - Concurrent Models - Agile Methodology

Unit II Requirement Modeling 12 h

Requirement Engineering - Establishing the groundwork – Identifying Stakeholders - Recognizing multiple viewpoints- Working toward Collaboration - Eliciting requirements - Collaborative requirement gathering- Quality function Deployment- Usage Scenario Elicitation Work Products - Developing Use Cases- Building the requirements model – Elements of the requirements Model- Analysis pattern - Negotiating requirements- Validating requirement

Unit III Software Design 12 h

Design process – Software quality guidelines and attributes- Evolution of software design - Design concepts –The Design Model – Data Design elements- Architectural Design Elements- Interface Design Elements- Component Level Design Elements- Deployment level Design Elements- Architectural Design: Software Architecture-Architectural Styles

Unit IV Software Testing 12 h

A Strategic approach to testing: Verification and Validation- Software testing strategy -Test strategies for conventional software: Unit testing - Integration testing- Validation testing- White- box testing- Basic path testing- Control structure testing – Condition testing- Data flow testing - Loop testing- Black-box testing - Test strategies for Object Oriented software- Software Maintenance

Unit V UML 12 h

UML: Introduction - Modeling Concepts and Diagrams – Use Case Diagrams – Class Diagrams – Interaction Diagrams – State Chart Diagrams – Activity Diagrams – Package Diagrams – Component Diagrams – Deployment Diagrams

Text Books

1. Roger. S. Pressman, (2015), Software Engineering A Practitioner's Approach, (8th Edn.), Tata McGraw Hill(Unit I-IV).
2. Grady Booch, Ivar Jacobson & Jim Rumbaugh, (2012)UML Distilled, (3rd Edn.), Addision Wesley(Unit V)

References

1. Shari Lawrence Pfleeger, (2017), "Software Engineering Theory and Practice", Pearson Education.
2. Ian Sommerville, (2012), "Software Engineering", Pearson Addison Wesley.

Course Code	Course Name	Category	L	T	P	Credit
194DA1A5CB	BIG DATA ANALYTICS	CORE	5	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Technologies related to Big data Analytics
- Major features of the Hadoop Frameworks and its Applications
- Spark, Scala, Pig and Hive scripts

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand big data concepts and characteristics	K2
CO2	Interpret Hadoop Framework and Map reduce	K2
CO3	Design applications using Spark and Scala	K3
CO4	Design applications using Pig Scripts	K4
CO5	Develop programs using Hive Scripts	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	S	M	S	S	M
CO3	S	S	S	S	M
CO4	S	M	S	M	M
CO5	S	M	S	S	M

S Strong M Medium L Low

194DA1A5CB	BIG DATA ANALYTICS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Big Data 10 h

Classification of digital data – Characteristics of data – Challenges – Five Vs- Typical Hadoop environment- Classification of analytics - Data science – Terminologies used in big data environments - Parallel Vs Distributed Environment - Big data applications

Unit II Hadoop 12 h

Introduction to Hadoop Eco system - Hadoop core components - Hadoop distributions- HDFS - Common Hadoop Shell commands - Processing data with Hadoop - NameNode - Secondary NameNode and DataNode - Introduction to MapReduce Programming - Mapper - Reducer- Combiner - Partitioner - Searching - Sorting -Hadoop MapReduce Paradigm - Job and Task trackers

Unit III SPARK and SCALA 13 h

SPARK and SCALA : Spark - Functional Features - Spark-Non Functional Features - Spark - Programming Interface - Spark Ecosystem - Apache Spark Use Cases - SCALA Programming: Introduction to SCALA - Frameworks in SCALA - SCALA REPL: SCALA Interactive Shell - SCALA Vs Java

Unit IV Programming with Pig 13 h

Introduction to Pig – Pig Features- Pig Data Model – Pig Data Types – Pig Latin - Input - Output - Relational operators - User Defined Functions - Join implementations - Embedding Pig latin in Python

Unit V Programming with Hive 12 h

Introduction to Hive – Data types and File formats – Hive Query Language(HQL) – HiveQL data definition – HiveQL data manipulation – Queries - Views - Indexes - Schema Design

Text Books

1. Seema Acharya and Subhashini Chellappan, (2015), "Big Data and Analytics", (1st Edn.), Wiley India.(Unit I,II,IV,V)

2. T. Devi ,V. Bhuvaneswari, (2016), "Big Data Analytics: A Practitioner's Approach"(Unit III)

References

1. C. Han Hu, Yonggang Wen, Tat-Seng, Chua, Xuelong Li, (2014), "Toward Scalable Systems for Big Data Analytics: A Technology Tutorial", IEEE.

2. Thomas Erl, Wajid Khattak, and Dr. Paul Buhler, (2016), "Big Data Fundamentals: Concepts, Drivers & Techniques", Prentice Hall

Course Code	Course Name	Category	L	T	P	Credit
194DA1A5CC	DATA MINING	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basic concepts of Data Mining
- Data Mining Techniques
- Applications and Recent trends in Data Mining

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of data mining	K2
CO2	Deploy appropriate classification techniques for data mining	K2
CO3	Apply association rules for mining data	K3
CO4	Examine similarity and distance measures in clustering	K3
CO5	Examine data mining applications and recent trends	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	S	S	S	M
CO3	S	S	S	M	M
CO4	S	S	S	M	M
CO5	M	M	M	S	S

S Strong M Medium L Low

194DA1A5CC	DATA MINING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 8 h

Introduction to Data Mining: Origins of Data Mining - Data Mining Tasks - Data: Attributes and Measurement - Types of Data sets - Data Mining Issues - Data Quality - Data Preprocessing - Measures of Similarity and Distance Measures - Proximity measures

Unit II Classification 10 h

Classification: Introduction – Statistical Based Algorithms: Regression – Bayesian Classifications – Distance Based Algorithms: K Nearest Neighbors - Decision Tree Based Algorithms

Unit III Associations 10 h

Association Rules - Introduction - Large Itemsets – Apriori Algorithm – Sampling algorithm – Advanced Association Rule Techniques: Generalized Association Rule – Multi Level Association Rules – Quantitative Association Rules.

Unit IV Clustering 10 h

Similarity and Distance Measures – Outliers – Hierarchical Algorithms : Agglomerative – Divisive Clustering – K means Clustering – Nearest Neighbor Algorithm

Unit V Applications and Trends 10 h

Web Mining – Web Content Mining – Structure and Usage Mining – Spatial Mining – Time Series and Sequence Mining – Temporal Association Rules.

Text Books

1. Vipin Kumar, Pang-Ning Tan Michael Steinbach (2006), "Introduction to Data Mining", Addison Wesley(Unit 1)
2. Margaret H. Dunham, (2003), "Data Mining : Introductory and Advanced Topics", (1st Edn.), Pearson Education (Unit II-V)

References

1. Arun.K.Pujari, (2013)"Data Mining Techniques", (3rd Edn.),University Press (India) Limited
2. Jiawei Han and Micheline Kamber, (2006), "Data Mining Concepts and Techniques", (2nd Edn.),Morgan Kaufmann Publication

Course Code	Course Name	Category	L	T	P	Credit
194DA1A5CD	WEB DESIGNING	CORE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The principles of webpage design
- Interactive webpages
- Scripting languages

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand concepts of web design	K2
CO2	Design applications using java script.	K3
CO3	Develop dynamic webpages using DHTML..	K3
CO4	Understand the concepts of PHP.	K4
CO5	Construct web applications.	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	M	M
CO2	S	M	S	M	M
CO3	S	M	S	M	S
CO4	M	S	S	M	S
CO5	S	M	S	S	M

S Strong M Medium L Low

194DA1A5CD	WEB DESIGNING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Internet Basics and HTML 10 h

Basic Concepts - Internet Domains - Internet Server Identities - IP Address - Transmission Control Protocol(TCP) - File Transfer Protocol(FTP) - Telecommunication Network (TELNET)- Hyper Text Markup Language (HTML): Introduction - Lists - Adding Graphics to HTML Document - Tables - Linking Documents – Frames

Unit II Java Script 10 h

Java Script in Web Pages – Advantages of Java Scripts – Writing Java Scripts in to HTML – Basic Programming Techniques – Operators and Expression in Java Scripts – Java Scripts Programming constructs – Conditional Checking – Super Controlled Endless Loop –Functions in Java Scripts – User Defined Functions – Placing Text in a Browser - Dialog Boxes- Java Script Document Object Model (DOM)

Unit III Dynamic HTML 8 h

Dynamic HTML – Cascading Style Sheets(CSS) – Font Attributes - Color and Background Attributes – Text Attributes – Border Attributes – List Attributes – Class - DHTML and Java Scripts – Java Scripts and HTML Events – Java Scripts and HTML DOM-Text Script

Unit IV Hypertext Preprocessor (PHP) 10 h

Introduction to PHP – PHP and HTML – The Basics of PHP: Data types – Constants – Here Documents – Operators – Arrays – conditional Statements – Iterations –Functions: User Defined functions – Built-in Functions – Working with Date and Time – Performing Mathematical Operations – Working with String Functions

Unit V PHP Forms and Debugging 10 h

HTML form Tags and Elements –Form elements: Text Box – Text Area -Password – Radio Button –Check Box – The Combo Box – Hidden Field - Image – Submit and Reset Buttons – Adding Elements to a Form –Uploading Files to the Web Server Using PHP- Debugging and Error Handling

Text Books

1 Ivan Bayross,(2010), "Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP", (4th Edn.), BPB Publications.

References

1 Thomas A. Powel, (2017), "Web Design - The Complete Reference", (5th Edn.), TMH Publications

2 Rajkamal, (2012), "Internet and web technologies", (4th Edn.), TMH Publications

194DA1A5CP	CORE PRACTICAL : BIG DATA ANALYTICS	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	LIST OF EXPERIMENTS
1	Create a single node cluster with Hadoop Management
2	Demonstrate file management functions
3	Move Hadoop files from specified source to destination .
4	Pig Latin scripts to sort and group data items
5	Pig Latin scripts to join, project and filter data.
6	Pig Latin Scripts to find the Word Count of document
7	Pig Latin Scripts to find a maximum temperature year wise
8	Hive Scripts to create, alter and drop databases
9	Hive Scripts to create tables and views
10	Hive Scripts to create functions and indexes

Note: Out of 10 – 8 mandatory

194DA1A5CQ	CORE PRACTICAL: WEB DESIGNING	SEMESTER V

Total Credits: 2
Total Instructions Hours: 48 h

S.No	Contents
1	Create a HTML Document using Basic HTML Tags.
2	Create a HTML Document using list Attributes.
3	Create a HTML Document to display a class timetable using <table> tag.
4	Create a HTML Document to display Mouse over effect on images using CSS.
5	Create a Web Page Containing a clock using Java Script.
6	Create a Web Page to display an Order form using JavaScript and DHTML.
7	Create a Web Page to validate a form using JavaScript.
8	Create a CGPA Calculator in Web Browser using HTML,CSS, JavaScript
9	Create a file and write data in to the file using PHP.
10	Create a file and upload using PHP and Scripts.

Note: Out of 10 – 8 Mandatory

Course Code	Course Name	Category	L	T	P	Credit
194DA1A5DA	MOBILE COMPUTING	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The concepts of mobile telecommunication system.
- The transport and application layer protocols
- Types of mobile platforms and application development.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand concepts of Wireless Data Networks	K1
CO2	Illustrate the generations of telecommunication systems in wireless networks	K3
CO3	Understand the architectures, the challenges and the Solutions of Wireless Communication	K2
CO4	Explain the functionality of Transport and Application layers	K4
CO5	Develop a mobile application using android	K6

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	M	M
CO2	M	M	M	S	M
CO3	M	M	M	M	M
CO4	M	M	S	M	M
CO5	S	M	S	S	S

S Strong M Medium L Low

194DA1A5DA	MOBILE COMPUTING	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 09 h

Introduction to mobile and wireless devices - wireless networking, Advantages and disadvantages of wireless networking, Evolution of mobile communication generations- Challenges in mobile computing – Vertical and horizontal mobile applications - Wireless LAN and Wireless WAN

Unit II Cellular Concept 10 h

Wireless transmission - Frequencies for radio transmission - Regulations - Signals : Antennas -Signal propagation - Path loss of radio signals - Additional signal propagation effects - Multi-path propagation - Multiplexing - Space Division Multiplexing - Frequency Division Multiplexing -Time Division Multiplexing - Code Division Multiplexing - Spread Spectrum - Direct sequence Spread Spectrum - Frequency hopping spread spectrum.

Unit III Global System for Mobile Communications 10 h

Global System for Mobile Communications (GSM) - Mobile services - System architecture - Handover – GPRS: System architecture – Services- Technology - Physical and Logical Channels - Bluetooth : Working Principle - Modes of operation - Applications

Unit IV Mobile Applications Architecture 10 h

Wireless Internet – Wireless Internet Architecture – Smart Client – Smart Client Architecture – Messaging Architecture – The Model-View-Controller Model-Delegate Pattern - Building Smart Client Applications : Design - Development - implementation - testing and deployment phase.

Unit V Mobile Application Development 09 h

Introduction to Android Platform – Android architecture overview - Application life cycle - UI design for Android - Different types of layouts – Widgets – List view and Adapters - Dialogs and Toasts – Intent filters - Files and database – SQLite on Android - Security model – Comparison with IOS application development.

Text Books

1 Jochen Schiller, (2012), "Mobile Communication", Pearson

2 John Horton, (2017), "Android Programming for Beginners", Packt Publishing.

References

1 Martyn Mallick, (2003),"Mobile and Wireless Design Essentials", Wiley

2 Andreas F.Mohisch, (2010), "Wireless Communications", Wiley

Course Code	Course Name	Category	L	T	P	Credit
194DA1A5DB	ARTIFICIAL INTELLIGENCE	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Fundamental concepts of Artificial Intelligence
- About basic Principles ,Techniques and Applications
- Concepts of Problem solving

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Discuss the History and Foundations of Artificial Intelligence	K2
CO2	Apply the Problems in Searching Techniques	K3
CO3	Use the Informed Search strategies	K3
CO4	Demonstrate the Constraint Satisfaction Problem and Adversarial Search	K3
CO5	Analyze the Knowledge representation and Reasoning	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	S	S	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	S

S Strong M Medium L Low

194DA1A5DB	ARTIFICIAL INTELLIGENCE	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Introduction 9 h

Artificial Intelligence: Foundations – History – State of the Art – Intelligent Agents: Agents and Environments –The concept of Rationality – The Nature of Environments – The Structure of Agents :Agent Programs – Simple reflex Agents – Model Based reflex Agents – Goal Based Agents – Utility based Agents – Learning Agents

Unit II Solving Problems by searching 10 h

Problem Solving Agents – Example Problems :Toy Problems – Real world Problems – Searching for Solutions – Uninformed Search Strategies : Breadth-First Search – Depth-First Search – Depth Limited Search - Iterative Deepening Depth first search – Bidirectional Search – Comparing Uninformed Search Strategies

Unit III Informed Search 10 h

Informed Search Strategies : Greedy Best First Search – A* Search – Memory Bounded Heuristic Search – Local Search Algorithms: Hill-Climbing Search – Simulated Annealing Search – Local Beam Search – Genetic Algorithms- Online Search Agents : Online Search Problems– Online local Search

Unit IV Constraint Satisfaction Problem(CSP) and Adversarial Search 10 h

Constraint Satisfaction Problem - Backtracking search for CSP's:Cryptarithmetic Problem- Graph Coloring – Local Search for Constraint Satisfaction Problem- Structure of Problems – Adversarial Search: Games –Optimal Decision in Games: Optimal Strategies – The Minmax Algorithm – Alpha-Beta Pruning –Imperfect - Real Time Decision: Evaluation Function – Cutting off Search

Unit V Knowledge and Reasoning 9 h

Logical Agents - Knowledge Based Agents – Logic – Propositional Logic: Syntax - Semantics - Inference -Equivalence, Validity and Satisfiability – Reasoning Patterns in Propositional Logic – First Order Logic : Syntax and Semantics of FOL – Using FOL

Text Books

1 Stuart.Russell, Peter.Norvig, (2020), "Artificial Intelligence-A Modern Approach,(3rd Edn.),Prentice Hall

References

1 Nilsson, N.J. (2011), Artificial Intelligence and New Systems, (1st Edn.), Elsevier.

2 Patterson, D.W.(2012), Introduction to Artificial Intelligence and Expert Systems, Prentice Hall of India

Course Code	Course Name	Category	L	T	P	Credit
194DA1A5DC	SOCIAL MEDIA ANALYTICS	DSE	4	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Evolution of Social Media
- Model and Visualize the Social Media
- Component of the social media

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the foundations of Social Media	K2
CO2	Analyze the Components used in Social Media	K4
CO3	Analyse Social Media Dashboards, Metrics and Reports.	K3
CO4	Describe the behavior of the user in social network	K1
CO5	Predict the outcomes of the social network	K3

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	M	S	M
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S Strong M Medium L Low

194DA1A5DC	SOCIAL MEDIA ANALYTICS	SEMESTER V

Total Credits: 4

Total Instruction Hours: 48 h

Syllabus

Unit I Social Media Data 9 h

Foundation of Analytics – Evolution of Data - Social Media Data Sources: Offline and Online – Defining Social Media Data – Data Sources into Social Media Channels – Estimated Vs Factual Data Sources – Public and Private Data – Data Gathering in Social Media Analytics – Application Programming Interface – Web Scraping or Crawling

Unit II Analytics in Social Media 10 h

Types of Analytics in Social Media – Social Media Listening: Keywords and Mention based Analysis – Advertising Analytics – Content Management Systems Analytics – Customer Relationship Management Analytics – Dedicated Vs Hybrid Tools – Advantages of Dedicated Tools –Hybrid Tools: Dedicated Tools with Hybrid Features – Advantages and Disadvantages of Hybrid Tools – Data Integration Tools

Unit III Metrics , Dashboards and Reports 10 h

Default and Custom metrics – Metric Categories :Divide and Conquer – Graph Types – Metrics and Strategy – Dealing with Complex and Subjective questions – Metric and Tactics – Dashboards: Defining Dashboard Objectives – Default Vs Custom Dashboards – Data integration Dashboard – Reports: Elements of Reporting – Element as Chain-Reporting Approaches – Goal Oriented –Story Telling Animation Effects in reporting-Reporting with Team

Unit IV Analyzing the Social Network-Facebook 10 h

Accessing the Facebook: Understanding the Graph API – Understanding the Netvizz – Data Access Challenge – Analyzing the Personal Social Network: Basic Descriptive Statistics – Analyzing the Mutual Interests – Build the friend network graph – Analyzing the Node Properties –Analyzing the network communities

Unit V Social Coding with GitHub 9 h

Environment Setup – Understanding the GitHub – Accessing GitHub Data – Registering an application in GitHub- Accessing the Data using the GitHub API – Analysis the repository Activities :Analyzing weekly commit frequency – Analyzing commit frequency distribution versus day of the week – Daily commit frequency – weekly code modification history – trending repository

Text Books

1. Alex GonCalves, (2017) , "Social Media Analytics Strategy Using Data to Optimize Business Performance", (1st Edn.), Apress.(Unit I-III)
2. Raghav Bali, Dipanjan Sarkar, Tushar Sharma,(2017), "Learning Social Media Analytics with R", (1st Edn.), Packt Publisher(Unit IV,V)

References

1. Marshall Sponder, (2012), "Social Media Analytics Effective Tools for Building Interpreting and using Metrics", Tata Mc Graw Hill.

Course Code	Course Category	Course Name	L	T	P	Exam (h)	Max Marks			Credits
							CIA	ESE	Total	
Sixth Semester										
Part – III										
194DA1A6CA	Core - XII	Data Visualization	5	-	-	3	25	75	100	4
194DA1A6CV	Core - XIII	Project Work	-	-	5	3	50	50	100	4
194DA1A6DA	DSE – II	Cloud Computing	5	-	-	3	25	75	100	4
194DA1A6DB		Machine Learning								
194DA1A6DC		Business Intelligence								
194DA1A6DD	DSE – III	Data Privacy and Security	5	-	-	3	25	75	100	4
194DA1A6DE		Natural Language Processing								
194DA1A6DF		Predictive Analytics								
194DA1A6CP	Core Practical - IX	Data Visualization	-	-	5	3	40	60	100	2
194DA1A6CQ	Core Practical - X	Analytics Tools	-	-	5	3	40	60	100	2
Part-V										
194DA1A6XA		Extension Activity	-	-	-	-	50	-	50	1
		Total	**15**	**-**	**15**	-	-	-	**650**	**21**
		Grand Total							**4400**	**140**

Course Code	Course Name	Category	L	T	P	Credit
194DA1A6CA	DATA VISUALIZATION	CORE	5	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The Complex Data Set in Web and other Data Sources
- The Methodology used to represent large Data Set
- The types and components of Visualization Tools.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts of Communication model	K2
CO2	Understand the methods for Visualizing data	K1
CO3	Apply Visualization data for various domains	K4
CO4	Design Interactive charts based on Data	K3
CO5	Design and Implement Dashboard and its Features	K4

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	M

S Strong M Medium L Low

194DA1A6CA	DATA VISUALIZATION	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Communication Data 12 h

Introduction- A Step in the process - A Model of Communication - Three Types of Communication Problems - Six Principles of Communicating Data - Handling Data - Gathering data : Finding sources- Data scraping- Formatting Data: Data formats- Formatting tools - Formatting with code

Unit II Ratios and Proportions 12 h

Ratios – Rates: Blending Data Source - Visualizing Rates - Proportions and Percentages: Introduction Filters and Quick Filters - Introducing Table Calculations - Proportions as waterfall charts using Gantt - Current-to-Historical - Actual-to-Target - Mean and Median: The Normal Distribution

Unit III Variations and Multiple Quantities 12 h

Variation: Visualizing Variation over Time: Control Charts – Anatomy of a control Chart – Creating a control chart - Understanding Uncertainty - Multiple Quantities: Scatterplots - Stacked Bars - Regression and Trend Lines - The Quadrant Charts

Unit IV Time Charts and Map Location 12 h

The Origin of Time charts - The Line charts - The Dual Axis Line chart - The Connected Scatterplots - The Date Filed Type - The Timeline - The Slope graph - Maps and Locations: Special Map - Circle Maps - Filled Maps - Dual Encoded Maps - A Dual Encoded Circle Maps

Unit V Dashboards 12 h

Dashboards - Types of Dashboards - Building and Exploratory Dashboards - Advanced Dashboards Features: Animating Dashboards - Showing Multiple Tabs - Adding Navigation with Filters - Custom Header Images - Adding Google Maps to Dashboards – Case Study

Text Books

1 Ben Jones, (2014),"Communication Data with Tableau", (1st Edn.), O'Reilly Media (Unit I)

2 Nathan Yau , (2011),"Visualize This : The Flowing Data guide to Design , Visualization and Statistics", (1st Edn.) Wiley (Unit II-V)

References

1 Steve Wexler , Jeffrey Shaffer, et al, (2017), "The Big Book of Dashboards: Visualizing Your Data Using Real-World Business Scenarios", Wiley.

2 Cole Nussbaumer Knaflic, (2015), "Storytelling with Data: A Data Visualization Guide for Business Professionals", John Wiley & Sons.

194DA1A6CV	PROJECT WORK	SEMESTER VI

Total Credits: 4

Total Instructional Hours 60 h

GUIDELINES:

1. A Guide has been allotted to each student by the department. Student can select any topic in discussion with the supervisor. Students should maintain a work diary were in weekly work carried out has to be written. Guide should review the work every week and put his/her signature. The work diary along with project report should be submitted at the time of viva voce.

2. CA Marks Distribution: A minimum of three reviews have to be done, one at the time finalizing the project title, second at framing questionnaire/identifying the primary data and the third review at the time of commencement of report writing. They should be asked to present the work doneto the respective guide in the three reviews. The guide will give the marks for CIA as per the norms stated below:

First Review	10 Marks
Second Review	10 Marks
Third Review	10 Marks
Document, Preparation and Implementation	20 Marks
Total	**50 Marks**

3. End Semester Examination: The evaluation for the end semester examination should be as per the norms Given Below:

Record work and Presentation	30 Marks
Viva-Voce	20 Marks
Total	**50 Marks**

Note: (End Semester Examination marks jointly given by the external and internal examiner).

Course Code	Course Name	Category	L	T	P	Credit
194DA1A6DA	CLOUD COMPUTING	DSE	5	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Basic Concepts of Cloud Computing and Services
- Cloud Computing Architectures, Applications and Challenges
- Cloud Storages and Explore File Sharing

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Learn the Fundamentals of Cloud and its working Environment	K1
CO2	Identify the usage of cloud	K2
CO3	Understand Cloud Services	K3
CO4	Illustrate the concepts of Storage and Sharing with Communities	K5
CO5	Evaluate Web based Communication Tools in cloud	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	M	S	M	S	M
CO3	S	S	M	S	M
CO4	S	S	M	S	S
CO5	M	S	S	S	S

S Strong M Medium L Low

194DA1A6DA	CLOUD COMPUTING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction 12 h

Cloud Computing :Introduction - From Collaboration to Cloud - Working of Cloud Computing –Advantages and Disadvantages - Benefits - Developing Cloud Services: Web Based Applications - - The Pros and Cons of Cloud Service Development - Discovering Cloud Services and Tools

Unit II Cloud Computing Usage 12 h

Centralizing Email Communications - Cloud Computing for Community - Collaborating on Schedules -Collaborating on Group Projects and Events - Cloud Computing for Corporation -Mapping Schedules- Managing the contact lists - Managing Projects – Collaborating on Reports – Collaborating on Presentations

Unit III Cloud Services 12 h

Collaborating on Calendars, Schedules and Task Management : Exploring Online Schedules Application - Exploring Online Planning and Task Management - Collaborating on Event Management - Collaborating on Project Management - Collaborating on Word Processing -Spreadsheets

Unit IV Storing and Sharing 12 h

Understanding Cloud Storage: Risks of Storing Data in the clouds -Evaluating Online File Storage and Sharing Services - Exploring online Bookmarking Services - Exploring Online Photo Editing Applications - Exploring Photo Sharing Communities -Controlling it with Web Based Desktops

Unit V Web based Communication Tools in cloud 12 h

Evaluating Web Mail Services - Evaluating Instant Messaging -Evaluating Web Conference Tools -Creating Groups on Social Networks : Creating Groups on Social Networks - Evaluating Online Groupware -Collaborating via Blogs and Wikis

Text Books

1 Michael Miller, (2014), “Cloud Computing”, Pearson Education, New Delhi.

References

1 ArshdeepBahga, (2013),"Cloud Computing: A Hands-On Approach Paperback – Import.

2 Anthony T. Velte, (2009), "Cloud Computing A Practical Approach", (1st Edn), Tata McGraw Hill Education Private Limited.

Course Code	Course Name	Category	L	T	P	Credit
194DA1A6DB	MACHINE LEARNING	DSE	5	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The Fundamentals of Machine Learning
- Supervised and Unsupervised Learning algorithms used for Classification, Prediction and Clustering
- Concepts of Artificial Neural Networks and Deep Learning.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic concepts of Machine Learning	K2
CO2	Identify suitable machine learning method for an application	K2
CO3	Implement Supervised and Unsupervised learning algorithms	K3
CO4	Analyze the performance of different machine learning algorithms	K4
CO5	Develop applications to solve real world problems using appropriate machine learning technique	K6

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	M
CO2	M	M	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	S

S Strong M Medium L Low

194DA1A6DB	MACHINE LEARNING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction to Machine Learning 11 h

Introduction - Types of Machine Learning: Supervised, Unsupervised and Reinforcement - Applications of Machine Learning – Machine Learning Activities- Basic Types of Data in Machine Learning – Exploring Structure of Data- Data quality and Remediation– Data Pre-Processing

Unit II Feature Engineering, Modeling and Evaluation 12 h

Introduction to Feature Engineering – Feature Transformation – Feature Subset Selection - Selecting a model – Training a model : Hold Out method – K fold Cross validation Method – Model Representation and Interpretability – Evaluating Performance of the model – Improving Model Performance

Unit III Supervised Learning : Classification, Regression 12 h

Introduction to Supervised learning – Classification Model – Classification learning steps: k – nearest neighbour – Decision Trees –Random Forest Model - Support Vector Machines- Regression: Introduction - Simple Linear Regression, Multiple linear Regression, Logistic Regression

Unit IV Unsupervised Learning : Clustering, Association Rules 12 h

Introduction – Supervised Vs Unsupervised learning- Applications of Unsupervised learning – Clustering: Types of Clustering – Partitioning methods- K-Medoids – Hierarchical clustering – DBSCAN –Finding patterns using Association rule : Association rule - Apriori algorithm

Unit V Neural Networks and Deep Learning 13 h

Introduction – Exploring the Artificial Neuron – Types of Activation Functions – Architectures of Neural Networks – Learning Process in ANN – Backpropagation – Deep learning : Shortcomings of Feature Selection – Vanilla Deep neural network issues –Filters and Feature maps – Convolutional layer

Text Books

1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, (2019), "Machine Learning", (1st Edn.), Pearson Publishers (Unit I-IV).
2. Nikhil Buduma,(2017), "Fundamentals of Deep Learning : Designing Next Generation Machine Intelligence Algorithms", (1st Edn.), O'Reilly Media(Unit-V)

References

1. Tom M. Mitchell, (1997), " Machine Learning", (1st Edn.), Tata McGraw-Hill
2. Suresh Samudrala,(2019), "Demystifying Machine Learning, Neural Networks and Deep learning", (1st Edn.), Notion Press.
3. Christopher M. Bishop, (2007), "Pattern Recognition and Machine Learning", (1st Edn.), Springer

Course Code	Course Name	Category	L	T	P	Credit
194DA1A6DC	BUSINESS INTELLIGENCE	DSE	5	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Concepts and components of business intelligence and decision support systems
- Technologies and practices for the analysis, presentation and interpretation of business information
- Emerging trends in business intelligence and the future impacts of business analytics

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the concepts of business intelligence, analytics and decision support for business applications	K2
CO2	Demonstrate business reporting, visual analytics and performance management for business applications	K3
CO3	Implement the various data mining and text mining concepts for business intelligence	K3
CO4	Examine business processes to develop business intelligence applications	K4
CO5	Create solutions for real world decision making problems using business intelligence tools	K6

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	M	S
CO2	M	S	M	S	S
CO3	M	S	S	S	M
CO4	M	S	S	S	S
CO5	M	S	S	S	S

S Strong M Medium L Low

194DA1A6DC	BUSINESS INTELLIGENCE	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Overview of Business Intelligence, Analytics and Decision Support 12 h

Changing Business Environments and Computerized Decision Support – An early framework for computerized Decision Support – Concept of Decision Support Systems(DSS) - Framework for Business intelligence –Business Analytics overview – DSS Capabilities - DSS classification – DSS components

Unit II Business Reporting, Visual Analytics and Business Performance Management 12 h

Business Reporting Definitions and Concepts - Data and Information Visualization - Different Types of Charts and Graphs - The Emergence of Data Visualization and Visual Analytics - Performance Dashboards - Business Performance Management - Performance Measurement - Balanced Scorecards - Six Sigma as a Performance Measurement System

Unit III Predictive Analytics 12 h

Data Mining Concepts and Applications - Data Mining Process – Data mining methods – Data Mining Privacy issues, myths - Text Analytics concepts- Text Mining applications – Text Mining process – Sentiment Analysis overview – Sentiment Analysis applications – Sentiment Analysis process

Unit IV Prescriptive Analytics 12 h

Model-Based Decision Making –Structure of Mathematical models for decision support-Multiple goals, Sensitivity analysis, What-if-analysis and Goal seeking-Decision analysis with Decision tables and Decision trees – Problem solving search methods - Simulation – Concepts of Expert systems-Applications of Expert systems

Unit V Emerging Trends and Future Impacts in Business Analytics 12 h

Location Based Analytics for Organizations - Analytics Applications for Consumers - Recommendation Engines - The Web 2.0 revolution and Online Social Networking - Cloud Computing and BI - Impacts of Analytics in Organizations - Issues of Legality, Privacy and Ethics – Case Study

Text Books

1 Efraim Turban, Ramesh Sharda, Dursun Delen, (2018), "Business Intelligence and Analytics: Systems for Decision Support", (10th Edn.), Pearson.

References

1 Efraim Turban, Ramesh Sharda, Dursun Delen, (2013), "Decision Support and Business Intelligence Systems", (9th Edn), Pearson Publications.

2 David Loshin, (2012), "Business Intelligence: The Savvy Manager‟s Guide", (2nd Edn), Morgan Kaufmann Publishing

3 Carlo Vercellis, (2009), "Business Intelligence: Data Mining and Optimization for Decision Making", (1st Edn), Wiley Publications

Course Code	Course Name	Category	L	T	P	Credit
194DA1A6DD	DATA PRIVACY AND SECURITY	DSE	5	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- Secure computer systems that protect information and resist attacks
- A Comprehensive overview of the different facets of Information Security
- Types of ciphers and digital certificates

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Explain the role of Information Security in organization	K2
CO2	Illustrate risk management process handled in the organization with business continuity planning	K3
CO3	Define authentication and explain the three commonly used authentication factors	K3
CO4	Explore various types of ciphers and encipherment techniques	K4
CO5	Learn the concept of digital certificates and its usage.	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	S
CO2	S	M	M	S	S
CO3	S	M	M	S	S
CO4	S	M	M	S	S
CO5	S	M	M	S	S

S Strong M Medium L Low

194DA1A6DD	DATA PRIVACY AND SECURITY	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Information Security 12 h

Introduction - History of Information Security– Security - Components of an Information System - Balancing Information Security and Access- The Systems Development Life Cycle - The Security Systems Development Life Cycle - Security Professionals and Organization

Unit II Risk Management 12 h

Introduction - Risk Identification: Planning and Organizing the Process - Identifying, Inventorying and Categorizing Assets- Classifying, Valuing, and Prioritizing Information Assets - Identifying and Prioritizing Threats - Specifying Asset Vulnerabilities - Risk Assessment- Risk Control: Strategies - Selecting Risk Control Strategies - Quantitative versus Qualitative Risk Control Strategies

Unit III Security Technology : Access Controls, Firewalls and VPNs 12 h

Introduction - Access Control: Access Control Mechanisms - Biometrics - Firewalls - Application Layer Proxy Firewalls- Media Access Control Firewalls - Hybrid firewalls Architecture - Selecting the Right Firewall - Configuring and Managing Firewalls - Protecting Remote Connections: Virtual Private Networks

Unit IV Cryptography Techniques 12 h

Introduction: Plain Text and Cipher Text - Substitution Techniques - Transposition Techniques - Encryption and Decryption - Symmetric and Asymmetric Key Cryptography - Steganography, Possible Types of Attacks

Unit V Public Key Infrastructure 12 h

Digital Certificates : Introduction - The Concept of Digital Certificates - Certification Authority(CA),Technical details of digital Certificate - Digital Certificate Creation - Trust Digital Certificates - Certificate Hierarchies and Self - Signed Digital Certificates - Certificate Types Private Key Management- The PRIX Model - Public Key Cryptography Standards (PKCS)

Text Books

1. Michael E Whitman and Herbert J Mattord, (2019), "Principles of Information Security", (6th Edn), Course Technology, Cengage Learning. (Unit I –III).
2. Atul Kahate, (2006),"Cryptography and Network Security", (4th Edn.), Tata McGraw Hill.(Unit IV –V)

References

1. William Stallings, "Cryptography and Network Security: Principles and Practice", (6th Edn), Pearson Education
2. John R Vacca ,(2013),"Computer and Information Security Handbooks",(2nd Edn.), Elsevier

Course Code	Course Name	Category	L	T	P	Credit
194DA1A6DE	NATURAL LANGUAGE PROCESSING	DSE	5	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The fundamental concepts and techniques of Natural Language Processing(NLP)
- The various strategies for NLP system evaluation and error analysis
- The various strategies of Natural Language Generation (NLG) and Machine translation approaches.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic standard notation for characterizing text sequences	K1
CO2	Describe word and sentence tokenization, and spelling error detection	K2
CO3	Evaluate N-gram language models by separating into training and test set	K3
CO4	Outline the concepts of phonetics and speech synthesis	K4
CO5	Relate NLG applications and machine translation approaches	K5

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	M
CO2	S	M	M	S	M
CO3	S	S	M	S	M
CO4	S	S	M	S	S
CO5	S	S	M	S	S

S Strong M Medium L Low

194DA1A6DE	NATURAL LANGUAGE PROCESSING	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction 12 h

Knowledge in Speech and Language Processing – Models and Algorithms – Language, Thought and Understanding - History – Natural Language Processing (NLP) Applications – Challenges of NLP – Regular Expressions and Automata: Regular Expressions – Finite-State Automata (FSA) – Regular Languages and FSAs.

Unit II Words and Transducers 12 h

Finite-State Morphological Parsing – Construction of a Finite-State Lexicon -Finite-State Transducers - Sequential Transducers and Determinism - FSTs for Morphological Parsing -Transducers and Orthographic Rules - Combining FST Lexicon and Rules - Lexicon-Free FSTs -Word and Sentence Tokenization -Detecting and Correcting Spelling Errors -Minimum Edit Distance.

Unit III Word Processing 12 h

N-Grams – Word Counting – Training and Test sets – Evaluating N-Grams – Smoothing – Parts of Speech(PoS) Tagging: English word classes – Tagsets – PoS Tagging – Rule based POS tagging – HMM(Hidden Markov Model) PoS tagging – Transformation based tagging – Evaluation and error analysis.

Unit IV Speech 12 h

Phonetics: Articulatory phonetics – Phonological categories and Pronunciation Variation - Speech Synthesis: Text Normalization – Phonetic Analysis – Prosodic analysis - Automatic Speech Recognition – Architecture- HMM Applied to speech

Unit V Natural Language Generation(NLG) and Machine Translation 12 h

Architecture of NLG Systems –Generation Tasks and Representations – Applications of NLG – Machine Translation(MT): Problems in Machine Translation – Machine Translation Approaches – Direct – Rule-based – Corpus Based – Semantic or Knowledge-based MT systems.

Text Books

1. Daniel Jurafsky, James H Martin, (2009), “Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech Recognition”, (2nd Edn.), Pearson Education Inc.

2. Tanveer Siddiqui, U.S. Tiwary, (2008), "Natural Language Processing and Information Retrieval", Oxford University Press.

References

1. James Allen, “Natural language Understanding” ,(1994), (2nd Edn), Pearson Education

2. Steven Bird, Ewan Klein and Edward Loper, (2009), “Natural Language Processing with Python”, (1st Edn), O'Reilly Media

Course Code	Course Name	Category	L	T	P	Credit
194DA1A6DF	PREDICTIVE ANALYTICS	DSE	5	-	-	4

PREAMBLE

This course has been designed for students to learn and understand

- The process to formulate business objectives, design, build, evaluate and implement predictive models
- Extract information from data to predict trends and behavior patterns
- Use of data, statistical algorithms and machine learning techniques

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the fundamentals concepts of predictive analytics	K1
CO2	Provides a foundation for data summarizing and identifying potential problems in data	K2
CO3	Build and interpret descriptive models	K3
CO4	Analyze data using various predictive modeling algorithms	K4
CO5	Outline the concepts of Text Mining	K2

MAPPING WITH PROGRAMME OUTCOMES

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	S	S	M	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S Strong M Medium L Low

194DA1A6DF	PREDICTIVE ANALYTICS	SEMESTER VI

Total Credits: 4

Total Instruction Hours: 60 h

Syllabus

Unit I Introduction 11 h

Overview of Predictive Analytics – Predictive Analytics vs. Business Intelligence – Predictive Analytics vs. Statistics – Predictive Analytics vs. Data Mining – Challenges in Using Predictive Analytics – Predictive Analytics Processing Steps – Defining Data – Defining the Target Variable – Defining Measures of Success for Predictive Models - Case Study: Fraud Detection

Unit II Data Understanding and Preparation 12 h

Single Variable Summaries – Data Visualization in One Dimension – Histograms – Multiple Variable Summaries – Data Visualization, Two or Higher Dimensions : Scatter Plots – Scatter Plot Matrices –Overlaying the target Variable – Scatterplots in more than two dimensions - The Value of Statistical Significance – Data Preparation: Variable Cleaning – Feature Creation

Unit III Descriptive Modeling 12 h

Data Preparation Issues with Descriptive Modelling – Principal Component Analysis – Clustering Algorithms – Interpreting Descriptive Models– Standard Cluster Model Interpretation: Problems with interpretation methods –Identifying Key variables informing cluster Models – Cluster Prototypes - Cluster Outliers

Unit IV Predictive Modeling 13 h

Decision Trees – Logistic Regression: Interpreting Logistic Regression Models – Practical Consideration for Logistics Regressions – Neural Networks – K-Nearest Neighbor – Naïve Bayes – Regression Models – Linear Regression: Assumptions – Variable Selection –Interpreting Linear Regression Model –Linear Regression for Classification

Unit V Text Mining 12 h

Introduction – A Predictive Modeling Approach to Text mining - Structured vs. Unstructured Data –Text Mining Applications –Data Sources for Text Mining - Data Preparation Steps – Text Mining Features – Modeling with text Mining Features – Regular Expressions - Survey Analysis Case Study – Help Desk Case Study

Text Books

1 Dean Abbott,(2014),"Applied Predictive Analytics: Principles and Techniques for the Professional Data Analyst", John Wiley & Sons Inc.

References

1 Eric Siegel, (2015), "Predictive Analytics", Wiley.

2 Daniel T. Larose, "Data Mining and Predictive Analytics", (1st Edn), Wiley

194DA1A6CP	CORE PRACTICAL : DATA VISUALIZATION	SEMESTER VI

Total Credits: 2
Total Instructions Hours: 60h

S.No	Contents
1	Construct a tree map and create appropriate hierarchical views and explore the data and visualization.
2	Construct an Excel file and use Tableau to create a bar chart version showing the same hierarchy as your tree map, coloring it to emphasize similar results.
3	Differentiate two versions having similar functionality by adding filters.
4	Make a visualization showing the total number of calls, separated by incoming and outgoing
5	Make a visualization showing the largest number of outgoing calls.
6	Make a visualization showing the most calls at the specific time block.
7	Use the grouping function for applications (subgroup under Branch).
8	Review the data and make visualization(s) that supports downsizing the company by laying off one branch.
9	Review the data and make a visualization(s) that supports recommending one employee for employee of the month honors.
10	Make a dash board and add elements to a dashboard containing visualizations.

Note: Out of 10 – 8 Mandatory

194DA1A6CQ	CORE PRACTICAL : ANALYTICS TOOLS	SEMESTER VI

Total Credits: 2
Total Instructions Hours: 60 h

S.No	Contents
1	Program to create Resilient Distributed Databases (RDD) and perform transformations like filter, sort, reduce, sample and union.
2	Program to create RDD and perform RDD action methods.
3	Program to create Spark data frame from RDD and perform update, drop, filter functions
4	Program to perform pivoting in Spark data frame
5	Program to find the frequency of each word that exists in a particular file
6	Program to load a CSV file into Spark RDD and read the contents
7	Program to create , update and alter key spaces
8	Program to create tables and perform CRUD operations
9	Program to perform operations with collections like set and list
10	Program to perform operations with map data type.
11	Program to create, alter and delete a user defined data type
12	Program to create composite keys and cluster the data

Note: Out of 12 – 10 Mandatory

23/12/21
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