JSS Mahavidyapeetha

JSS Science and Technology University

JSS TI Campus, Mysuru - 570 006

Bachelor of Computer Applications

Scheme & Syllabus

2020-2023

Scheme of Teaching and Examination

First Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA110	Indian Language – Kannada -I	Kannada	2	0	0	2.0	2	50	50	50	1.5
2.	BCA120	English Language - I	English	2	0	0	2.0	2	50	50	50	1.5
3.	BCA130	Mathematics – I	Mathematics	4	0	0	4.0	4	50	50	100	3
4.	BCA140	Programming Language	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA150	Computer Fundamentals and Problem Solving	CA	4	0	0	4.0	4	50	50	100	3
6.	BCA160	Soft Skills I – (Professional Communication)	CA	2	0	0	2.0	2	50	50	50	1.5
7.	BCA170	Indian Constitution*	Law	0	0	0	0.0	2	50	00	50	-
8.	BCA12L	English Laboratory	English	0	0	1	1.0	2	50	00	50	-
9.	BCA14L	Programming Language Laboratory	CA	0	0	1	1.0	2	50	00	50	-
10.	BCA15L	Computer Fundamentals Laboratory	CA	0	0	1	1.0	2	50	00	50	-
Total				18	0	3	21	26	500	300	650	-

*Marks secured in the subject will not be considered for awarding class.

Scheme of Teaching and Examination

Second Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA210	Indian Language –Kannada –II	Kannada	2	0	0	2.0	2	50	50	50	1.5
2.	BCA220	English Language - II	English	2	0	0	2.0	2	50	50	50	1.5
3.	BCA230	Mathematics-II	Mathematics	4	0	0	4.0	4	50	50	100	3
4.	BCA240	Object Oriented Programming with C++	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA250	Data Structures	CA	4	0	0	4.0	4	50	50	100	3
6.	BCA260	Operating System	CA	4	0	0	4.0	4	50	50	100	3
7.	BCA270	Soft Skills – II (Professional Ethics)	CA	2	0	0	2.0	2	50	50	50	1.5
8.	BCA280	Environmental Studies*	Environmental	0	0	0	0.0	2	50	00	50	-
9.	BCA24L	Object Oriented Programming Laboratory	CA	0	0	1	1.0	2	50	00	50	-
10.	BCA25L	Data Structures Laboratory	CA	0	0	1	1.0	2	50	00	50	-
Total				22	0	2	24	28	500	350	700	-

*Marks secured in the subject will not be considered for awarding class.

Scheme of Teaching and Examination

Third Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA310	Indian Language –Kannada –III	Kannada	2	0	0	2.0	2	50	50	50	1.5
2.	BCA320	Database Management System	CA	4	0	0	4.0	4	50	50	100	3
3.	BCA330	Mathematics - III	Mathematics	4	0	0	4.0	4	50	50	100	3
4.	BCA340	Java Programming	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA350	Analysis and Design of Algorithms	CA	4	0	0	4.0	4	50	50	100	3
6.	BCA360	Data Communications and Networking	CA	4	0	0	4.0	4	50	50	100	3
7.	BCA32L	Database Management System Laboratory	CA	0	0	1	1.0	2	50	00	50	-
8.	BCA34L	Java Programming Laboratory	CA	0	0	1	1.0	2	50	00	50	-
9.	BCA35L	Algorithms Laboratory	CA	0	0	1	1.0	2	50	00	50	-
Total				22	0	3	25	28	450	300	700	-

Scheme of Teaching and Examination

Fourth Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA410	Indian Language –Kannada –IV	Kannada	2	0	0	2.0	2	50	50	50	1.5
2.	BCA420	Data Warehouse and Mining	CA	4	0	0	4.0	4	50	50	100	3
3.	BCA430	Management Information System	CA	4	0	0	4.0	4	50	50	100	3
4.	BCA440	Python Programming	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA450	Cloud Computing	CA	4	0	0	4.0	4	50	50	100	3
6.	BCA460	Foreign Language	Language	2	0	0	2.0	2	50	50	50	1.5
7.	BCA42L	Data Warehouse and Mining Laboratory	CA	0	0	1	1.0	2	50	00	50	-
8.	BCA44L	Python Programming Laboratory	CA	0	0	1	1.0	2	50	00	50	-
Total				22	0	2	22	26	400	300	650	-

Scheme of Teaching and Examination

Fifth Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA510	Data Analysis & Visualization	CA	4	0	0	4.0	4	50	50	100	3
2.	BCA520	Fundamentals of Machine Learning	CA	4	0	0	4.0	4	50	50	100	3
3.	BCA530	Software Engineering	CA	4	0	0	4.0	4	50	50	100	3
4.	BCA540	Web Programming	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA51L	Data Analytics Laboratory	CA	0	0	1	1.0	2	50	-	50	-
6.	BCA54L	Web Programming Laboratory	CA	0	0	1	1.0	2	50	-	50	-
7.	BCA56P	Mini Project	CA	0	0	2	2.0	2	50	-	50	-
Total				16	0	4	20	22	350	200	550	-

Scheme of Teaching and Examination

Sixth Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Weekly Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA610	Entrepreneurship & Leadership	CA	4	0	0	4.0	4	50	50	100	3
2.	BCA620	Big Data Analytics	CA	4	0	0	4.0	4	50	50	100	3
3.	BCA630	Project Work	CA	0	0	15	15.0	4	100	150	250	1
Total				8	0	15	23.0	12	200	250	400	-

Credit Pattern for BCA Course

Semester	Credits
1	21
2	24
3	25
4	22
5	20
6	23
Total	135

I Semester
Grid and Syllabus

Scheme of Teaching and Examination

First Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA110	Indian Language – Kannada -I	Kannada	2	0	0	2.0	2	50	50	50	1.5
2.	BCA120	English Language - I	English	2	0	0	2.0	2	50	50	50	1.5
3.	BCA130	Mathematics – I	Mathematics	4	0	0	4.0	4	50	50	100	3
4.	BCA140	Programming Language	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA150	Computer Fundamentals and Problem Solving	CA	4	0	0	4.0	4	50	50	100	3
6.	BCA160	Soft Skills I – (Professional Communication)	CA	2	0	0	2.0	2	50	50	50	1.5
7.	BCA170	Indian Constitution*	Law	0	0	0	0.0	2	50	00	50	-
8.	BCA12L	English Laboratory	English	0	0	1	1.0	2	50	00	50	-
9.	BCA14L	Programming Language Laboratory	CA	0	0	1	1.0	2	50	00	50	-
10.	BCA15L	Computer Fundamentals Laboratory	CA	0	0	1	1.0	2	50	00	50	-
Total				18	0	3	21	26	500	300	650	-

*Marks secured in the subject will not be considered for awarding class.

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	I	Theory	02	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA110	Indian Language – Kannada -I	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: ದೇಶಾಭಿಮಾನ, ಭಾಷಾಭಿಮಾನ, ಸಂಬಂಧಗಳ ಮಹತ್ವದ ಅರಿವು.
CO 2: ಸಾಮಾಜಿಕ ಬದುಕಿನ ಅರಿವಿನೊಟ್ಟಿಗೆ ಸ್ವಾಸ್ಥ್ಯ ಸಮಾಜದ ಚಿಂತನೆಗೆ ಒರೆ ಹಚ್ಚುವುದು.
CO 3: ಸಾಂಸ್ಕೃತಿಕ ವೈವಿಧ್ಯತೆಯ ಪರಿಚಯ
CO 4: ಸಂವಹನ ಕೌಶಲ್ಯದ ಬೆಳವಣಿಗೆ
CO 5: ಸಂದರ್ಶನ, ನಿರೂಪಣಾ ಕೌಶಲ್ಯ ವೃದ್ಧಿ

TOPICS COVERED:

UNIT:1 – **05 Hours**

ಕಾವ್ಯ—೧. ಕನ್ನಡ ಪದಗೊಳ್ -- ಜಿ.ಪಿ. ರಾಜರತ್ನಂ
2.ಮಾವನ ಮನೆಯಲ್ಲಿ -- ಕೆ.ಎಸ್. ನರಸಿಂಹಸ್ವಾಮಿ
3.ಗುಬ್ಬಿ---------- ಚೆನ್ನವೀರ ಕಣವಿ

UNIT:2 – **05 Hours**

ಸಣ್ಣ ಕಥೆಗಳು–೧. ಧ್ವನ್ವಂತರಿಯ ಚಿಕಿತ್ಸೆ --- ಕುವೆಂಪು
೨. ಅಲೆಕ್ಸಾಂಡರನ ಗುರುದಕ್ಷಿಣೆ -- ಮಾಸ್ತಿ ವೆಂಕಟೇಶ ಅಯ್ಯಂಗಾರ್

UNIT:3 - **06 Hours**

ಪ್ರವಾಸ ಕಥನ--ನಾನೂ ಅಮೇರಿಕಾಗೆ ಹೋಗಿದ್ದೆ---- ಕೃಷ್ಣನಂದ ಕಾಮತ್

UNIT:4 - **05 Hours**

ಭಾಷಾಕೌಶಲ್ಯ (ಲಿಖಿತ ಚಟುವಟಿಕೆಗಳು)—೧. ನುಡಿಗಟ್ಟುಗಳು–ಪದಗಳನ್ನು ಬಳಸಿಕೊಂಡು ಸಣ್ಣ ವಾಕ್ಯಗಳ ರಚನೆ.
ಪರ್ಯಾಯ ಪದಗಳನ್ನು ಬರೆಯುವುದು
೨.ಪತ್ರಗಳ ರಚನೆ: ವೈಯಕ್ತಿಕ ಪತ್ರ, ವ್ಯವಹಾರ ಪತ್ರ
೩.ರಸಪ್ರಶ್ನೆಗಳ ಕಾರ್ಯಕ್ರಮ

UNIT:5 – **05Hours**

ಭಾಷಾಕೌಶಲ್ಯ (ಮೌಖಿಕ ಚಟುವಟಿಕೆಗಳು)—೧.ಸಹಜ ಭಾಷಾ ಬಳಕೆ
೨.ಮಾದರಿ ಸಂದರ್ಶನ
೩.ಗುಂಪು ಚರ್ಚೆ
೪.ವಚನಗಳು
೫.ನಿರೂಪಣೆ

TEXT BOOKS / REFERENCES:

Text books: 1.ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ "ಹೊಸಗನ್ನಡ ಸಾಹಿತ್ಯ ಸಂಪುಟ"
2.ಪ್ರವಾಸ ಕಥನ–"ನಾನೂ ಅಮೇರಿಕಾಗೆ ಹೋಗಿದ್ದೆ"–ಕೃಷ್ಣಾನಂದ ಕಾಮತ್

Reference books: 1. ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ–ರಂ.ಶ್ರೀ.ಮುಗಳಿ
2.ತಾಂತ್ರಿಕ ಕನ್ನಡ–ಪಾಲಿಟೆಕ್ನಿಕ್ ಡಿಪ್ಲೊಮ ಕೋರ್ಸಿನ 3 ಮತ್ತು 4ನೇ ಸೆಮಿಸ್ಟರ್ ಪಠ್ಯ

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	I	Theory	02	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA120	English Language - I	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understanding of the Grammar & Vocabulary.
CO 2: Understanding of the Functional English.
CO 3: Understanding of the Poetry.
CO 4: Understanding of the Prose-Short stories.

TOPICS COVERED:

UNIT:1 – 05 Hours

Grammar & Vocabulary:
1. Parts of speech: Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, and Interjection.
2.Articles
3. Verbs in relation to Tenses
4. Usage of Prepositions, Adjectives
5.Reading: Comprehension of unseen passages, reading tracts

UNIT:2 – 06 Hours

Functional English:
1. Vocabulary Usage: Homonyms, homographs, homophones, prefixes, suffixes
2. Paragraph writing, Essay writing
3. Expansion of ideas, proverbs
4. Words often confused.
5. Group discussion, extempore speech, debates

UNIT:3 – 05 Hours

Poetry:
1. Where the mind is without fear- Rabindranath Tagore
2. I wandered lonely as a cloud- William Wordsworth
3. When in disgrace (sonnet 29) -WilliamShakespeare

UNIT:4 – 10 Hours

Prose-Short stories:
1. With the photographer-Stephen Leacock
2. A snake in the grass-R.K.Narayan
3. The Clay mother-in-law: A South Indian Folktale (collected by A.K. Ramanujan)

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	I	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA130	Mathematics I	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Find the n^{th} derivative of given functions.

CO 2: Understand polar curves and use these concepts to find different parameters

CO 3: Evaluate integrals of powers of trigonometric functions and use it to find area, surface area and volume.

CO 4: Apply concepts of functions of several variables to calculate rate of change of multivariate functions.

CO 5: Handle matrix computations that come up in linear algebra like accurate / approximate solutions of systems of linear equations, eigenvalues, eigenvectors, inverses, etc

TOPICS COVERED:

UNIT:1 – 08 Hours

Recapitulation of Limit and Continuity, Differentiability of functions. Successive differentiation: Leibnitz Theorem (without proof)-Problems, increasing and decreasing functions.

UNIT:2 – 10 Hours

Polar Coordinates- angle between the radius vector and the tangent, angle between polar curves, length of perpendicular from pole to the tangent, orthogonality of curves & pedal equations.

UNIT:3 - 10 Hours

Reduction formulae for $Sin^{n}x$, $Cos^{n}x$, $Sin^{m}xCos^{n}x$. Leibnitz's rule for differentiation under the integral sign.

UNIT:4 - 12 Hours

Partial derivatives–Homogeneous functions – Euler's theorem, total derivatives, Differentiation of implicit functions and composite functions, Jacobians.

UNIT:5 – 12 Hours

Elementary row and column operations, equivalent matrices, invariance of rank under

elementary operations, determination of rank of a matrix by reducing it to the echelon form. Homogeneous and non-Homogeneous systems of ‘m’ linear equations in ‘n’ unknowns, criterion for uniqueness of solutions. Eigen values and Eigen vectors of a square matrix, standard properties, reduction of matrix to diagonal form, Cayley-Hamilton theorem (without proof), and applications.

TEXT BOOKS / REFERENCES:

1. A Textbook of B Sc Mathematics, Volume 1 & 2, G K Ranganath
2. LipmanBers – Calculus, Volumes 1 and 2

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	I	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA140	Programming Language	----

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Gain fundamental knowledge on basic programming aspects and storage classes.
CO 2: Understand the basic terminologies used in computer programming, write, compile and debug programs in C language.
CO 3: Use different data types in a computer program.
CO 4: Design programs involving decision structures, loops and functions.
CO 5: Understand and use the dynamics of memory by the use of pointers.

TOPICS COVERED:

Unit - I **10 Hours**

Introduction to Programming Concepts:

Software, Classification of Software, Modular Programming, Structured Programming, Algorithms and Flowcharts with examples. Overview of C Language: History of C, Character set, C tokens, Identifiers, Keywords, Data types, Variables, Constants, Symbolic Constants , Operators in C, Hierarchy of Operators, Expressions, Type Conversions and Library Functions.

Unit - II **12 Hours**

Managing Input and Output Operation:

Formatted and Unformatted I/O Functions, Decision making, branching and looping: Decision Making Statements - if Statement, if–else statement, nesting of if-else statements, else–if ladder, switch statement, operator, Looping - while, do-while, for loop, Nested loop, break, continue, and goto statements. Functions: Function Definition, prototyping, types of functions, passing arguments to functions, Nested Functions, Recursive functions.

Unit - III **08 Hours**

Arrays:

Declaring and Initializing, One Dimensional Arrays, Two Dimensional Arrays, Multi Dimensional Arrays - Passing arrays to functions. Strings: Declaring and Initializing strings, Operations on strings, Arrays of strings, passing strings to functions. Storage Classes - Automatic, External, Static and Register Variables.

Unit-IV **10 Hours**

Structures-Declaring and Initializing, Nested structure, Array of Structure, Passing Structures to functions, Unions, typedef, enum, Bit fields. Pointers – Declarations, Pointer arithmetic, Pointers and functions, Call by value, Call by reference, Pointers and Arrays, Arrays of Pointers, Pointers and Structures. Meaning of static and dynamic memory allocation, Memory allocation functions.

Unit-V **12 Hours**

Files - File modes, File functions, and File operations, Text and Binary files, Command Line arguments. C Preprocessor directives, Macros – Definition, types of Macros, Creating and implementing user defined header files.

TEXT BOOKS / REFERENCES:

Text books:

1. Programming in ANSI C, Third Edition, E.Balaguruswamy. 6th Edition (2013)
2. The C Programming Language, Brian W Kernighan, Dennis M Rtchie, PHI, 2nd Edition.

Reference books:

1. Let us C, 4th Edition, Yashwanthkanetkar.
2. Programming with C, Byron Gottfried, Tata McGraw-Hill edition.

ADDITIONAL LEARNING SOURCES:

1. http://www.worldbestlearningcenter.com/index_files/c_tutorial_lesson.htm
2.http://www.cluster2.hostgator.co.in/files/writeable/uploads/hostgator99706/file/letusc-yashwantkanetkar.pdf

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	I	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA150	Computer Fundamentals and Problem Solving	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Analyze the computer basics, processes and devices used with computers
CO 2: Discern operations of computers and importance of hardware components
CO 3: Apply the concept of Problem solving and steps involved for algorithm development
CO 4: Design and Analyze developing an algorithm with logic structures
CO 5: Chose the concept of flowchart development and basic programming structures for efficient problem solving

TOPICS COVERED:

Unit-1 **12 Hours**

Introduction to Computers: History of development of Computers Computer as multipurpose tool -Overview of the Computer system — looking inside the machine - Software brings machine to life - shapes of Computer today .
Processing Data : Transforming data into information - How a Computer processes data - factors affecting processing speed - CPU's used in personal Computers.
Interacting with Computer :The Keyboard - the mouse - other input devices - The monitor - Printers - Sound systems - Connecting I/O devices to the Computer.
Storing information in a Computer: Types of storage devices - Magnetic storage devices, Optical Storage devices, measuring device performance.

Unit-2 **06 Hours**

Operating System and the user interface: What is an Operating System - the use interface - running programs - managing files - managing hardware - Enhancing the operating system with utility Software - typical operating systems in use.

Unit-3 **12 Hours**

Introduction to Problem Solving and Programming : Problem Solving Concepts – Problem Solving in everyday life, types of problems, problem solving concepts for computers, Algorithms and Flow charts; Programming Concepts.

Unit-4 **10 Hours**

Logic Structures: Introduction to Programming structure – Modules and their functions – Local

and Global Variables – Four Logic structures – Problems solving with Sequential and Decision Logic Structures.

Unit-5 **12 Hours**

Loop & Case Logic Structure : Loop Logic structure – While/While Wend Structure, Repeat /Until Structure, Automatic Counter loop, Nested Loops and Recursion.

Array Data Structure & File Concepts: Processing Arrays – Arrays, one dimensional arrays, 2Darrays, Multidimensional arrays – Searching and Sorting Techniques. Definition – Record, File – Primary and Secondary Keys – Sequential Access File Applications.

TEXT BOOKS / REFERENCES:

Text books:

1. Computer Fundamentals - P K Sinha,BPB
2. Computers Today - Suresh K Basandra, Galgotia. Maureen Sprankle, Problem solving and Programming Concepts, Pearson Education, New Delhi.
3. Dromey – How to solve it by computer –PHI

Reference books:

1. Introduction to Computers - N Subramanian,TMH
2. Understanding Computers - R Rajagopalan. TMH
3. Computers Today - Donald Sanders, MGH
4. Compilation Notes, Department of Information Technology, SRM University.

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/
2. http://nptel.ac.in/

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Theory	02	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA160	Soft skills –I (Professional Communication)	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Enhance the qualities of technical communication and remove barriers.
CO 2: Apply technology for improvement of Communication.
CO 3: Advances the effective presentation strategies using various tools.
CO 4: Understanding the importance of listening.
CO 5: Apply Group discussion strategies.

TOPICS COVERED:

Unit:1: **05 Hours**
Introduction, Process of Communication, Language as a Tool, Levels of Communication, Communication Networks, Importance of Technical Communication. Definition of Noise, Classification of Barriers.

Unit:2: **05 Hours**
Impact of Technology, Software for Creating Messages, Software for Writing Documents, Software for Presenting Documents, Transmitting Documents, Effective use of Available Technology.

Unit:3: **05 Hours**
Introduction, Types of Listening, Traits of good Listener, Active versus passive listening, implications of effective listening.

Unit:4: **05Hours**
Effective Presentation: Introduction, Defining purpose, Analyzing Audience and Locale, Organizing Contents, preparing outline, Visual Aids, Understanding Nuances of Delivery, Kinesics, Proxemics, Paralinguistic's, Chronemics, Sample speech.

Unit:5: **05 Hours**
Group discussion: Introduction, Group Discussion types, Organizational Group discussion, Group discussion as part of selection process.

TEXT BOOKS / REFERENCES:

1. Meenakshi Raman and Sangeeta Sharma: Technical Communication - Principles and Practices, Oxford University Press, 2010.
2. M.Ashraf Rizivi: Effective Technical Communication, Tata McGraw Hill, 2009.

ADDITIONAL LEARNING SOURCES:

1. www.coursehero.com
2. www.studocu.com

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	I	Theory	00	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA170	Indian Constitution	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Importance of Indian Constitution and its overall view of Constitutional developments.
CO 2: Democratic institutions created by the Constitution.
CO 3: Fundamental Rights and Duties
CO 4: Enforcing rights through writs and Principles of State Policy.
CO 5: Doctrine of Separation of Powers and Features of Indian Federalism.

TOPICS COVERED:

Unit:1 **12 Hours**

Meaning of the term —Constitution-Its importance-making of the Indian Constitution 1946-49-Dr.Ambedkar‘s contribution-Preamble-Method of amending the constitution and its limitation-An over view of constitutional developments.

Unit:2 **10 Hours**

The democratic institutions created by the Constitution-bicameral system of legislature and cabinet form of government at the Center and States-Role and Position of President and Prime Minister-Adult Franchise System-Election Commission, Panchayat Raj System.

Unit:3 **08 Hours**

Fundamental Rights and Duties- Their content and significance-Special, rights created in the constitution for Dalits, Backwards, Women, Children and the Religious and Linguistic Minorities.

Unit:4 **10 Hours**

Enforcing rights through writs: Certiorari, Mandamus, Quo Warranto and Habeas Corpus-public interest Litigation-Directive Principles of State Policy-The need to balance Fundamental Rights with Directive Principles-Constitution and sustainable development.

Unit:5 **12 Hours**

Doctrine of Separation of Powers-Legislative, Executive and Judicial and their composition and functioning in India-Features of Indian Federalism-Center State relations. Measures for national Unit-Public Service Commissions.

TEXT BOOKS / REFERENCES:

1. J.C. Johari, The constitution of India- A Politico-Legal Study-Sterling Publications, Pvt.Ltd.New Delhi.
2. J.N.Pandey:Constitutional Law of India, Allahabad, Central Law Agency, 2002.
3. Granville Austin:The Indian Constitution-Corner Stone of a Nation-Oxford, NewDelhi.2000.

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	I	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
BCA12L		English Laboratory				--	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understanding of the Grammar & Vocabulary.
CO 2: Understanding of the Functional English.
CO 3: Understanding of the Poetry.
CO 4: Understanding of the Prose-Short stories.
CO 1: Understanding of the Grammar & Vocabulary.

LIST OF PROGRAMS TO BE COVERED:

The English Lab trains the students with its self- learning modules and self-evaluation models, to build English verbal competency, to enable to take up IELTS and GRE English tests or competitive exams. It utilizes word games, quiz and puzzles to teach grammatical and verbal concepts. It offers entry level and exit level tests to map students' English competency at primary, medium and advanced levels.

The English Lab has software on four skills of English: Reading, writing, listening, and speaking (phonetics):

1. Communication skills:
Reading, writing, grammar, vocabulary

2. Fundamental Language skills:
Reading, writing, Grammar-parts of speech, kinds of sentences, transformation of sentences, subject-verb agreement, modals, tenses, articles, comparative degrees, direct-indirect sentences, active-passive voice.
Vocabulary- Homonyms, homographs, phrasal verbs, Correcting spelling, One-word equivalents, synonyms, antonyms, prefixes, suffixes, collocation, words often confused.

3. Reading skills:
Reading tracts, graphs, line charts, pie charts tables, leaflets etc.

4. Writing skills:
Letter writing, report writing, note making, paragraph writing, précis writing, essay writing, applications

5. Vocabulary:
Word games, word banks, expressions, quiz, and puzzles, proverbs, idioms & phrases.

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	I	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
BCA14L		Programming Language Laboratory				------	

COURSE ASSESSMENT METHOD:

Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation] Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

- **CO 1:** Able to have fundamental knowledge on basic programming aspects and storage classes.
- **CO 2:** Able to understand the basic terminologies used in computer programming, write, compile and debug programs in C language.
- **CO 3:** Able to use different data types in a computer program.
- **CO 4:** Able to design programs involving decision structures, loops and functions.
- **CO 5:** Able to understand the dynamics of memory by the use of pointers.

LIST OF PROGRAMS TO BE COVERED:

Part A:

1. C program to accept radius and to find area of a circle.
2. C program to check whether the given number is positive or negative.
3. C program to print biggest of two number using if else statement.
4. C program to check whether the given number is odd or even.
5. C program to exchange values of two variable using a temporary variable.
6. C program to print ASCII code for the given character.
7. C program to print the character for the given ASCII code.
8. C program to find the sum of n natural numbers using the formula S=n(n+1)/2.
9. C program for given two numbers to perform arithmetic operations using switch statement.
10. C program to find biggest of three number using nested if statement.
11. C program to find biggest of three number using ladder if statement or else if statement.
12. C program to find sum of the S=1+2+3+……+n series by indirect method using looping statement
13. C program to find sum of the $S=1^2+2^2+3^2+.....+n^2$ indirect method using looping statement
14. C program to find sum of the S=2+4+6+……+n series by indirect method using looping statement

15. C program to find sum of the S=1-2+3-4+5…….+n series by indirect method using looping statement
16. C program to find sum of the S=1-3+5-7+……+n series by indirect method using looping
17. C program to find sum of the S=1+1/x+1/x^2.....+1/x^n series by indirect method using looping
18. C program to generate prime numbers using for loop
19. C program to check whether the given number is prime or not.
20. C program to generate Fibonacci series up to n numbers
21. C program to check whether the given number is factorial of a number or not
22. C program to convert binary number to decimal number.
23. C program to convert decimal number to binary number.

Part B:

24. C program to find the roots of the quadratic equation using else if statement.
25. C program to find the reverse of the given number. Also sum & count the number of digits and check whether the given number is palindrome or not palindrome.
26. C program to find largest and smallest of n numbers
27. C program to find second largest and second smallest of n numbers
28. C program for sorting given set of numbers using bubble sort technique.
29. C program to search given number using linear search technique
30. C program to accept two square matrix of square order. To find sum of two matrix
31. C program to print difference or subtraction of two matrices.
32. C program to accept two matrices of order m*n and p*q. to find product of two matrix using function
33. C program to check whether given number is Fibonacci or not.
34. C program to check whether the given number is factorial or not
35. C program to accept m*n matrix. To find trace and norm of square matrix. to print principle diagonal elements
36. C program to accept m*n matrix to find sum of upper diagonal and lower diagonal elements.
37. C program to find factorial of a number using recursive function
38. C program to find NCR and NPR using function.
39. C program to find LCM and GCD of two numbers.
40. C program to display transpose of given m*n matrix using function
41. C program to swap two numbers using function and pointers
42. C program to accept an employee information and display the same using structure
43. C program to create simple marks card assuming appropriate condition
44. C program to read and write information of an employee using a file.

TEXT BOOKS / REFERENCES:

Text books:

1. Programming in ANSI C, Third Edition, E.Balaguruswamy. 6th Edition (2013)
2. The C Programming Language, Brian W Kernighan, Dennis M Rtchie, PHI, 2nd Edition.

Reference books:

1. Let us C, 4th Edition, Yashwanthkanetkar.
2. Programming with C, Byron Gottfried, Tata McGraw-Hill edition.

ADDITIONAL LEARNING SOURCES:

1. http://www.worldbestlearningcenter.com/index_files/c_tutorial_lesson.htm
2. http://www.cluster2.hostgator.co.in/files/writeable/uploads/hostgator99706/file/letusc-yashwantkanetkar.pdf

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	I	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
BCA15L		Computer Fundamentals Laboratory				--	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Analyze the computer basics, processes and devices used with computers
CO 2: Discern operations of computers and importance of hardware components
CO 3: Apply the concept of Problem solving and steps involved for algorithm development
CO 4: Design and Analyze developing an algorithm with logic structures
CO 5: Chose the concept of flowchart development and basic programming structures for efficient problem solving

LIST OF PROGRAMS TO BE COVERED:

1. Using Ms-Word with suitable examples, write the steps and execute the following with respect to table handling
   a. Creating a table (At least 4 Columns and 6 Rows).
   b. Entering appropriate data into the table.
   c. Sort the table.
   d. Apply the formulas on table numeric values.
2. Using Ms-Word, write the steps and execute for creating “Mail Merge” document for “FORM LETTERS”.
3. Using Ms-Excel spread sheet, with suitable example, write steps and create worksheet called “Employee” and calculate the following using formulas
   a. Enter Employee Code, Name and Basic Salary.
   b. Calculate DA (20% of Basic Salary).
   c. Calculate HRA (10% of Basic Salary).
   d. Calculate CCA (8.5% of Basic Salary).
   e. Calculate Total Salary (Basic Salary + DA + HRA + CCA)

f. Calculate Deductions (10% of Total Salary).

g. Calculate Net Salary (Total Salary – Deductions).

4. Using Ms-Excel draw X-Y Line Chart and Bar Charts based on the following worksheet data and write the steps

ITEM	**MONTHLY SALES (in Thousands)**
Cotton	2,750
Wool	3,100
Yarn	2,975
Jute	2,100
Fiber	3,010

5.Using Ms-Excel spreadsheet write the steps and execute the following:

Roll No	Stud Name	Marks1	Marks2	Mark3	Total	Percentage	Result

a. Create appropriate records

b. Calculate total and marks using formula.

c. Update result column using IF function. (Result: Distinction, First Class, Second Class, Pass, Fail).

6. Using Ms-Access with suitable examples write steps and execute the following.

a. Create STUDENT database table.

b. Create appropriate records.

c. Add two more records to the table.

d. Delete 2nd record to the table.

e. View the records.

7. Using Ms-Access with suitable examples write steps and execute the following.

a. Create EMPLOYEE database table.

b. Create appropriate records.

c. Sort the records in ascending order of name.

d. Sort the records in descending order of salary.

e. View the records

8. Using Ms-PowerPoint with suitable examples write steps and execute the following:

a. Create presentation slides with Titles, Sub Titles and Charts choosing different

slide layouts.

b. Use Design templates for background.

c. Format the slide design.

9.Using Ms-PowerPoint with suitable examples write steps and execute the following:

a. Create presentation table slides using an organization chart.

b. Use different views such as slide view, slide sorter view and slide show view.

TEXT BOOKS / REFERENCES:

1. Computer Fundamentals - P K Sinha,BPB
2. Introduction to Computers - N Subramanian,TMH
3. Understanding Computers - R Rajagopalan. TMH
4. Computers Today - Donald Sanders, MGH
5. Computers Today - Suresh K Basandra, Galgotia
6. Peter Norton's 'Introduction to Computers', Second edition, TMH.
7. Dromey – How to solve it by computer –PHI
8. Computer Concepts and C Programming – P.B.KOTUR
9. Computer Fundamentals - P K Sinha, BPB

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/
2. http://nptel.ac.in/

II Semester
Grid and Syllabus

Scheme of Teaching and Examination

Second Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA210	Indian Language –Kannada –II	Kannada	2	0	0	2.0	2	50	50	50	1.5
2.	BCA220	English Language - II	English	2	0	0	2.0	2	50	50	50	1.5
3.	BCA230	Mathematics-II	Mathematics	4	0	0	4.0	4	50	50	100	3
4.	BCA240	Object Oriented Programming with C++	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA250	Data Structures	CA	4	0	0	4.0	4	50	50	100	3
6.	BCA260	Operating System	CA	4	0	0	4.0	4	50	50	100	3
7.	BCA270	Soft Skills – II (Professional Ethics)	CA	2	0	0	2.0	2	50	50	50	1.5
8.	BCA280	Environmental Studies*	Environmental	0	0	0	0.0	2	50	00	50	-
9.	BCA24L	Object Oriented Programming Laboratory	CA	0	0	1	1.0	2	50	00	50	-
10.	BCA25L	Data Structures Laboratory	CA	0	0	1	1.0	2	50	00	50	-
Total				22	0	2	24	28	500	350	700	-

*Marks secured in the subject will not be considered for awarding class.

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Theory	02	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA210	Indian Language –Kannada –II	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: ವೈಯಕ್ತಿಕ ಮತ್ತು ಸಾಮಾಜಿಕ ಮೌಲ್ಯಗಳ ಅರಿವು
CO 2: ಥಳುಕು-ಕಪಟಕ್ಕಿಂತ ಸಂಸ್ಕಾರವಂತ ಜೀವನ ಪ್ರೀತಿಯೇ ದೊಡ್ಡದೆಂಬ ತಿಳಿವು
CO 3: ಸಂವಹನ ಕೌಶಲ್ಯದ ವೃದ್ಧಿ
CO 4: ಶಿಷ್ಟ ಭಾಷೆಯ ವ್ಯಾಕರಣ ಜ್ಞಾನ
CO 5: ಪದ್ಯರಚನಾ ಕ್ರಮದಲ್ಲಿ ಛಂಧಸ್ಸಿನ ಬಳಕೆಯ ಅರಿವು

TOPICS COVERED:

UNIT:1 – **10 Hours**

ಪದ್ಯ ಭಾಗ—೧.ವಚನಗಳು-- ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ

2.ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗ-- ಡಿವಿಜ

UNIT:2 – **10 Hours**

ನಾಟಕ---- ತಾಳೀಕಟ್ಟೋಕ್ಕೂಲೀನೇ?--- ಟಿ.ಪಿ.ಕೈಲಾಸಂ

UNIT:3 - **10 Hours**

ಭಾಷಾಕೌಶಲ್ಯ-- ಗಾದೆಗಳು , ಪ್ರಬಂಧ, ಸಂಕ್ಷೇಪ ಲೇಖನ

UNIT:4 - **10 Hours**

ವ್ಯಾಕರಣ-- ವರ್ಣಮಾಲೆಗಳು, ಕನ್ನಡ ಸಂಧಿಗಳು, ಸಮಾಸಗಳು

UNIT:5 – **12 Hours**

ಛಂದಸ್ಸು--ಪ್ರಾಸ, ಯತಿ, ಗಣ

TEXT BOOKS / REFERENCES:

Text books: 1. ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ ಪಠ್ಯಪುಸ್ತಕ

2.ನಾಟಕ–"ತಾಳೀಕಟ್ಟೋಕ್ಕೂಲೀನೇ?–ಟಿ.ಪಿ.ಕೈಲಾಸಂ

3.ವಚನಗಳ ಪುಸ್ತಕ

4.ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗ–ಡಿ.ವಿ.ಜಿ.

5.ಛಂಧಸ್ಸು

6.ವ್ಯಾಕರಣ

Reference books:

1.ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳ ಪುಸ್ತಕಗಳು

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Theory	02	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA220	English Language - II	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understanding of the Grammar & Vocabulary.
CO 2: Understanding of the Functional English.
CO 3: Understanding of the Poetry.
CO 4: Understanding of the Prose-Short stories.

TOPICS COVERED:

UNIT:1 – 05 Hours

Grammar & Vocabulary:

1. Kinds of sentences, Direct-indirect speech.
2.Transformation of sentences: Active-Passive
3. Modals and their usage
4. Subject-verb agreement.
5.Reading:Comprehension of- graphs, notices, leaflet, advertisements, charts, tables- for interpretation and understanding, to learn close reading, wider reading, reading between the lines and speed reading.

UNIT:2 – 06 Hours

Functional English:

1. Précis writing
2. Report writing: Newspaper, journal
3. Letter writing: Personal/Formal letters
4. Usage of phrasal verbs, collocations, idioms & phrases
5. Presentation: preparation of materials and presentation, e.g.; posters, charts

UNIT:3 – 05 Hours

Poetry:

1. Obituary-A.K.Ramanujan
2. The road not taken-Robert Frost
3. Because I could not stop for death-Emily Dickinson

UNIT:4 – 10 Hours

Prose-Novel

1. Swami and Friends- a novel by R.K.Narayan

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Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA230	Mathematics II	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Verify the correctness of an argument using propositional and predicate logic and truth tables.

CO 2: Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.

CO 3: Solve problems involving recurrence relations and generating functions.

CO 4: Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.

CO 5: Explain and differentiate graphs and trees.

TOPICS COVERED:

UNIT:1 – 10 Hours

Fundamentals of Logic: Basic Connectives and Truth Tables, Logic Equivalence – The Laws of Logic, Logical Implication – Rules of Inference. The Use of Quantifiers, Quantifiers, Definitions and the Proofs of Theorems,

UNIT:2 – 10 Hours

Properties of the Integers: Mathematical Induction, The Well Ordering Principle – Mathematical Induction, Recursive Definitions. Fundamental Principles of Counting: The Rules of Sum and Product, Permutations, Combinations – The Binomial Theorem, Combinations with Repetition,

UNIT:3 - 12 Hours

Relations and Functions: Cartesian Products and Relations, Functions – Plain and One-to-One, Onto Functions. The Pigeon-hole Principle, Function Composition and Inverse Functions. Properties of Relations, Computer Recognition – Zero-One Matrices and Directed Graphs, Partial Orders – Hasse Diagrams, Equivalence Relations and Partitions.

UNIT:4 - 10 Hours

The Principle of Inclusion and Exclusion: The Principle of Inclusion and Exclusion, Generalizations of the Principle, Derangements – Nothing is in its Right Place, Rook Polynomials. Recurrence Relations: First Order Linear Recurrence Relation, The Second Order

Linear Homogeneous Recurrence Relation with Constant Coefficients.

UNIT:5 – **12 Hours**

Introduction to Graph Theory: Definitions and Examples, Sub graphs, Complements, and Graph Isomorphism, Vertex Degree, Euler Trails and Circuits , Trees: Definitions, Properties, and Examples, Routed Trees, Trees and Sorting, Weighted Trees and Prefix Codes.

TEXT BOOKS / REFERENCES:

1. Ralph P. Grimaldi: Discrete and Combinatorial Mathematics, , 5th Edition, Pearson Education. 2004
2. Kenneth H. Rosen: Discrete Mathematics and its Applications, 6th Edition, McGraw Hill, 2007.

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA240	Object Oriented Programming with C++	C

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understand the features of C++ supporting object oriented programming
CO 2: Understand the relative merits of C++ as an object oriented programming language
CO 3: Understand how to produce object-oriented software using C++
CO 4: Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
CO 5: Understand advanced features of C++ specifically stream I/O, templates and operator overloading

TOPICS COVERED:

UNIT:1 - 12 Hours

Introduction: Procedure-oriented programming, Concepts of Object-oriented programming, Structure of C++ program.

Fundamentals: Tokens, Keywords, Identifiers and constants, Basic Data Types, User-defined data types, Derived data Types, Symbolic constants, Type compatibility, Declaration of variables, Dynamic initialization of variables, Reference variables, Operators in C++, Scope resolution operator, Member dereferencing operators, Memory management operators, Manipulators, Type cast operator, Expressions and their types, Special assignment expressions, Implicit conversions, Operator overloading, Operator precedence, Control structures.

UNIT:2 - 8 Hours

Functions: The main function, Function prototyping, Call by Reference, Return by Reference, Inline functions, Default arguments, const arguments, Function overloading, Friend function.

UNIT:3 - 10 Hours

Classes and Objects: Specifying a Class, Defining member functions, Making an Outside function Inline, Nesting of member functions, Private member functions, Arrays within a Class, Static data members, Static member functions, Arrays of Objects, Objects as function arguments, friendly functions, Returning Objects, const member functions, Pointers to

members.

UNIT:4 - **12 Hours**

Constructors and Destructors: Constructors, Parameterized constructors, Multiple constructors in a class, Constructors with default arguments, Dynamic initialization of objects, Dynamic constructor, Constructing Two-dimensional arrays, Destructors.

Operator Overloading and Type Conversions: Defining operator overloading, Overloading unary operators, Overloading Binary operators, Rules for overloading operators, Type conversions.

UNIT:5 - **8 Hours**

Inheritance and Polymorphism: Programming concepts and types. Console I/O Operations: C++ streams, C++ stream classes, Unformatted I/O operations, Formatted I/O operations, managing output with manipulators.

Files: Classes for file stream operations, opening, reading, writing, closing, detecting end of file

TEXT BOOKS / REFERENCES:

1. Object Oriented Programming with C++ - E. Balagurusamy
2. OOPS and C++ by Robert Lafore.
3. C++ by Stephen Prata.
4. Teach yourself c++ by Al Stevens.
5. C++ Primer by Stanley B Lippman

ADDITIONAL LEARNING SOURCES:

1. www.tutorialspoint.com
2. www.geeksforgeeks.org
3. www.Javatpoint.com
4. www.begineersbook.com

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA250	Data Structures	Programming Concepts

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Defined data types including structures and unions and solve the problems.
CO 2: Understand pointers and to allocate memory using dynamic memory management function.
CO 3: Understand about writing algorithms and step by step approach in solving problems with the help of fundamental data structures.
CO 4: Introduce the concept of data structures through ADT including List, Stack, and Queues.
CO 5: Implement non-linear data structures using trees.

TOPICS COVERED:

Unit-1 **12 Hours**

Structure and union: Structure definition, giving values to members, structure initialization, and comparison of structure variables, arrays of structure, self-referential structures, and union. **Pointers:** Understanding pointers, accessing the address of variables, Declaring and initializing pointers, accessing a variable through its Pointer. Dynamic memory allocation: Meaning of static and dynamic memory allocation. Memory allocation functions: malloc(), calloc(), free() and realloc().

Unit-2 **10 Hours**

Introduction to Data Structures & Stack: Definition, Applications, Classification of data structures: primitive and non-primitive, Operations on data structures Definition, Array Implementation of stack(using structure) and operations on stack, Applications of stacks, Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix.

Unit-3 **8 Hours**

Queue and Recursion: Definition, Types of queue: Simple queue, circular queue, double ended queue, priority queue, Array Implementations of queue (using structure) and operations on all types of queues. Definition, Recursion in C – Binomial coefficient, Fibonacci, GCD, tower of Hanoi.

Unit-4 **10 Hours**

Linked list: Definition, components of linked list, Representation of linked list, Advantages and disadvantages of linked list, Types of linked list: singly linked list, doubly linked list, Circular list and circular doubly linked list, operations on all types of linked lists: Creation, insertion, deletion, search and display.

Unit-5 **12 Hours**

Non Linear Data Structures

Tree: Definition: Tree, Binary tree, complete binary tree, Binary search tree, Tree terminology: root, Node, Degree of a node, ancestors of a node, Binary tree, Array representation of tree, Creation of Binary tree, Traversal of Binary tree: Preorder, In order and post order.

TEXT BOOKS / REFERENCES:

Text books:

1. An Introduction to Data Structures with Applications 2nd edition - J.P.Trembly and Sorenson, McGraw Hill 2001.
2. Data structures using C & C++ by Yedidyah Langsun, Moshe J Augenstein, Teneinbaum published by Prentice Hall of India Ltd.

Reference books:

1. Algorithms + Data Structures = Programs by Niklaus Wirth Prentice Hall 1976.
2. Data structures and algorithms by Aho, A.V.,Hopcroft and Ullman,J.E., Addison Wesley, 1980.
3. Fundamentals of data structures by Horowitze,E and Sahni,S., Galgotia bookstore.

ADDITIONAL LEARNING SOURCES:

1.http://www.tutorialspoint.com/Data-Structures-in-C-Online-Training/classid=13
2. http://nptel.ac.in/datastructures_c

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA260	Operating System	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understand the basic concepts of Operating System, its functions and services.
CO 2: Compare the various algorithms and performance of various algorithms used for management of memory, CPU scheduling.
CO 3: Apply various concept related with Deadlock to solve problems.
CO 4: Understand the concepts of memory management.
CO 5: Understand the concepts of virtual memory management.

TOPICS COVERED:

UNIT:1– 12 Hours

Introduction: Computer System Organization – Computer System Architecture – Operating System Structure – Operating System Operations.

System Structure: Operating System Services – System Calls – Types of Systems Calls – System Programs.

UNIT:2 – 12 Hours

Process Concept: Process Scheduling – Operations on Processes – Interprocess Communication – Communications in Client Server Systems

Process Scheduling: Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple Processor Scheduling – Thread Scheduling.

UNIT:3 - 12 Hours

Synchronization: The critical section problem – Peterson's Solution – Synchronization Hardware – Semaphores.

Deadlocks: Characterization - Methods for handling deadlocks - Deadlock prevention – Deadlock Avoidance – Deadlock Detection - Recovery from deadlock.

UNIT:4 - 07 Hours

Memory Management: Swapping – Contiguous Memory Allocation, Paging, Segmentation.

UNIT:5 – **09 Hours**

Virtual Memory Management: Demand Paging – Copy on Write – Page Replacement – Allocation of Frames – Thrashing – Memory Mapped Files.

TEXT BOOKS / REFERENCES:

Text books:

1. Operating System Concepts by - Silberschatz, Galvin, Gagne, John-Wiley (2002).
2. Andrew S. Tanenbaum, “Modern Operating Systems”, PHI, Fourth edition.

Reference books:

1. Operating system principles by Brinch Hansen. P., PHI.
2. Operating systems by Milan Milenkovic., McGraw Hill.
3. Logical design of operating systems by Show.A., PHI.

ADDITIONAL LEARNING SOURCES:

1.https://www.tutorialspoint.com/operating_system/os_linux
2.https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Theory	02	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA270	Soft Skills II (Professional Ethics)	-----

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO1: Acquire the importance of Ethics in professional life.
CO2 : Practice and support ethics as IT users
CO3: Experience and explore the Right to privacy and information protection
CO4: Gain knowledge about Intellectual Property, Patents and Copy Rights
CO5: Follow the strategies to become engineers, specific to software engineering.

TOPICS COVERED:

Unit:1: **05Hours**
What are Ethics: Definition of ethics, Importance of Integrity, Ethics in the Business world, and Ethics in Information Technology (IT).

Unit:2: **05Hours**
Professional, The ethics behavior of IT professionals, IT users: Common ethical issues for IT users, Supporting the ethical practices of IT users.

Unit:3: **05Hours**
Privacy protection and the law: The right of privacy and recent history of privacy protection, Key privacy and anonymity issues.

Unit:4: **06Hours**
What is intellectual property: copy rights, patents, trade secret laws, Key intellectual property issues: plagiarism, reverse engineering, open source code, competitive intelligence, cyber squatting.

Unit:5: **05Hours**
Strategies to Engineer Quality Software, Key issues in software development, Use of non-traditional workers, Whistle blowing. Case Studies and Discussion.

TEXT BOOKS / REFERENCES:

1. George Reynolds: Ethics in Information Technology, CENAGE Learning, 2014
2. Mike W Martin, Roland Schinzinger, Ethics in Engineering, Tata McGraw Hill Edition 2007.

* Latest editions of all the suggested books are recommended.

ADDITIONAL LEARNING SOURCES:

1. http://www2.ece.ohio-state.edu/~passino/ee481.html
2. https://freevideolectures.com/course/2689/management-science/4
3. https://nptel.ac.in/courses/110105097/
4. http://www.idt.mdh.se/kurser/cd5590/10_11/LECTURES.htm
5. https://courses.engr.illinois.edu/ece110/sp2019/content/courseNotes/files/?ethicsAndEngineering

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				Theory	**Laboratory**	**Tutorials**	
I	II	Theory	02	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA280	Environmental Studies	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understand the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.

CO 2: Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.

CO 3: Demonstrate ecology knowledge of a complex relationship between biotic and abiotic components.

CO 4: Apply their ecological knowledge to illustrate and graph a problem and describe the realities that managers face when dealing with complex issues.

TOPICS COVERED:

UNIT:1 – 05 Hours

Introduction: Environment – Components of Environment Ecosystem: Types & Structure of Ecosystem, Balanced ecosystem Human Activities – Food, Shelter, And Economic & Social Security.

Impacts of Agriculture & Housing Impacts of Industry, Mining & Transportation Environmental Impact Assessment, Sustainable Development.

UNIT:2 – 05 Hours

Natural Resources, Water resources – Availability & Quality aspects, Water borne diseases & water induced diseases, Fluoride problem in drinking water Mineral resources, Forest Wealth Material Cycles – Carbon Cycle, Nitrogen Cycle & Sulphur Cycle.

Energy – Different types of energy, Conventional sources & Non Conventional sources of energy Solar energy, Hydro electric energy, Wind Energy, Nuclear energy, Biomass & Biogas Fossil Fuels, Hydrogen as an alternative energy.

UNIT:3 - 05 Hours

Environmental Pollution – Water Pollution, Noise pollution, Land Pollution, Public Health Aspects.

Global Environmental Issues: Population Growth, Urbanization, Land Management, Water &

Waste Water Management.

UNIT:4 - **05 Hours**

Air Pollution & Automobile Pollution: Definition, Effects – Global Warming, Acid rain & Ozone layer depletion, controlling measures.

Solid Waste Management, E – Waste Management & Biomedical Waste Management – Sources, Characteristics & Disposal methods.

UNIT:5 – **06 Hours**

Introduction to GIS & Remote sensing, Applications of GIS & Remote Sensing in Environmental Engineering Practices.

Environmental Acts & Regulations, Role of government, Legal aspects, Role of Nongovernmental Organizations (NGOs), Environmental Education & Women Education

TEXT BOOKS / REFERENCES:

Text books:

1. Benny Joseph (2005), "Environmental Studies", Tata McGraw – Hill Publishing Company Limited.
2. R.J.Ranjit Daniels and Jagadish Krishnaswamy, (2009), "Environmental Studies", Wiley India Private Ltd., New Delhi.
3. R Rajagopalan, "Environmental Studies – From Crisis to Cure", Oxford University Press, 2005,
4. Aloka Debi, "Environmental Science and Engineering", Universities Press (India) Pvt. Ltd. 2012

Reference books:

1. Raman Sivakumar, "Principals of Environmental Science and Engineering", Second Edition, Cengage learning Singapore, 2005
2. P. Meenakshi, "Elements of Environmental Science and Engineering", Prentice Hall of India Private Limited, New Delhi, 2006
3. S.M. Prakash, "Environmental Studies", Elite Publishers Mangalore, 2007
4. Erach Bharucha, "Text Book of Environmental Studies", for UGC, University press, 2005

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
BCA24L		Object Oriented Programming Laboratory				C	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

- **CO 1:** Understand the features of C++ supporting object oriented programming
- **CO 2:** Understand the relative merits of C++ as an object oriented programming language
- **CO 3:** Understand how to produce object-oriented software using C++
- **CO 4:** Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism
- **CO 5:** Understand advanced features of C++ specifically stream I/O, templates and operator overloading

LIST OF PROGRAMS TO BE COVERED:

PART-A

1. Write a c++ program to calculate the average of three numbers.
2. Write a c++ program to find the biggest of three numbers.
1. Write a c++ program to find minimum and maximum of two numbers using functions.
2. Write a c++ program to check the given number is palindrome or not
3. Write a c++ program to sum of all even and odd numbers.
4. Write a c++ program to perform arithmetic operations using classes and objects.
5. Write a c++ program to define a student class with user name, to name, total, average for “n” students.
6. Write a c++ program to illustrate the use of static member function.
7. Write a c++ program to find the mean value using friend function..
8. Write a c++ program to implement multiple inheritance.
9. Write a c++ program to illustrate pointers to objects.
10. Write a c++ program to read a string with get line function.
11. Write a c++ program to display string with write() function.

PART-B

1. Write a c++ program to accept two times (hh:mm:ss) to find subtraction of two times.
2. Write a c++ program to implement processing shopping list using a class with arrays as

data members.

3. Write a c++ program to implement banking scheme.
4. Write a c++ program to show the use of over loaded constructor.
5. Write a c++ program to construct variables at run time using dynamic initialization.
6. Write a c++ program to find the largest value among the set of parameters using overloaded function.
7. Write a c++ program to add two complex number using operator overloading.
8. Write a c++ program to demonstrate single inheritance.
9. Write a c++ program to implement multilevel inheritance.
10. Write a c++ program to illustrate the use of array of pointer to objects.
11. Write a c++ program to implement reading and writing class objects using files.

TEXT BOOKS / REFERENCES:

1. Object Oriented Programming with C++ - E. Balagurusamy
2. OOPS and C++ by Robert Lafore.
3. C++ by Stephen Prata.
4. Teach yourself c++ by Al Stevens.
5. C++ Primer by Stanley B Lippman

ADDITIONAL LEARNING SOURCES:

1. www.tutorialspoint.com
2. www.geeksforgeeks.org
3. www.Javatpoint.com
4. www.begineersbook.com

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
I	II	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
BCA25L		Data Structures Laboratory				C Programming	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

- **CO 1:** Defined data types including structures and unions and solve the problems.
- **CO 2:** Understand pointers and to allocate memory using dynamic memory management function.
- **CO 3:** Understand about writing algorithms and step by step approach in solving problems with the help of fundamental data structures.
- **CO 4:** Introduce the concept of data structures through ADT including List, Stack, and Queues.
- **CO 5:** Implement non-linear data structures using trees.

LIST OF PROGRAMS TO BE COVERED:

1. Write a C program to create a structure Employee that stores empno, name, age , salary and include

the following tasks:
ii) Accept details of N employees
iii) Display the details of N employees in the following format"
Empno Name age salary
1.
2.
3.
:
:
N

2. Write a C program to demonstrate pointer arithmetic.

3. Write a C program to create file N students, it should contain Rollno, Name, marks in two subjects, Using the above created file, create an output file which contains Rollno, Name, Marks in subjects, Total and average.

4. Write a C program to create a character file and count the number of characters, words and

blank
Spaces present in it.

5. Write a C program to demonstrate the working of stack of size N using an array the elements of the
stack may be assumed to be of type integer by creating an array, the operations to be supported are
1. PUSH 2. POP 3. DISPLAY. The program to should print the appropriate message for stack is Underflow and overflow.

6. Write a C program to convert and print valid fully parenthesized infix arithmetic expression to Postfix.

7. Write a C program to simulate the working of a Queue using an array Provide the operations QINSERT, QDELETE and QDISPLAY, check the Queue status for empty and full.

8. Write a C program to simulate the working of a Circular Queue using an array Provide the operations
CQINSERT, CQDELETE and CQDISPLAY, check the Circular Queue status for empty and full.

9. Write a C program to demonstrate the working of a Dequeue using array and provide for all its basic
Operations.

10. Write a C program to find the Binomial Coefficient using recursion.

11. Write a C program to find the nth Fibonacci number by using recursion.

12. Write a C program to simulate the working of towers of Hanoi for N disks, print the total number of
Moves taken.

13. Using Dynamic variables and pointers write a C program to construct a singly linked list consisting of the following information in each node: Rollno(integer), name (string):
The operations to be supported are:
1. LINSERT – Inserting a node in the front of the list
2. LDELETE – deleting a node based on rollno
3. LSEARCH – searching a node on rollno
4. LDISPLAY –Displaying the data in all the nodes

14. Write a C program to create a doubly linked list where each node consists of the following information: left link, data (integer), right link. The operations to be supported are:
1. INSERT – Insert a node at the end of the doubly linked list
2. DELETE – Delete any node from the doubly linked list
3. DISPLAY – Display the data in all the nodes

15. Using dynamic variables and pointer create a binary search tree of integers and perform the following operations:
1. Given a key, perform a search in the binary search tree and insert the key if it is not a duplicate key.
2. Traverse the tree using inorder traversal method.

TEXT BOOKS / REFERENCES:

Text books:

1. An Introduction to Data Structures with Applications 2nd edition - J.P.Trembly and Sorenson, McGraw Hill 2001.
2. Data structures using C & C++ by Yedidyah Langsun, Moshe J Augenstein, Teneinbaum published by Prentice Hall of India Ltd.

Reference books:

1. Algorithms + Data Structures = Programs by Niklaus Wirth Prentice Hall 1976.
2. Data structures and algorithms by Aho, A.V.,Hopcroft and Ullman,J.E., Addison Wesley, 1980.
3. Fundamentals of data structures by Horowitze,E and Sahni,S., Galgotia bookstore.

ADDITIONAL LEARNING SOURCES:

1.http://www.tutorialspoint.com/Data-Structures-in-C-Online-Training/classid=13

2. http://nptel.ac.in/datastructures_c

III Semester
Grid and Syllabus

Scheme of Teaching and Examination

Third Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA310	Indian Language –Kannada –III	Kannada	2	0	0	2.0	2	50	50	50	1.5
2.	BCA320	Database Management System	CA	4	0	0	4.0	4	50	50	100	3
3.	BCA330	Mathematics - III	Mathematics	4	0	0	4.0	4	50	50	100	3
4.	BCA340	Java Programming	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA350	Analysis and Design of Algorithms	CA	4	0	0	4.0	4	50	50	100	3
6.	BCA360	Data Communications and Networking	CA	4	0	0	4.0	4	50	50	100	3
7.	BCA32L	Database Management System Laboratory	CA	0	0	1	1.0	2	50	00	50	-
8.	BCA34L	Java Programming Laboratory	CA	0	0	1	1.0	2	50	00	50	-
9.	BCA35L	Algorithms Laboratory	CA	0	0	1	1.0	2	50	00	50	-
Total				22	0	3	25	28	450	300	700	-

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Theory	02	02	00	00	26

Course No	Course Title	Pre Requisites
BCA310	Indian Language –Kannada –III	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: ಸೋದರ ಪ್ರೀತಿ, ತ್ಯಾಗ, ನಾಯಕತ್ವಕ್ಕೆ ಇರಬೇಕಾದ ಮೌಲ್ಯಗಳು ಹಾಗೂ ಧರ್ಮಾಧರ್ಮಗಳ ಅರಿವು
CO 2: ವೃದ್ಧರ ಆರಾಧನೆ–"ಮಾಡಿದ್ದುಣ್ಣೋ ಮಹಾರಾಯ" ಎಂಬ ನೀತಿ ಸಂಗತ
CO 3: ಸಾಧಕನಿಗೆ ಸಾಧಿಸುವ ಛಲವಿರಬೇಕೆಂಬ ತಿಳಿವು
CO 4: ಶಿಷ್ಟ ಭಾಷೆಯ ವ್ಯಾಕರಣ ಜ್ಞಾನ
CO 5: ಪದ್ಯರಚನಾ ಕ್ರಮದಲ್ಲಿ ಛಂಧಸ್ಸಿನ ಬಳಕೆಯ ಅರಿವು

TOPICS COVERED:

UNIT:1 – **05 Hours**
ಪದ್ಯ ಭಾಗ--ಧರ್ಮಯುದ್ಧ-- ರತ್ನಾಕರವರ್ಣಿ

UNIT:2 – **06 Hours**
ವಡ್ಡಾರಾಧನೆ--ಸುಕುಮಾರ ಸ್ವಾಮಿ ಕಥೆ--ಶಿವಕೋಟ್ಯಾಚಾರ್ಯ

UNIT:3 - **05 Hours**
ಭಾಷಾಕೌಶಲ್ಯ ಚಟುವಟಿಕೆ–ಪೌರಾಣಿಕ ನಾಟಕ: ಒಂದು ಸಣ್ಣ ನಾಟಕ-ಏಕಲವ್ಯ

UNIT:4 - **05 Hours**
ವ್ಯಾಕರಣ--ನಾಮಪದಗಳು, ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು, ಕ್ರಿಯಾಪದಗಳು,

UNIT:5 – **25 Hours**
ಛಂಧಸ್ಸು-- ತ್ರಿಪದಿ, ಖ್ಯಾತಕರ್ನಾಟಕಗಳು, ಕಂದ

TEXT BOOKS / REFERENCES:

Text books: 1.ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯದ ಪಠ್ಯಪುಸ್ತಕ
2.ಭರತೇಶ ವೈಭವ–ರತ್ನಾಕರವರ್ಣಿ

೩..ಛಂಧಸ್ಸು

4.ವ್ಯಾಕರಣ

Reference books:1. .ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳ ಪುಸ್ತಕಗಳು

2.ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ–ರಂ.ಶ್ರೀ. ಮುಗಳಿ

Department of Computer Applications, JSS Science and Technology University, Mysuru							
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				Theory	**Laboratory**	**Tutorials**	
II	III	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA320	Database Management System	Data structures

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Analyze the concepts of data models and modeling notations, understanding the need of database, developing a database.
CO 2: Relate and Design the Entity Relationship models, diagrams.
CO 3: Solve algebraic expressions/ operations on relational database and mapping.
CO 4: Use of SQL, Design the queries to handle all the basic and advanced operations on DBMS, need and modes of normalizing the databases.
CO 5: Design of applications which handles the operations involved in RDBMS.

TOPICS COVERED:

Unit 1: Introduction to Database Management 12hours

Introduction, what is a Database? Characteristics of Databases Data Governance and Importance of Databases, History of Database Software, File Systems vs. Database Systems, What is a DBMS, Uses of a Database Systems, Advantages of using an Enterprise Database, Concerns when using an Enterprise Database, Three-Level DBMS Architecture and Data Abstraction, Data Independence, DBMS System Architecture, Database Administrator, Designing an Enterprise Database System, Future of Databases-Web Databases, Choosing a DBMS.

Unit 2: Entity-Relationship Data Model 10hours

Introduction, Benefits of Data Modeling, Types of Models, Phases of Database Modeling The Entity-Relationship Model, Generalization, Specialization and Aggregation, Extended Entity-Relationship Model The Database Design Process Strengths of the E-R Model Weakness of the E-R Model A Case Study of Building an E-R Model, Evaluating Data Model Quality.

Unit 3: Relational Model and Relational Algebra 10hours

Introduction, Data Structure, Mapping the E-R Model to the Relational Model, Data Manipulation, Data Integrity, Advantages of the Relational Model, Rules for Fully Relational Systems, Earlier Database Models-Hierarchical and Network Models. Relational Algebra, Relational Algebra Queries.

Unit 4: Structured Query Language **10hours**

Introduction, SQL, Data Definition-CREATE,ALTER and DROP Commands, Data Manipulation-SQL Data Retrival, Views-Using Virtual Tables in SQL, Using SQL in Procedural Programming Languages-Embedded SQL and Dynamic SQL, Data Integrity and Constraints, Triggers and Active Databases, Data Control-Database Security, Further Data Definition Commands, Summary of Some SQL Commands, SQL Standards.

Unit 5: Normalization **10hours**

Introduction, Possible Undesirable Properties of Relations and Schema Refinement, Functional Dependencies, Single-Valued Normalization, Desirable Properties of Decompositions, Multivalued Dependencies, Denormalization, Inclusion Dependency.

TEXT BOOKS / REFERENCES:

Text books:

1. Database Management Systems by G K Guptha, Mc Grawhill Publications.
2. Database Systems, Models, Languages, Design and Application Programming by Elmasri & Navathe, Pearson Publications.

Reference books:

1. “Database System Concepts”, A.Silberschatz, Henry.F.Korth, S.Sudharshan, 6th Edition.
2. “Database Systems”, Ramez Elmasri, Shamkant.B.Navathe, 6th Edition.
3. “Database Management Systems”, Raghu Ramakrishnan and J Gehrke 3rd Edition.
4. “An Introduction to Database System” C.J.Date , AKannan, S..Swamynathan 8th Edition.

ADDITIONAL LEARNING SOURCES:

1. www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
2. nptel.ac.in/courses/106106093/6
3. msdis.missouri.edu/resources/gis_advanced/pdf/relational.pdf

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	III	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA330	Mathematics III	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Interpret and analyze data.
CO 2: To interpret large data, analyze and arrive at intelligent conclusions.
CO 3: Recognize and analyze elementary probability models.
CO 4: Identify discrete / continuous probability density situations and analyse them. Understand the concepts of expectation, variance.
CO 5: Understand and use concepts of stochastic processes, probability vectors, markov chains and transition probabilities.

TOPICS COVERED:

UNIT:1 – 12 Hours
Treatment of data: measures of central tendency – mean, median, mode and quartiles; measures of dispersion – Standard deviation, moments, skewness, kurtosis

UNIT:2 – 10 Hours
Method of least squares; correlation and regression, coefficient of correlation, standard error of estimate.

UNIT:3 - 10 Hours
Definition, addition and product theorems; total probability, conditional probability, compound probability; Bayes' theorem

UNIT:4 - 10 Hours
Discrete and Continuous random distributions: P.D.F. And C.D.F.; Bernoulli's theorem; Binomial distribution; Poisson distribution. Normal, Exponential distributions

UNIT:5 – 12 Hours
Stochastic processes: Definition of probability vector; stochastic matrix and regular stochastic matrix; fixed point and fixed probability vector; Markov chain definition; transition probabilities and its matrix; higher transition probabilities; stationary distribution of regular Markov chains;

irreducible Markov chain; absorbing state of a Markov chain
TEXT BOOKS / REFERENCES:
1. Problems in Probability and Statistics, Schaum Series. 2. Introductory Statistics, Sheldon Ross, 2nd Edition (2006)

Department of Computer Applications, JSS Science and Technology University, Mysuru

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	III	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA340	Java Programming	C++ Concepts

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Demonstrate and implement programs on structure and components of a Java language

CO 2: Understand classes, objects, members of a class and use packages and interfaces appropriately.

CO 3: Demonstrate multithread, synchronization and exception handling concepts

CO 4: Use the concept of string, event handling, simple data structures like arrays and members of classes of Java API in application development

CO 5: Design and develop Java based UI and Networking applications using applets, swing components and networking concepts.

TOPICS COVERED:

UNIT:1 – Java Basics **10 Hours**

History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, nested and inner classes, exploring string class

UNIT:2 – OOP concepts in Java, Packages and Interfaces **10 Hours**

Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class.

Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces. Exploring java.io.

UNIT:3 - Exception handling & Multi Threading **10 Hours**

Concepts of exception handling, benefits of exception handling, Termination or presumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling, Exploring java.util.
Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads; inter thread communication, thread groups, daemon threads. Enumerations, auto boxing, annotations, generics.

UNIT:4 - String and Event Handling **10 Hours**

String fundamentals, String Constructors, Three string related language features, The Length() method, Obtaining the characters within the string, String comparison, using indexOf() and lastindexOf(), changing the case of the characters within the string, String buffer and String builder.
Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scroll pane, dialogs, menu bar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT:5 – Applets, Swings and Fundamentals of Java.Net **12 Hours**

Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.
Swings- Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

Networking fundamentals, Networking Classes & Interfaces, The InetAddress class, The Socket class, URL class, URL connection class, Http URL connection class, Exploring collection frame work, Collection overview, Collection classes and interfaces, Array class.

TEXT BOOKS / REFERENCES:

Text books:

1. Herbert Schildt. Java - The Complete Reference, Ninth Edition. Oracle Press, McGraw Hill Education (India) Edition- 2014.

Reference books:

1. Cay S. Horstmann, Gary Cornell. Core Java, Core Java Volume-1 – Fundamentals, 9th edition, Pearson Education, 2014.
2. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.

ADDITIONAL LEARNING SOURCES:

1. http://www.oracle.com/technetwork/java/index-jsp-135888.html
2. http://www.javaworld.com/article/2074929/core-java
3. http://www.javaworld.com/
4. http://www.learnjavaonline.org/

Department of Computer Applications, JSS Science and Technology University, Mysuru							
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				Theory	**Laboratory**	**Tutorials**	
II	III	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA350	Analysis and Design of Algorithms	C and Data Stucture

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understand basic notion of algorithm, fundamentals of algorithms and data structures.
CO 2: Implement various searching and sorting algorithms.
CO 3: Able to implement efficient algorithms w.r.t time and space.
CO 4: Understand divide and conquer strategy, decrease and conquer, greedy and dynamic algorithms.
CO 5: Incorporate efficient algorithms into the applications they write.

TOPICS COVERED:

UNIT:1 - 10 Hours
Introduction
Notion of Algorithm, Fundamentals of Algorithmic Problem Solving, Important Problem Types, Fundamental data Structures.

UNIT:2 - 10 Hours
Fundamentals of the Analysis of Algorithm Efficiency
Analysis Framework, Asymptotic Notations and Basic efficiency classes, Mathematical analysis of Recursive and Non-recursive algorithms, Examples

UNIT:3 - 10 Hours
Brute Force and Exhaustive Search
Selection Sort and Bubble Sort, Sequential Search and String Matching, Exhaustive Search, Merge-sort, Quick-sort, Binary Search, Binary tree Traversals and related properties.

UNIT:4 - **10 Hours**
Decrease-and-Conquer & Divide-and-Conquer Insertion Sort, Depth First search and Breadth First Search, Topological sorting, Algorithms for Generating Combinatorial Objects. Merge Sort, Quick Sort and Binary tree traversal and related properties, Strassen's Matrix Multiplication.

UNIT:5 - **12 Hours**

Transform and Conquer and Space and Time Tradeoffs

Presorting, Balanced Search Trees, Heaps and Heap sort, Problem Reduction, Sorting by Counting, Input Enhancement in String Matching, Computing a binomial coefficient.

TEXT BOOKS / REFERENCES:

Text books:

1. Anany Levitin: Introduction to the Design and Analysis of Algorithms, Pearson Education, 2003.

Reference books:

1. Coremen T.H., Leiserson C.E., and Rivest R.L.: Introduction to Algorithms, PHI, 1998.
2. Horowitz E., Sahani S., Rajasekharan S.: Computer Algorithms, Galgotia Publications, 2001.

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/data_structures_algorithms/
2. http://nptel.ac.in/courses/106101060/

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	III	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA360	Data Communications and Networking	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Data communication concepts and design of Network models.
CO2: Data transmission in the form of electromagnetic signals across a transmission medium.
CO3: Mechanisms for detecting and correcting errors.
CO4: Explore few client-server application programs
CO5: Concepts of Data compression and Multimedia.

TOPICS COVERED:

UNIT 1 - Data Communications Concepts, Network Models **12 Hours**

Data Communications: Components, Data Representation, Data Flow, Networks; Network Criteria, Physical Structures, Network Types: LAN, WAN, Switching, the internet, accessing the internet. Internet History: Early History, Birth of the internet, Internet today. Standards and Administrations: Internet standards, Internet Administration.
Network Models Protocol Layering: Principles of Protocol Layering, Logical Connections, TCP/IP Protocol Suite: Layered Architecture, Layers in the TCP/IP Protocol Suite, Encapsulation and Decapsulation, Addressing, Multiplexing and Demultiplexing, The OSI Model; OSI versus TCP/IP, Lack of OSI Model's Success,

UNIT 2 – Data Transmission, Digital and Analog signals **10 Hours**

Data Transmission: Parallel Transmission, Serial Transmission, Bit Rate, Receiving Data Bits. Modes of data transmission: Asynchronous Transmission, Synchronous Transmission. Transmission Channels: Bauds, Baseband Transmission, Modem.
Data and Signals: Analog and Digital data, Analog and Digital signals, Periodic and Non-Periodic signals. Periodic Analog Signals: Sine Wave, Phase, Wavelength, Time and Frequency Domains, Composite Signals, Bandwidth. Digital Signals: Bit rate, Bit length, Digital signal as a composite analog signal. Transmission Impairment: Attenuation, Distortion, Noise. Data rate Limits: Noiseless channel: Nyquist Bit Rate, Noisy Channel: Shannon Capacity, Using both limits. Performance: Bandwidth, Throughput, Latency(delay), Bandwidth Delay Product, Jitter.

UNIT 3 – Error Detection and Correction **10 Hours**

Introduction: Types of Errors, Redundancy, Detection versus Correction, Coding. Block Coding:Error Detection. Cyclic Codes:Cyclic Redundancy Check, Polynomials,Cyclic Code Encoder Using Polynomials, Cyclic Code Analysis,Advantages of Cyclic Codes,Hardware Implementation. Checksum:Concept,Other Approaches to the Checksum. Forward Error Correction:Using Hamming Distance, Using XOR,Chunk Interleaving, Combining Hamming Distance and Interleaving,Compounding High-and Low-Resolution Packets.

UNIT 4 – Standard Client-Server Protocols **10 Hours**

World Wide Web and HTTP: World Wide Web, HyperText Transfer Protocol FTP: Two Connections, Control Connection, Data Connection, Security for FTP. Electronic Mail: Architecture, Web-Based Mail, E-mail Security. TELNET: Local versus Remote Logging. Secure Shell(SSH): Components, Applications. Domain Name System (DNS): Name Space, DNS in the Internet, Resolution, Caching, Resourse Records, DNS Messages, Registrars, DDNS, Security of DNS.

UNIT 5 – Data Compression and Multimedia **10 Hours**

Compression: Lossless Compression, Lossy Compression. Multimedia Data: Text, Image, Video, Audio. Multimedia in the Internet: Steaming Stored Audio/Video, Steaming Live Audio/Video, Real-Time Interactive Audio/Video. Real-Time Interactive Protocols: Rationale for New Protocols, RTP, RTCP, Session Initialization Protocol (SIP), H.323.

TEXT BOOKS / REFERENCES:

Text books:

1. B. A. Forouzan, Data Communications and Networking, 5th Edition, McGraw Hill Education (India) Private Limited, 2013.
2. William Stallings, Data and Computer Communications, 10th Edition, Pearson, 2013.
3. Data Communications and Computer Networks, Prakash C Gupta, 2006.

Reference books:

1. Larry L. Peterson and Bruce S. David: Computer Networks – A Systems Approach, 5th Edition, Elsevier, 2011.
2. Andrew S. Tanenbaum, Computer Networks, Fourth Edition, PHI, 2008.
3. Fred Halsall, Data Communications, Computer Networks and Open Systems, 4th Edition, Pearson Education, 2005.

ADDITIONAL LEARNING SOURCES:

1. www.nptel.ac.in/courses
2. http://freevideolectures.com/Course/2276/Computer-Networks

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	III	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
BCA32L		Database Management System Laboratory				Data Structures	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Analyse the concepts of data models and modeling notations, understanding the need of database, developing a database.
CO 2: Relate and Design the Entity Relationship models, diagrams.
CO 3: Solve algebraic expressions/ operations on relational database and mapping.
CO 4: Use of SQL,Design the queries to handle all the basic and advanced operations on DBMS, need and modes of normalising the databases.
CO 5: Design of applications which handles the operations involved in RDBMS.

LIST OF PROGRAMS TO BE COVERED:

1. Consider the following relations:
   Student (snum: integer, sname: string, major: string, level: string, age: integer)
   Class (name: string, meets at: string, room: string, d: integer)
   Enrolled (snum: integer, cname: string)
   Faculty (fid: integer, fname: string, deptid: integer)
   The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)

   Write the following queries in SQL. No duplicates should be printed in any of the answers.
   - Find the names of all Juniors (level = JR) who are enrolled in a class taught by Prof. XYZ
   - Find the names of all classes that either meet in room R128 or have five or more Students enrolled.
   - Find the names of all students who are enrolled in two classes that meet at the same time.
   - Find the names of faculty members who teach in every room in which some class is taught.

 Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five.

2. The following relations keep track of airline flight information:

Flights (no: integer, from: string, to: string, distance: integer, Departs: time, arrives: time, price:real.
Aircraft (aid: integer, aname: string, cruisingrange: integer)
Certified (eid: integer, aid: integer)
Employees (eid: integer, ename: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well; certified for some aircraft, and only pilots are certified to fly.
Write each of the following queries in SQL.

 Find the names of aircraft such that all pilots certified
 Find the names of aircraft such that all pilots certified to operate have salaries more than
Rs.80, 000.
 For each pilot who is certified for more than three aircrafts, find the eidand the maximum cruisingrangeof the aircraft for which she or he is certified
 Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.
For all aircraft with cruisingrangeover 1000 Kms, .find the name of the aircraft and the average salaryof all pilots certified for this aircraft.
 Find the names of pilots certified for some Boeing aircraft.
 Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.

3. Consider the following database of student enrollment in courses & books adopted for each course.

STUDENT (regno: string, name: string, major: string, bdate:date)
COURSE (course #:int, cname:string, dept:string)
ENROLL (regno:string, course#:int, sem:int, marks:int)
BOOK _ ADOPTION (course# :int, sem:int, book-ISBN:int)
TEXT (book-ISBN:int, book-title:string, publisher:string, author:string)

 Create the above tables by properly specifying the primary keys and the foreign keys.
 Enter at least five tuples for each relation.
 Demonstrate how you add a new text book to the database and make this book be adopted by some Department.
 Produce a list of text books (include Course #, Book-ISBN, Book-title) in the alphabetical order for Courses offered by the ‘CS’ department that use more than two books.
 List any department that has all its adopted books published by a specific publisher.
 Generate suitable reports.
 Create suitable front end for querying and displaying the results.

4. The following tables are maintained by a book dealer.

AUTHOR (author-id:int, name:string, city:string, country:string)
PUBLISHER (publisher-id:int, name:string, city:string, country:string)
CATALOG (book-id:int, title:string, author-id:int, publisher-id:int, category-id:int, year:int, price:int)

CATEGORY (category-id:int, description:string)
ORDER-DETAILS (order-no:int,book-id:int, quantity:int)

- Create the above tables by properly specifying the primary keys and the foreign keys.
- Enter at least five tuples for each relation.
- Give the details of the authors who have 2 or more books in the catalog and the price of the books is greater than the average price of the books in the catalog and the year of publication is after 2000.
- Find the author of the book which has maximum sales.
- Demonstrate how you increase the price of books published by a specific publisher by 10%.
- Generate suitable reports.
- Create suitable front end for querying and displaying the results.

5. Consider the following database for a banking enterprise

BRANCH(branch-name:string, branch-city:string, assets:real)
ACCOUNT(accno:int, branch-name:string, balance:real)
DEPOSITOR(customer-name:string, accno:int)
CUSTOMER(customer-name:string, customer-street:string, customer-city:s
LOAN(loan-number:int, branch-name:string, amount:real)
BORROWER(customer-name:string, loan-number:int)

- Create the above tables by properly specifying the primary keys and the foreign keys
- Enter at least five tuples for each relation
- Find all the customers who have at least two accounts at the Main branch.
- Find all the customers who have an account at all the branches located in a specific city.
- Demonstrate how you delete all account tuples at every branch located in a specific city.
- Generate suitable reports also suitable front end for querying and displaying the results.

TEXT BOOKS / REFERENCES:

Text Books :

1. Database Management Systems by G K Guptha, Mc Grawhill Publications.
2. Database Systems, Models, Languages, Design and Application Programming by Elmasri & Navathe, Pearson Publications.

Reference books:

1. “Database System Concepts”, A.Silberschatz, Henry.F.Korth, S.Sudharshan, 6th Edition.
2. “Database Systems”, Ramez Elmasri, Shamkant.B.Navathe, 6th Edition.

ADDITIONAL LEARNING SOURCES:

1. www.tutorialspoint.com/sql/sql-rdbms-concepts.htm
2. nptel.ac.in/courses/106106093/6
3. msdis.missouri.edu/resources/gis_advanced/pdf/relational.pdf

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	III	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
MCA34L		Java Programming Laboratory				OOP Concepts	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understand and implement programs on structure and components of a Java language

CO 2: Understand classes, objects, members of a class and use packages and interfaces appropriately.

CO 3: Demonstrate for Java program for multithread, synchronization and exception handling concepts.

CO 4: Use the concept of string, event handling, simple data structures like arrays and members of classes of Java API in application development

CO 5: Design and develop Java based UI and Networking applications using applets, swing components and networking concepts.

LIST OF PROGRAMS TO BE COVERED:

1. Write a program to display Hello world
2. Write a program to ODD and EVEN numbers
3. Write a program to find factorial of number
4. Write a program to find the sum of the digits of a given number
5. Write a program to swap two numbers without using a temporary variable
6. Write a program accepts a name and display the name with greeting message using Class.
7. Write a program to generate a salary for an employee using class, object, constructors, methods and access control. Different parameters to be considered are Emp_No, Emp_Name, Age, Basic, DA, HRA, CA, PT, IT.
8. Write a program to generate a sales report for a sales executive using class, object, constructors, methods and access control. Different parameters to be considered are Emp_No, Emp_Name, Sales_Q1, Sales_Q2, Sales_Q3, Sales_Q4.
9. Write a JAVA Program to demonstrate Constructor Overloading and Method Overloading.
10. Write a JAVA Program to implement Inner class and demonstrate its Access protection.

11. Write a program in Java for String handling which performs the following:
    a. Checks the capacity of StringBuffer objects.
    b. Reverses the contents of a string given on console and converts the resultant string in upper case.
    c. Reads a string from console and appends it to the resultant string of ii.
12. Write a JAVA Program to demonstrate Inheritance.
13. Simple Program on Java for the implementation of Multiple inheritance using
    a. interfaces to calculate the area of a rectangle and triangle.
14. Write a JAVA program which has
    a. A Class called Account that creates account with 500Rs minimum balance, a deposit() method to deposit amount, a withdraw() method to withdraw amount and also throws LessBalanceException if an account holder tries to withdraw money which makes the balance become less than 500Rs.
    b. A Class called LessBalanceException which returns the statement that says withdraw amount (Rs) is not valid.
    c. A Class which creates 2 accounts, both account deposit money and one account tries to withdraw more money which generates a LessBalanceException take appropriate action for the same.
15. Write a JAVA program using Synchronized Threads, which demonstrates Producer
16. Consumer concept.
17. Write a JAVA program to implement a Queue using user defined Exception Handling (also make use of throw, throws.).
18. Complete the following:
    a. Create a package named shape.
    b. Create some classes in the package representing some common shapes like Square,
    c. Triangle and Circle. Import and compile these classes in other program.
19. Write a JAVA Program
    a. Create an enumeration Day of Week with seven values SUNDAY through SATURDAY. Add a method is Workday( ) to the DayofWeek class that returns true if the value on which it is called is MONDAY through FRIDAY. For example, the call DayOfWeek.SUNDAY.isWorkDay ( ) returns false.
20. Write a JAVA program which uses Datagram Socket for Client Server Communication.
21. Write a JAVA applet program, which handles keyboard event.
22. Write a JAVA Swing program, to design a form.

TEXT BOOKS / REFERENCES:

Text books:

1. Herbert Schildt. Java - The Complete Reference, Ninth Edition. Oracle Press, McGraw Hill Education (India) Edition- 2014.

Reference books:

1. Cay S. Horstmann, Gary Cornell. Core Java, Core Java Volume-1 – Fundamentals, 9th edition, Pearson Education, 2014.
2. Timothy Budd, “Understanding Object-oriented programming with Java”, Updated Edition, Pearson Education, 2000.

ADDITIONAL LEARNING SOURCES:
1. http://www.learnjavaonline.org/ 2. https://www.codecademy.com/learn/learn-java 3. http://www.tutorialspoint.com/java/ 4. http://www.java-examples.com/

Department of Computer Applications, JSS Science and Technology University, Mysuru							
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				Theory	**Laboratory**	**Tutorials**	
II	III	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
BCA35L		Analysis and Design of Algorithms Laboratory				C and Data Stuctures	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

- **CO 1:** Understand basic notion of algorithm, fundamentals of algorithms and data structures.
- **CO 2:** Implement various searching and sorting algorithms.
- **CO 3:** Able to implement efficient algorithms w.r.t time and space.
- **CO 4:** Understand divide and conquer strategy, decrease and conquer, greedy and dynamic algorithms.
- **CO 5:** Incorporate efficient algorithms into the applications they write.

LIST OF PROGRAMS TO BE COVERED:

PART-A

1. Implement Recursive Binary search and Linear search and determine the time required to search an element. Repeat the experiment for different values of n, the number of elements in the list to be searched and plot a graph of the time taken versus n.
2. Sort a given set of elements using the Heapsort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
3. Sort a given set of elements using Merge sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
4. Sort a given set of elements using Selection sort and determine the time required to sort elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.
5. Implement 0/1 Knapsack problem using dynamic programming.
6. From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm.
7. Sort a given set of elements using Quick sort method and determine the time required sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted and plot a graph of the time taken versus n.

8. Find Minimum Cost Spanning Tree of a given undirected graph using Kruskal's algorithm.
9. a. Print all the nodes reachable from a given starting node in a digraph using BFS method.
   b. Check whether a given graph is connected or not using DFS method.
10. Find a subset of a given set S = {sl,s2,.....,sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S= {1,2, 5, 6, 8} and d = 9 there are two solutions{1,2,6}and{1,8}.A suitable message is to be displayed if the given problem instance doesn't have a solution.
11. a. Implement Horspool algorithm for String Matching.
    b. Find the Binomial Co-efficient using Dynamic Programming.
12. Find Minimum Cost Spanning Tree of a given undirected graph using
Prim's algorithm.
13. a. Implement Floyd's algorithm for the All-Pairs- Shortest-Paths problem.
    b. Compute the transitive closure of a given directed graph using Warshall's algorithm.
14. Implement N Queen's problem using Back Tracking.

TEXT BOOKS / REFERENCES:

Text books:

1. Anany Levitin: Introduction to the Design and Analysis of Algorithms, Pearson Education, 2003.

Reference books:

1. Coremen T.H., Leiserson C.E., and Rivest R.L.: Introduction to Algorithms, PHI, 1998
2. Horowitz E., Sahani S., Rajasekharan S.: Computer Algorithms, Galgotia Publications, 2001.

ADDITIONAL LEARNING SOURCES:

1. https://www.tutorialspoint.com/data_structures_algorithms/
2. http://nptel.ac.in/courses/106101060/

IV Semester
Grid and Syllabus

Scheme of Teaching and Examination

Fourth Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA410	Indian Language –Kannada –IV	Kannada	2	0	0	2.0	2	50	50	50	1.5
2.	BCA420	Data Warehouse and Mining	CA	4	0	0	4.0	4	50	50	100	3
3.	BCA430	Management Information System	CA	4	0	0	4.0	4	50	50	100	3
4.	BCA440	Python Programming	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA450	Cloud Computing	CA	4	0	0	4.0	4	50	50	100	3
6.	BCA460	Foreign Language	Language	2	0	0	2.0	2	50	50	50	1.5
7.	BCA42L	Data Warehouse and Mining Laboratory	CA	0	0	1	1.0	2	50	00	50	-
8.	BCA44L	Python Programming Laboratory	CA	0	0	1	1.0	2	50	00	50	-
Total				22	0	2	22	26	400	300	650	-

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	IV	Theory	02	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA410	Indian Language –Kannada –IV	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [50 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: ದಾಯಾದಿ ಮತ್ಸರದಿಂದುಂಟಗುವ ಅನಾಹುತ, ಸ್ವಾಭಿಮಾನದ ಮಹತ್ವದ ಅರಿವು
CO 2: ಸಂಸ್ಕೃತಿಯ ಪರಿಚಯ
CO 3: ರೈತ ಅಥವಾ ಮಹಿಳಾ ಸಮಸ್ಯೆ–ಪರಿಹಾರ
CO 4: ಶಿಷ್ಟ ಭಾಷೆಯ ವ್ಯಾಕರಣ ಜ್ಞಾನ
CO 5: ಪದ್ಯರಚನಾ ಕ್ರಮದಲ್ಲಿ ಛಂಧಸ್ಸಿನ ಬಳಕೆಯ ಅರಿವು

TOPICS COVERED:

UNIT:1 – **05 Hours**

ಪದ್ಯ ಭಾಗ--- ಅಭಿಮಾನಧನಂ ಸುಯೋಧನಂ--ಪಂಪ

UNIT:2 – **05 Hours**

ವಿಚಾರ ಸಾಹಿತ್ಯ --ನಮ್ಮ ಸಂಸ್ಕೃತಿ ಹೆಮ್ಮೆ ಸಾಲದೆ--ಶಿವರಾಮಕಾರಂತ

UNIT:3 -

ಭಾಷಾಕೌಶಲ್ಯ ಚಟುವಟಿಕೆ--ಸಾಮಾಜಿಕ ನಾಟಕ: ದೈನಂದಿನ ಬಳಕೆ ವಸ್ತು, ವ್ಯಕ್ತಿ, ಭಾವನೆಗಳ ಮೇಲೆ ಒಂದು ಸಣ್ಣ ನಾಟಕ

UNIT:4 - **05 Hours**

ವ್ಯಾಕರಣ-- ವಾಕ್ಯರಚನೆ–ದ್ವಿರುಕ್ತಿ, ಜೋಡುನುಡಿ, ಚಿಹ್ನೆಗಳು

UNIT:5 – **05 Hours**

ಛಂಧಸ್ಸು-- ರಗಳೆ, ಷಟ್ಪದಿ, ಸಾಂಗತ್ಯ

TEXT BOOKS / REFERENCES:

Text books: 1.ವಿಕ್ರಮಾರ್ಜುನ ವಿಜಯ–ಪಂಪ

2. ..ಛಂಧಸ್ಸು

3.ವ್ಯಾಕರಣ

Reference books: .ಸ್ಪರ್ಧಾತ್ಮಕ ಪರೀಕ್ಷೆಗಳ ಪುಸ್ತಕಗಳು

2.ಕನ್ನಡ ಸಾಹಿತ್ಯ ಚರಿತ್ರೆ–ರಂ.ಶ್ರೀ. ಮುಗಳಿ

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	IV	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA420	Data Warehouse and Mining	DBMS

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: To understand the fundamental processes, concepts and techniques of data mining and warehousing.

CO 2: To develop an appreciation for the inherent complexity of the data-mining and warehousing tasks

CO 3: To Analyze the Advance programming skills relevant to the data-mining and warehousing task.

CO 4: Will make students Understanding of contemporary data-mining and warehousing systems.

CO 5: To understand the concepts, strategies, and methodologies related to the design and construction of data mining.

TOPICS COVERED:

UNIT:1 – Data Warehouse **10 Hours**

Data Warehouse basic concept, Data Warehouse modeling: Data Cube and OLAP, Data Warehouse design and usage, Data warehouse implementation, Data Generalization by Attribute-oriented Introduction. Data Cube Technology: Data Cube computation: Preliminary concepts, Data Cube computation Methods.

UNIT 2 – Introduction to Data Mining **10 Hours**

Introduction: Data Mining, Different kinds of data used for mining, Technologies used, applications of Data Mining, issues in Data Mining, Data objects and attributes type, Basic statistical description of data, Data Visualization.

UNIT 3 –Data Processing and Frequent Pattern Mining **10 Hours**

Data Processing: an overview, Data cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization. Basic concepts of Frequent Itemset, Frequent Itemset Mining methods and Pattern Evaluation Methods.

UNIT 4– Advanced pattern mining and classification **12 Hours**

Pattern Mining: A road map, Pattern Mining in Multilevel, Multidimensional Space, and Classification: Basic Concepts, Decision tree Introduction, Bayes Classification methods, and Rule-based classification.

UNIT 5–Clustering and Data Mining Trends and Applications **10 Hours**

Clustering Analysis, Partitioning Methods, Hierarchical Methods, Mining complex data types, other methodologies of data mining, data mining applications, data mining and society.

TEXT BOOKS / REFERENCES:

1.Jiawei Han, Micheline Kamber, "Data Mining Concepts and Techniques", Morgan Kauf Mann Publishers.2012

2.Arun.K.Poojari, "Warehousing and Mining", PHI 2010

3.Liu. B, "Web Data Mining, Exploring Hyperlinks, Contents and Usage Data", Springer, 2012.

ADDITIONAL LEARNING SOURCES:

1.web.cse.ohio-state.edu/~srini/674/part1.ppt.

2.www.cse.iitb.ac.in/~dbms/Data/Talks/datamining-intro-IEP.

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	IV	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA430	Management Information System	--

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Able to understand the concepts of system, system components and development techniques with case studies.

CO 2: Design and develop Information system for business environment by understanding the need and criticality of type of information and integrate information system into business requirement using management techniques.

CO 3: Apply the different strategies for the management of business to formulate business process.

CO 4: Analyze the need for business process re-engineering, and the process of making

CO 5: Understand the concepts and functionalities of enterprise systems like ERP, SCM and DSS.

TOPICS COVERED:

UNIT 1-Systems Engineering, Information and Knowledge 14 Hours

System concepts, system control, types of systems, handling system complexity, Classes of systems, General model of MIS, Need for system analysis, System analysis for existing system & new requirement, system development model, MIS & system analysis. Information concepts, classification of information, methods of data and information collection, value of information, information: A quality product, General model of a human as information processor, Knowledge, Introduction of MIS: MIS: Concept, Definition, Role of the MIS, Impact of MIS, MIS and the user, Management as a control system, MIS support to the management, Management effectiveness and MIS, Organization as system. MIS: organization effectiveness.

UNIT 2- Decision Making and DSS 08 Hours

Decision making concepts; decision making process, decision-making by analytical modeling, and Behavioral concepts in decision making, organizational decision-making, Decision structure, DSS components, and Management reporting alternatives

UNIT 3- Electronic Business systems 10 Hours

Enterprise business system – Introduction, cross-functional enterprise applications, real world case, Functional business system, - Introduction, marketing systems, sales force automation,

CIM, HRM, online accounting system, Customer relationship management, ERP, Supply chain management (real world cases for the above)
E-business Technology: Introduction to E-business, model of E-business, internet and World Wide Web, Intranet/Extranet, Electronic, Impact of Web on Strategic management, Web enabled business management, MIS in Web environment.

UNIT 4- Strategic Management of Business **10 Hours**

Concept of corporate planning, Essentiality of strategic planning, Development of the business strategies, Type of strategies, short-range planning, tools of planning, MIS: strategic business planning. Planning fundamentals (real world cases), Organizational planning, planning for competitive advantage, (SWOT Analysis).

UNIT 5: E-Commerce Introduction **10 Hours**

Course overview; Introduction to e-commerce, E-commerce Business Models and Concepts, Ecommerce Infrastructure: The Internet and World Wide Web, Web design, JavaScript Internet Information Server (IIS); Personal Web Server (PWS). Ethical, Social and Political Issues in E-Commerce.

TEXT BOOKS / REFERENCES:

TEXT BOOKS :

1. Waman S Jhawadekar: Management Information System, 3rd Edition, Tata McGraw Hill.
2. James A O'Brien and George M Marakas: Management Information System, 7th Edition, Tata McGraw Hill, 2006
3. Turban, Rainer, and Potter, Introduction to E-Commerce, second edition, 2003
4. H. M. Deitel, P. J. Deitel and T. R. Nieto, E-Business and E-Commerce: How to Program, Prentice hall, 2001

REFERENCES:

1. Ralph M Stair and George W Reynolds: Principles of Information Systems, 7th Edition, Thomson, 2010.
2. Steven Alter: Information Systems - The Foundation of E-Business, 4th Edition, Pearson Education, 2001.
3. Elizabeth Chang: E-Commerce Fundamentals and Applications, Wile India Edition.

ADDITIONAL LEARNING SOURCES:

1. ncbi.nlm.nih.gov
2. Tutorialpoint.com

Department of Computer Applications, JSS Science and Technology University, Mysuru

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
II	IV	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA440	Python Programming	OOPS Concepts

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understand and comprehend the basics of python programming.
CO 2: Apply knowledge in real time applications.
CO 3: Understands about files and its applications
CO 4: Apply object-oriented programming concepts.
CO 5: To develop dynamic interactive Python applications.

TOPICS COVERED:

UNIT:1– Introduction to Python **10 Hours**

Python Basics: Data Types, Operators, Input/output Statements, Creating Python Programs, Python Flow Control statements: Decision making statements, Indentation, Conditionals, loops, break, continue, and pass statements. Strings, lists, Tuples, Dictionaries

UNIT:2 – Python Functions **10 Hours**

Defining functions, DOC strings, Function parameters: default, keyword required and variable length arguments, key-word only parameters, local and global variables, pass by reference versus value, Anonymous functions, Recursion. Functional Programming:
Mapping, Filtering and Reduction, Lambda Functions, List Comprehensions.

UNIT:3 - Object Oriented Programming **10Hours**

Definition and defining a class, Constructor, Destructor, self and del keywords, Access to Attributes and Methods, geattr and hasattr attributes, Data Attributes and Class Attributes, Data Hiding, Inheritance, Static Members.

UNIT:4 - File Handling **12 Hours**

File object attributes, Read and Write into the file, Rename and Delete a File, Exceptions Handling: Built-in Exceptions and User defined Exceptions GUI Programming.

UNIT:5 – Python GUI Programming **10 Hours**

Introduction to Python GUI Programming, Tkinter Programming, Tkinter widgets, Events and Bindings**.**

TEXT BOOKS / REFERENCES:

Text books:

1. Timothy A. Budd: Exploring Python, Tata McGraw-Hill, 2011.

Reference books:

1. Ascher, Lutz: Learning Python, 4th Edition, O'Reilly, 2009.
2. Wesley J Chun: Core Python Applications Programming, Pearson Education, 3rd Edition, 2013.
3.Paul Gries, Jennifer Campbell, Jason Montojo , Practical Programming: An introduction to Computer Science Using Python, second edition, Pragmatic Bookshelf.
4.Allen Downey , Jeffrey Elkner , Learning with Python: How to Think Like a Computer Scientist Paperback –, 2015

ADDITIONAL LEARNING SOURCES:

http://www.network-theory.co.uk/docs/pytut/
http://docs.python.org/tutorial/
http://zetcode.com/tutorials/pythontutorial/
http://www.sthurlow.com/python/ http://www.tutorialspoint.com/python/

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	IV	Theory	04	04	00	00	52

Course No	**Course Title**	**Pre Requisites**
BCA450	Cloud Computing	Computer Networks, Data Communication

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understand the cloud types, models, characteristics, obstacles of Cloud Computing.
CO 2: Understand the cloud architectures, and use of service models by applications types.
CO 3: Work on any real cloud service considering all the cloud services.
CO 4: Understand the service Management and Security of Cloud.
CO 5: Understand the connecting to the cloud, the Computing Paradigms and Cloud Computing.

TOPICS COVERED:

UNIT :1- Defining Cloud Computing, Assessing the Value Proposition. 10 Hours

Defining Cloud Computing, Cloud types: The NIST model, The Cloud Cube Model, Deployment models, Service models, Examining the Characteristics of Cloud Computing: paradigm shift, benefits of cloud computing, disadvantages of cloud computing, Assessing the role of open standards.
Assessing the Value Proposition: Measuring the Cloud's Value: Early adopters and new application, the laws of cloudonomics, Cloud computing obstacles, Behavioral factors relating to cloud adoption, Measuring cloud computing costs. Avoiding Capital Expenditures: Right-sizing. Computing the total cost of ownership, specifying service level agreements, Defining licensing models.

UNIT:2 - Understanding Cloud Architecture, Services and Applications by type.10 Hours

Exploring the Cloud Computing Stack: composability, Infrastructure, Platforms, Virtual appliances, communication protocols, applications. Connecting to the cloud: The Jolicloud Netbook OS, Chromium OS: The browser as an Operating System.
Understanding Service and Application by Type: Defining Infrastructure as a service (IaaS), IaaS Workloads, Pods, aggregation and silos. Defining Platform as a Service (PaaS), Defining

Software as a Service (SaaS): SaaS Characteristics, Open SaaS and SOA, Salesforce.com and CRM SaaS. Defining Identity as a Service (IDaaS): What is an identity? Network identity service classes, Identity system codes of conduct, IDaaS interoperability: User authentication, Authorization markup languages and Defining Compliance as a Service (CaaS).

UNIT:3 – Understanding Abstraction and Virtualization, Capacity Planning. 10 Hours

Understanding Abstraction and Virtualization: Using Virtualization technologies, Load Balancing and Virtualization: Advanced load Balancing, the google cloud. Understanding Hypervisors: Virtual Machine types, VMware vSphere. Understanding Machine Imaging, Porting Applications: The Simple Cloud API, AppZero Virtual Application Appliance

Capacity Planning, Defining Baseline and Metrics: Baseline measurements, System Metrics, Load testing, Resource ceilings, server and instance types., Network Capacity, Scaling.

UNIT:4 – Exploring Platform as a Service, Managing the Cloud, Understanding the Cloud Security. 10 Hours

Exploring Platform as a Service: Defining Services: Salesforce.com versus Force.com: SaaS versus PaaS, Using PaaS Application Frameworks: Drupal, Eccentex AppBase 3.0, Long Jump, Squarespace, Wave Maker, Wolf Frameworks.

Managing the Clouds: Administrating the Clouds: Management responsibilities, Lifecycle management, Cloud Management Products, Emerging Cloud Management Standards: DMTF cloud Management standards, Cloud Commons and SMI.

Understanding Cloud Security: Securing the cloud: The security boundary, Security service Boundary, Security mapping., Securing data: Brokered cloud storage access, Storage location and tenancy, Encryption, Auditing and compliance, Establishing identity and Presence: Identity protocol standards, Windows Azure identity standards, Presence.

UNIT: 5 - Moving Applications to the Cloud, working with Cloud-Based Storage, Communicating with the cloud. 12 Hours

Moving Application to the Cloud: Application in the Cloud: Functionality Mapping, Application attributes, Cloud service attributes, System abstraction, Cloud bursting, Applications and cloud APIs.

Working with cloud-based storage: Measuring the digital universe: Cloud storage in the digital universe, Cloud Storage definition, Provisioning Cloud Storage: Unmanaged cloud storage, managed cloud storage, creating cloud storage systems, Virtual storage containers. Exploring Cloud Backup Solutions: Backup Types, Cloud Backup features, Cloud attached backup, Cloud Storage Interoperability: Cloud Data management Interface (CDMI), Open Cloud Computing Interface (OCCI).

Communicating with the cloud: Exploring instant messaging: Instant messaging clients, instant messaging interoperability, Micro-blogs or short Message services, exploring collaboration technologies, Using social networks: Features, List of social networking sites, privacy and security, interaction and interoperability.

TEXT BOOKS / REFERENCES:

Text Books:

1.Barrie Sosinsky “Cloud Computing Bible” Published by Wiley, 2015.

Reference Books:

1. Cloud Computing Principles and Paradigms by Rajkumar Buyya.
2. Cloud Computing Theory and Practice by Dan C.Marinescu.

ADDITIONAL LEARNING SOURCES:

1. www.scoopworld.in
2. www.cloudschool.com
3. www.techno-pulse.com

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	IV	Theory	02	02	00	00	26

Course No	**Course Title**	**Pre Requisites**
BCA460	Foreign Language	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Carry out basic conversation in German language with correct grammar, tense and suitable vocabulary.

CO 2: Develop appropriate pronunciation in German of alphabets and numbers.

CO 3: Read texts in German and able to write & respond to short messages, emails and letters on a basic level.

CO 4: Listen to messages, announcements in social context and able to follow the same.

TOPICS COVERED:

UNIT:1 – 10 Hours

Introduction: German Language, Alphabets and pronunciation.

UNIT:2 – 10 Hours

Theme: Name, Land, Familie und Geschwister, Menschen und Beruf, Einkaufen und Zahlen, Fahren und Reisen, Hause, Freunde und Kollegen, Essen und Trinken, Freizeitaktivitäten und Zeit, Feste und Jahrezeiten.

UNIT:3 - 10 Hours

Listening: Listening to social situations like mall announcements, talk between friends, railway/airport/ and be able to follow the monologue and dialogue.

UNIT:4 - 10 Hours

Reading: Reading texts from advertisements, signboards, short paragraphs from general articles and be able to understand and follow them.

UNIT:5 – 12 Hours

Performance: **Vocabulary and grammar**: Under all of the lesson themes.

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	IV	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
BCA42L		Data Warehouse and Mining Laboratory				DBMS	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understand the concepts, strategies, and methodologies related to the design and construction of data mining and warehouse.
CO 2: To develop an appreciation for the inherent complexity of the data-mining and warehousing tasks using R tool.
CO 3: Analyze the Advance programming skills relevant to the data-mining and warehousing task.
CO 4: Understand the contemporary data-mining and warehousing systems.
CO 5: Understand the basic classification and clustering rule using mining algorithms.

LIST OF PROGRAMS TO BE COVERED:

- To explore Data Warehouse implementation by performing OLAP queries using different schemas.
- To explore R tool by conducting programs on Data with R, Graphics with R, Statistical analysis with R, Programming with R in practice.
- List of Algorithms to be implemented Using R tool :

1. Demonstration of Association rule process on transaction dataset for sales prediction using Apriori Algorithm.
2. Demonstration of frequent pattern mining on binary datasets for Partition algorithm.
3. Demonstration of classification rule process on time series dataset using Decision tree algorithm for the prediction of result.
4. Demonstration of classification rule process on different continuous data using Bayes Theorem.
5. Demonstration of clustering rule process on datasets using simple k-Means algorithms.
6. Demonstration of clustering rule process on datasets using K-Medoids Algorithm.

TEXT BOOKS / REFERENCES:

1. Emmanuel Paradis's “R for beginners”.
2. Jiawei Han, Micheline Kamber, “Data Mining Concepts and Techniques”, Morgan Kauf Mann Publishers.2012.
3. Arun.K.Poojari, “Warehousing and Mining”, PHI 2010.
4. Liu. B, “Web Data Mining, Exploring Hyperlinks, Contents and Usage Data”, Springer, 2012.

ADDITIONAL LEARNING SOURCES:

1. http://www.tutorialspoint.com/r/r_tutorial.pdf
2. web.cse.ohio-state.edu/~srini/674/part1.ppt.
3. www.cse.iitb.ac.in/~dbms/Data/Talks/datamining-intro-IEP.

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
II	IV	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre Requisites**	
BCA44L		Python Programming Laboratory				OOPS	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO 1: Understand and comprehend the basics of python programming.
CO 2: Apply knowledge in real time applications.
CO 3: Understands about files and its applications
CO 4: Apply object-oriented programming concepts.
CO 5: To develop dynamic interactive Python applications.

LIST OF PROGRAMS TO BE COVERED:

1. Python program to check Armstrong number.
2. Python program to display powers of 2 using anonymous function.
3.Write a Python program to print alphabet pattern 'Z'
4. Write a Python program to get the number of occurrences of a specified element in an array.
5. Python Program to add two matrix.
6. Python program to transpose a matrix.
7. Python program to multiply two matrices.
8. Write a Python function that takes a list and returns a new list with unique elements of the first list.
9.Write a Python program to replace dictionary values with their sum
10. Python program to count occurrence of an elements in a list.
11. Python program to count number of vowels in a string.
12. Python program to split and join a string.
13. Python program to print even length words in a string.
14. Python program to find all duplicate characters in a string.
15. Write a Python program to convert a string to date, time.
16. Python program to find frequency of occurrence of words in a text.
17. Create a list of tuples from given list having number and its cube in each tuple.
18. Python program for recursive insertion sort.
19. Python program to merge two files.
20. Write a Python program to read a file line by line store it into an array.

21. Create a Python project for web application.

TEXT BOOKS / REFERENCES:

Text books:

1. Timothy A. Budd: Exploring Python, Tata McGraw-Hill, 2011.

Reference books:

1. Ascher, Lutz: Learning Python, 4th Edition, O'Reilly, 2009.
2. Wesley J Chun: Core Python Applications Programming, Pearson Education, 3rd Edition, 2013.
3. Paul Gries, Jennifer Campbell, Jason Montojo , Practical Programming: An introduction to Computer Science Using Python, second edition, Pragmatic Bookshelf.
4. Allen Downey , Jeffrey Elkner , Learning with Python: How to Think Like a Computer Scientist Paperback –, 2015

ADDITIONAL LEARNING SOURCES:

1. http://www.network-theory.co.uk/docs/pytut/
2. http://docs.python.org/tutorial/
3. http://zetcode.com/tutorials/pythontutorial/
4. http://www.sthurlow.com/python/ http://www.tutorialspoint.com/python/

V Semester
Grid and Syllabus

Scheme of Teaching and Examination

Fifth Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA510	Data Analysis & Visualization	CA	4	0	0	4.0	4	50	50	100	3
2.	BCA520	Fundamentals of Machine Learning	CA	4	0	0	4.0	4	50	50	100	3
3.	BCA530	Software Engineering	CA	4	0	0	4.0	4	50	50	100	3
4.	BCA540	Web Programming	CA	4	0	0	4.0	4	50	50	100	3
5.	BCA51L	Data Analytics Laboratory	CA	0	0	1	1.0	2	50	-	50	-
6.	BCA54L	Web Programming Laboratory	CA	0	0	1	1.0	2	50	-	50	-
7.	BCA56P	Mini Project	CA	0	0	2	2.0	2	50	-	50	-
Total				16	0	4	20	22	350	200	550	-

Department of Computer Applications, JSS Science and Technology University, Mysuru

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Theory	04	04	00	00	52

Course No	Course Title	Pre-Requisites
BCA510	Data Analysis and Visualization	DBMS, Data Wearhouse and Mining, Python Programming

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Understand the basics of data science for better understanding of data analysis.

CO2: Understand the basic concepts of data collection structures.

CO3: Understand the file operations and evaluating data.

CO4: Understand how to gather data, clean and perform evaluation based on analysis.

CO5: Understand the analyzed data and apply different plotting techniques.

TOPICS COVERED:

Unit: 1 – Introduction to data science **08 hours**

The ascendance of data, definition ofdata science, motivating hypothetical: DataSciencester: Finding Key Connectors,Data Scientists You May Know,Salaries and Experience, Paid Accounts, Topics of Interest, stages of data science.

Unit: 2 – Data Collection Structures **12 hours**

Lists: creating lists, accessing values in lists, adding and updating lists, deleting list elements, basic list operations, indexing, slicing and matrices, built-in list functions and methods, list functions, list methods, list sorting and traversing, lists and strings, Dictionaries: creating dictionaries, updating and accessing values in dictionaries, deleting dictionary elements, built-in dictionary functions, built-in dictionary methods, Tuples, Series, Data Frames, Panels.

Unit: 3 – File I/O Processing and Regular Expressions **10 hours**

File I/O processing: File I/O Processing, Data Input and Output, Opening and Closing files, File Object Attributes, Reading and Writing to Files, Directories in Python,Regular Expressions: Regular Expression Patterns, Special Character Classes, Repetition Classes, Alternatives, Anchors.

Unit: 4 – Data Gathering, Cleaning, Exploring and Analysis **12 hours**

Cleaning data, reading and cleaning CSV data, merging and integrating data, reading data from the JSON format, reading data from the HTML format, reading data from the XML format, series data structures, data frame data structures, data analysis.

Unit: 5 – Data Visualization and Case Studies **10 hours**

Direct Plotting: Line Plot, Bar Plot, Pie Chart, Box Plot, Histogram Plot, Scatter Plot, Seaborn Plotting System: Strip Plot, Box Plot, Swarm Plot, Joint Plot, Matplotlib Plot: Line Plot, Bar Chart, Histogram Plot, Scatter Plot, Stack Plot,Pie Chart, and case studies.

TEXT BOOKS / REFERENCES:

Text books:

1. Data Analysis and Visualization Using Python: Dr. OssamaEmbarak, 2018, Apress.

Reference books:

1. Data Science from Scratch: Joel Grus, First Edition, 2015, O'Reilly.

ADDITIONAL LEARNING SOURCES:

1. https://towardsdatascience.com/intro-to-data-science-531079c38b22.

Department of Computer Applications, JSS Science and Technology University, Mysuru

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours / Semester
				Theory	Laboratory	Tutorials	
III	VI	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA520	Fundamentals of Machine Learning	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 2 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- **CO1:** Understand the basics of Probability theory for better understanding of machine learning Concept.
- **CO2:** Understand several fundamental concepts and techniques in Image Processing and Pattern Recognition.
- **CO3:** Understand how to apply a variety of techniques to data, perform evaluation, model selection and feature extraction.
- **CO4:** Understand several fundamental concepts and techniques in machine learning.
- **CO5:** Should be able to design and implement machine learning solutions to classification problems.

TOPICS COVERED:

UNIT:1 – Introduction to Probability and Bayes' Theorem 10 Hours

Introduction, Probabilities of events, Random variables, Joint distributions and densities, Moments of Random variables, Estimation of Parameters from samples, Minimum risk estimators, Bayes' theorem, Multiple features, Decision Boundaries

UNIT:2 – Introduction to Image Processing and Pattern Recognition 12 Hours

Image Processing: Introduction, Digital Image, Image Sampling , Noise, Image processing methods, Image Enhancement, Segmentation and labeling, counting objects, Morphological Operations, texture, shape and color.

Pattern recognition: Introduction, Sensing, Segmentation and Grouping, Feature Extraction, Classification, Post Processing, Design Cycle, Learning and Adaptation.

UNIT:3 – Representation & Nearest Neighbor Based Classifiers 10 Hours

Data Structures for Pattern Representation; Representation of Clusters; Proximity Measures; Size of Patterns Abstractions of the Data Set; Feature Extraction; Feature Selection; Evaluation of Classifiers; Evaluation of Clustering. Nearest Neighbour Algorithm;Variants of the NN Algorithm; Use of the Nearest Neighbour Algorithm for Transaction Databases; Efficient Algorithms ; Data Reduction; Prototype Selection.

UNIT:4 – Fundamentals of Machine Learning **10 Hours**

Introduction, Learning associations, Classification, Regression, Supervised learning, Unsupervised learning, reinforcement learning, some basic concepts in machine learning, The log-sum-exp trick.

UNIT:5 – Supervised learning **10 Hours**

Learning a class from examples, Vapnik-Chervonenkis (VC) Dimension, Probably Approximately Correct (PAC) Learning, Noise, Learning Multiple Classes, Regression, Model Selection and Generalization, Dimensions of a Supervised Machine Learning Algorithm.

TEXT BOOKS / REFERENCES:

1. Earl Gose and Richard Johnsonbaugh, “Pattern Recognition and Image Analysis”, PHI Learning, 2009.
2. Richard O. Duda and Peter E. Hart, “Pattern classification”, Wiley student edition, 2010, 2nd edition.
3. M. Narasimha Murthy and V Susheela Devi, “Introduction to pattern recognition and machine learning”, IISc press , 2015.
4. Ethem Alpaydin, ”Introduction to Machine learning”, PHI learning, MIT Press, 2010, 2nd edition.
5. Tom Mitchael, “Machine Learning”, McGraw Hill, 1997.

Department of Computer Applications, JSS Science and Technology University, Mysuru

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours / Semester
				Theory	Laboratory	Tutorials	
III	V	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA530	SOFTWARE ENGINEERING	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

- **CO1:** An ability to identify, formulates, analyze, and solve problems.
- **CO2:** An ability to design, implements, and evaluate software based systems.
- **CO3:** An ability to apply knowledge of computing, mathematics, science, and engineering appropriate to the discipline.
- **CO4:** An ability to use current techniques, skills, and tools necessary for professional practice.
- **CO5:** Modeling and design of software systems and in the analysis of tradeoffs inherent in design decisions.

TOPICS COVERED:

UNIT – 1 Introduction **10 Hours**

Introduction: professional software development, software engineering ethics, case studies, Software Process: software process model, process activities, the rational unified process, Agile Software Development: Agile methods, plan-Driven and agile-development, Extreme programming, agile project Management, Scaling Agile methods.

UNIT – 2 System Requirement **10 Hours**

Requirements Engineering: Functional and Non-functional requirements; the software requirements document. Requirements Engineering Processes: Requirement specification, Requirements elicitation and analysis; Requirements validation; Requirements management. System Modeling: Context models, Interaction models, structural models, Behavioral models; Model-driven engineering.

UNIT – 3 Design and Implementation **12 Hours**

Architectural Design: Architectural Design decisions, architectural views, architectural patterns, Application architectures. Design and Implementation: object-oriented design using the UML, Design patterns, Implementation issues, open source development.Software Testing: Development Testing, Test-Driven testing, Release testing, user testing.

UNIT:4 - **10 Hours**

Software Evolution: Evolution process, program evolution dynamics, software maintenance, Legacy system development.

Dependability and Security: Dependability properties, Availability and reliability, Safety, Security

Dependability and security specification: Risk- driven requirements specification, safety specification, Reliability specification, Security specification, Formal specification.

UNIT:5 – **10 Hours**

Dependability Engineering: Redundancy and diversity, Dependable process, Dependable system architectures, Dependable programming.

Security Engineering: Security risk management, Design for security, System survivability.

Dependability and Security Assurance: Static analysis, reliability testing, Security testing, process assurance.

TEXT BOOKS / REFERENCES:

1. Roger S. Pressman, "*Software Engineering-A Practitioner's Approach*", Seventh Edition, Tata McGraw-Hill, 2010.
2. Ian Sommerville "*Software Engineering*", Ninth Edition, 2011
3. Richard Fairley , "*Software Engineering concepts*", Tata McGraw-Hill Publishing Company Pvt. Ltd., Ninth Edition

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
III	V	Theory	04	04	00	00	52
Course No		**Course Title**				**Pre-Requisites**	
BCA540		Web Programming				Programming concepts	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO1: Understand and apply basic design and usability principles when creating content for the internet.

CO2: Understand and apply the style properties and able to design.

CO3: Ability to design a client-side scripting.

CO4: Ability to understand and design server-side components.

CO5: Make informed and critical decisions regarding client development using XHTML, JavaScript and AngularJS.

TOPICS COVERED:

UNIT: 1 – HTML5 & CSS3 **12 Hours**

Introduction to Web Development, code, test, and validate a web page, HTML to structure a web page, CSS to format the elements of the web page, CSS box model for spacing, borders, and backgrounds, CSS for page layout, Responsive Web Design.

UNIT: 2 – JavaScript & jQuery **10 Hours**

Basic JavaScript Instructions, Functions, Methods & Objects, Decisions & Loops, Document Object Model, Events.

jQuery – Ajax & JSON, APIs, Form Enhancement & Validation.

UNIT 3 – XML **08 Hours**

Introduction – What is XML? , Where did XML come from? , What can I do with XML? , Markup and Core Concepts – Tags, Documents, Elements, Entities, Miscellaneous Markup, Modeling Information – Simple Data Storage

UNIT 4 – AngularJS **12 Hours**

The basics Angular JS, Introduction to MVC - Design patterns, model view controller, Introduction to filters, Built-in filters, AngularJS modules, Directives, the basic of directives,

AngularJS socks, Event handling directives, creating custom directive, the restrict option, the template option, the link option.

UNIT 5 – Introduction to Angular **10 Hours**

Working with forms, HTML Forms Overview, Angular JS Forms, validating forms, Using Services, Server Communication, Handling Returned Data, handling errors, Using URL Routes, Deployment Considerations - Configuration, Testing.

TEXT BOOKS / REFERENCES:

Text Books:

1. Murach's HTML5 and CSS3, Annie Boehm, Zak Ruvalcaba, Third Edition, Mike Murach & Associates, 2015.
2. Javascript & JQuery interactive front-end web development, Jon Duckett, John Wiley & Sons, 2014.
3. Learning XML, Erik T. Ray, Second Edition, O'Reilly, 2003.
4. Grant, Andrew, Beginning AngularJS, Apress Publication,2014.

Reference Books:

1. Robert W.Sebesta, Programming the World Wide Web, Third Edition, Pearson Education (2007).
2. Abders Moller and Michael Schwartzbach, An Introduction to XML and Web Technologies, Addison Wesley (2006).

ADDITIONAL LEARNING SOURCES:

1. https://www.w3schools.com
2. https://docs.angularjs.org/tutorial
3. A Better Way to Learn AngularJS
4. AngularJS Tutorial
5. https://cs.wmich.edu/~alfuqaha/spring18/cs5560/lectures/angular4_tutorial.pdf

Department of Computer Applications, JSS Science and Technology University, Mysuru

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours/ Semester
				Theory	Laboratory	Tutorials	
III	V	Laboratory	01	00	02	00	32

Course No	Course Title	Pre-Requisites
BCA51L	Data Analysis and Visualization Laboratory	DBMS, Data Warehouse and Mining, Python Programming

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation] Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Implement data collection structures.

CO2: Implement data gathering, cleaning using list, dictionaries, frames.

CO3: Implement data storage in file format and its relevant operations.

CO4: Implement the visualization techniques for better understanding / interpretation of data.

LIST OF PROGRAMS TO BE COVERED:

1. Write a program to create a list of names; then define a function to display all the elements in the received list. Call the function to execute its statements and display all names in the list.
2. Write a program to read text file data and create a dictionary of all keywords in the text file. The program should count how many times each word is repeated inside the text file and then find the keyword with a highest repeated number. The program should display both the keywords dictionary and the most repeated word.
3. Write a program to compare tuples of integers and tuples of strings.
4. Write a program to create a data frame to maintain three students' names associated with their grades in three courses and then add a new column named Mean to maintain the calculated mean mark per course. Display the final data frame.

Name	Course 1	Course 2	Course 3
Peter	110	103	+7
Alan	223	214	+9
George	197	120	+77

5. Write a Python script to extract a course number, code, name and to extract digits of size 4 and digits of size 2 to 4 using regular expressions from the following text:

   CoursesData = """510DAVData_Analytics_and_Visuaization

520BDBig_Data_Analytics
530SESoftware_Engineering"""

6. Write a Python script to extract each course's details in a tuple form from the following text using regular expressions. In addition, use regular expressions to retrieve string values in the CoursesData and then retrieve numerical values in CoursesData.
7. Write a Python script to read the data in an Excel file named movies.xlsx and save this data in a data frame called mov. Perform the following steps:
    a. Read the contents of the second sheet that is named 2000s in the Excel file (movies.xlsx) and store this content in a data frame called Second_sheet.
    b. Write the code needed to show the first seven rows from the data frame Second_sheet using an appropriate method.
    c. Write the code needed to show the last five rows using an appropriate method.
    d. Use a suitable command to show only one column that is named Budget.
    e. Use a suitable command to show the total rows in the first sheet that is called 2000s.
    f. Use a suitable command to show the maximum value stored in the Budget column.
    g. Use a suitable command to show the minimum value stored in the Budget column.
    h. Write a single command to show the details (count, min, max, mean, std, 25%, 50%, 75%) about the column User Votes.
    i. Using a suitable command, sort the Country values in ascending order (smallest to largest) and Avg_reviews in descending order (largest to smallest).
8. Create a data frame called df from the following tabular data dictionary that has these index labels: ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j'].

	Animal	Age	Priority	Visits
a	Cat	2.5	Yes	1
b	Cat	3.0	Yes	3
c	Snake	0.5	No	2
d	Dog	NaN	Yes	3
e	Dog	0.5	No	2
f	Cat	2.0	No	3
g	Snake	4.5	No	1
h	Cat	NaN	Yes	1
i	Dog	7.0	No	2
j	Dog	3.0	No	1

    a. Display a summary of the data frame's basic information.
    b. Return the first three rows of the data frame df.
    c. Select just the animal and age columns from the data frame df.
    d. Count the visit priority per animal.
    e. Find the mean of the animals' ages.
    f. Display a summary of the data set.
9. Create a random reading of any example and demonstrate types of plotting.
10. Case study – which will contain following process
    a. Data gathering
    b. Data analysis
    c. Data visualization
    d. Findings

Note: Course owner should decide regarding the type of dataset of CSV format for case study.

TEXT BOOKS / REFERENCES:

Text books:

1. Data Analysis and Visualization Using Python: Dr. OssamaEmbarak, 2018, Apress.

Reference books:

1. Data Science from Scratch: Joel Grus, First Edition, 2015, O'Reilly.

ADDITIONAL LEARNING SOURCES:

1. https://www.analyticsvidhya.com/blog/2016/01/complete-tutorial-learn-data-science-python-scratch-2/.

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
III	V	Laboratory	01	00	02	00	32
Course No		**Course Title**				**Pre-Requisites**	
BCA54L		Web Programming Laboratory				Programming concepts	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 2 Written Tests, Viva-voce + Record + Observation]
   Marks: 50 [15+15+10+5+5]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to,

CO1 : Create the web pages using HTML/XHTML and cascading sheets.

CO2 : Apply the skills to create JavaScript, AngularJS pages with in web pages for dynamic client-side programming and build XML document.

CO3 : Construct websites using a variety of skills and techniques.

LIST OF PROGRAMS TO BE COVERED:

HTML & JavaScript

1. Develop a program to create links to other HTML documents or web resources.
2. Develop a program to insert images into the HTML document with responsive design.
3. Develop a program to create ordered, unordered, definition, nested list.
4. Develop a program to validate an email id and show the response of valid or invalid on submission.

AngularJS

1. Program to evaluate expression.
2. Program to evaluate expression using variables.
3. Program to display first name and Last name.
4. Program to evaluate expression with numbers.
5. Program to evaluate expression with objects.
6. Program to evaluate expression with arrays.
7. Program to using a new directive as element.
8. Program to read a static JSON file.
9. Program to display a table with CSS.
10. Develop an Angular application to perform CRUD operations using database.
11. Develop an Angular application using database.
    a. User registration and login.
    b. Insert and fetch list of items from database and populate the items. After login allow user to add items into cart.

c. It should contain user icon with picture, cart summary, profile details and sign out.

TEXT BOOKS / REFERENCES:

Text Books:

1. Murach's HTML5 and CSS3, Annie Boehm, Zak Ruvalcaba, Third Edition, Mike Murach & Associates, 2015.
2. Javascript & JQuery interactive front-end web development, Jon Duckett, John Wiley & Sons, 2014.
3. Learning XML, Erik T. Ray, Second Edition, O'Reilly, 2003.
4. Grant, Andrew, Beginning AngularJS, Apress Publication,2014.

Reference Books:

1. Robert W.Sebesta, Programming the World Wide Web, Third Edition, Pearson Education (2007).
2. Abders Moller and Michael Schwartzbach, An Introduction to XML and Web Technologies, Addison Wesley (2006).

ADDITIONAL LEARNING SOURCES:

1. https://www.w3schools.com
2. https://docs.angularjs.org/tutorial
3. A Better Way to Learn AngularJS
4. AngularJS Tutorial
5. https://cs.wmich.edu/~alfuqaha/spring18/cs5560/lectures/angular4_tutorial.pdf

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Weeks/ Semester**
				Theory	**Laboratory**	**Tutorials**	
III	V	Mini Project	02	00	00	00	12
Course No		**Course Title**				**Pre-Requisites**	
BCA56P		Mini Project				NIL	

COURSE ASSESSMENT METHOD:

Internal Assessment [4 Events: Presentation and Report] Marks: 50.

COURSE OUTCOMES:

Upon Successful completion of the project, students are able to :

1. Apply the knowledge acquired within and beyond the curriculum.
2. Formulate and investigate a problem which is of current trend.
3. Apply Software Engineering methodologies by following Software Development Life Cycle (SDLC).
4. Communicate, interpret, design and implement efficiently.
5. Document and Present the processes involved in project implementation.

VI Semester
Grid and Syllabus

Scheme of Teaching and Examination

Sixth Semester BCA

SL. No.	Subject Code	Course Title	Teaching Department	Credits				Weekly Contact Hours	Marks			Exam Duration (Hrs)
				L	T	P	Total		CIE	SEE	Total	
1.	BCA610	Entrepreneurship & Leadership	CA	4	0	0	4.0	4	50	50	100	3
2.	BCA620	Big Data Analytics	CA	4	0	0	4.0	4	50	50	100	3
3.	BCA630	Project Work	CA	0	0	15	15.0	4	100	150	250	1
Total				8	0	15	23.0	12	200	250	400	-

Credit Pattern for BCA Course

Semester	Credits
1	21
2	24
3	25
4	22
5	20
6	23
Total	135

Department of Computer Applications, JSS Science and Technology University, Mysuru							
Course Year	**Course Semester**	**Course Type**	**Credits**	**Contact Hours/ Week**			**Total Hours/ Semester**
				Theory	**Laboratory**	**Tutorials**	
III	VI	Theory	04	04	00	00	52
Course No		**Course Title**				**Pre-Requisites**	
BCA610		Entrepreneurship & Leadership				Soft Skills-I (Professional Communication)	

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Understand the role of entrepreneur and importance of entrepreneurship in the current scenario.
Identify the sources of idea generation and significance of feasibility of ideas

CO2: Understand the ownership structure and its appropriateness.
Recognizing the funding institutions for entrepreneurship and examining the sources of venture capitals.

CO3: Analyze the industry, market and operations of plan chosen and its impact o rural and social entrepreneurship

CO4: Understand the concept of leadership, types, and theories and conceive the leadership potential in themselves

CO5: Develop knowledge, skills and understanding the leadership behavior and motivation concepts.

TOPICS COVERED:

UNIT:1 **10 Hours**

Foundation of Entrepreneurship: Nature of entrepreneurship, social & cultural factors in nurturing Entrepreneurship. Institutionalsupport for promoting entrepreneurship in India. Role of universities and colleges, CSIR labs inIndia to promote entrepreneurship.

Business Planning: Idea generation to preparation of detailed plan. Project identification, selection, significanceand feasibility.

UNIT:2 **10 Hours**

Ownership Structures: Proprietorship, partnership, company, co-operative. Selection of appropriate form of ownershipstructure.

Institutional Support to Entrepreneurs: Need for institutional support. Institutional support to small entrepreneurs: NSIC, SIDO, SSIB,SSICS, SISI, DICs, Industrial estates, specialized institutions, TCOs.

UNIT:3 **12 Hours**

Industry, Market and Operational Analysis: Industry identification, trends and industry analysis. Analysis of market demand, supply, STP.Identifying operational process and product

/service description.
Rural and social entrepreneurship: potential of entrepreneurship in rural India, SHGs, Micro credit facilities and problems of rural and social entrepreneurship.
Individuals as Leaders: Leadership is everyone's business, leadership managerial roles, levels of analysis of leadershiptheory, leadership theory paradigms.

UNIT:4 **10 Hours**

Leadership Traits, Ethics, Behavior and Motivation: Personality traits and leadership, traits of effective leaders, leadership attitudes, ethicalleadership.
Leadership behavior and styles, leadership grid, major motivational theories, content motivation theories, process motivation theories, reinforcement theory.

UNIT:5 **10 Hours**

Communication, Coaching and Conflict skills: Communication, feedback, coaching, managing conflict.
Team Leadership and Self-Managed Teams: The use of team in organizations, types of teams, decision making in teams.

TEXT BOOKS / REFERENCES:

Text books:

1. Entrepreneurial Development: S S Khanka, First Edition, 2003, S Chand & Company.
2. Lussier/Achua: Effective Leadership, 3rd Edition, Thomson Education, India edition, 2010.

Reference books:

1. Entrepreneurship – Prof. T V Rao, Indian Edition 2009, S Chand & Company
2. Northouse, P. G. (2013). (6th ed.) Leadership: Theory and Practice. Thousand Oaks:CA: Sage Publications.

ADDITIONAL LEARNING SOURCES:

1. https://www.slideshare.net/esmatullahamini1/entrepreneurial-developmentbook-pdf.
2. www.roletech.net/books/Entrepreneurship2ndEdition.pdf.
3. www.unimaid.edu.ng/root/CDl/Entrepreneurship%20Studies.pdf.
4. https://www.ted.com/topics/leadership

Department of Computer Applications, JSS Science and Technology University, Mysuru

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Hours / Semester
				Theory	Laboratory	Tutorials	
III	VI	Theory	04	04	00	00	52

Course No	Course Title	Pre Requisites
BCA620	Big Data Analytics	---

COURSE ASSESSMENT METHOD:

1. Internal Assessment [5 Events: 3 Written Tests, 2 Events] Marks: 50 [10* 5 Events]
2. Semester End Exam [100 Marks, 3 Hours]

COURSE OUTCOMES:

Upon successful completion of this course, students will be able to:

CO1: Understand the basic concepts in Big Data Analytics and gain the ability to choose the right solution for a task involving big data, including databases, architectures and cloud services.

CO2: Understand the different methods to analyze and visualize the big data

CO3: Develop the skillset to build effective solutions for Big Data issues using Hadoop and its Eco-System.

CO4: Get insights into different data visualization techniques and standard tools.

CO5: Understanding of real life issues faced by different organizations and its effective solutions through case studies.

TOPICS COVERED:

UNIT:1 – Introduction **10 Hours**

Introduction to Big Data: Types of Digital Data, Characteristics of Big Data, Evolution of Big Data, Definition of Big Data, Data Appliance, Challenges with Big Data, Big data sources, Best practices in Big Data Analytics, Introduction to Data Modeling.

UNIT:2 – Data Analysis **12 Hours**

Introduction to elementary data analysis: Measures of center: Mean, Median, Mode, Variance, Standard deviation, Range, Normal Distribution :Center, Spread, Skewed Left, Skewed Right, Outlier, Correlation Patterns, Magnitude and Direction in relationship, Introduction to Bayesian Model.

UNIT:3- Data Visualization **10 Hours**

History of Visualization, Goals of Visualization, Types of Data Visualization: Scientific Visualization, Information Visualization, Visual Analytics, Impact of visualization, Big Data Visualization Tools: Tableau, Google Chart.

UNIT:4– Data Processing **10 Hours**

Introduction to Big Data Processing and Apache Hadoop, Installation and Configuration of Hadoop in Ubuntu, HDFS Concepts, Map Reduce Framework, Anatomy of a Map Reduce Job Run, Job Scheduling, Shuffle and Sort, Task Execution.

UNIT:5 – Hadoop **10 Hours**

Introduction to Hadoop Eco System, Apache Hive, Apache Mahout, Apache Pig, Case studies: Analyzing big data with twitter, Big data for Ecommerce, Big data for blogs.

TEXT BOOKS / REFERENCES:

1. SeemaAcharya, SubhasiniChellappan, "Big Data Analytics", Wiley, 2015
2. Frank J Ohlhorst, “Big Data and Analytics: Turning Big Data into Big Money”, Wiley and SAS Business Series, 2012.
3. Tom White, “ Hadoop: The Definitive Guide” Third Edition, O’reily Media, 2012.

JSS Mahavidyapeetha

JSS Science and Technology University

JSS TI Campus, Mysuru - 570 006

DEPARTMENT OF COMPUTER APPLICATIONS

BACHELOR OF COMPUTER APPLICATIONS

PROJECT GUIDELINES

FOR

5th SEMESTER MINI PROJECT

&

6th SEMESTER MAJOR PROJECT

Course Year	Course Semester	Course Type	Credits	Contact Hours/ Week			Total Weeks/ Semester
				Theory	Laboratory	Tutorials	
III	VI	Project	15	00	00	00	12

Course No	Course Title	Prerequisites
BCA630	Project Work	NIL

COURSE ASSESSMENT METHOD:

Internal Assessment [4 Events: Presentation and Report] Marks: 100.

COURSE OUTCOMES:

Upon Successful completion of the project, students are able to :

1. Apply the knowledge acquired within and beyond the curriculum.
2. Formulate and investigate a problem which is of current trend.
3. Apply Software Engineering methodologies by following Software Development Life Cycle (SDLC).
4. Communicate, interpret, design and implement efficiently.
5. Document and Present the processes involved in project implementation.

1. Introduction

Department of Computer Applications aims to impart value based technical education with right blend of computation skills, analyzing, designing and managing projects. The Project work constitutes a major component in most of the professional programmers. The project work not only aims at the partial fulfillment of the BCA requirements, but also provides a mechanism to demonstrate the student's skills, abilities and specialization of interest. As the program covers a wide range of theoretical and practical subjects related to computer applications, it is an opportunity for a student to showcase the combined practical implementation of all the courses covered in the earlier 5 semesters effectively and efficiently. The project work should compulsorily include the software development life cycle, documentation and demonstration of the same within the stipulated period of 18weeks.

2. Aim

The main aim of the project is to make students aware of the process of project implementation using their domain knowledge and to provide computer based solutions/applications for the industry, academic & research oriented real time problems.

3. Objective

The objective of the project is in such way that it helps the student in developing the ability to apply theoretical knowledge and practical tools/techniques.

4. Outcome

At the end of implementation of project, student is capable of,

- Understanding and applying Systems Development Life Cycle (SDLC).
- Identifying systems requirements.
- Applying different data gathering and analyzing techniques.
- Performing and evaluating feasibility studies like cost-benefit analysis, technical feasibility, time feasibility and operational feasibility for the project.
- Designing and developing of system architectures and data flow diagrams.
- Evaluating methods of process description to include structured, decision tables and decision trees.
- Creating and evaluating such alternative graphical tools as systems flow charts and state transition diagrams.
- Decide the software requirement specifications and hardware requirement specifications.
- Plan the systems design phase of the SDLC.
- Distinguish between logical and physical design requirements.
- Designing and evaluating system inputs and outputs.
- Estimate storage requirements.
- Explain the various file update processes based on the standard file organizations.
- Construct and evaluate Entity-Relationship (ER) diagrams for RDBMS related projects.
- Perform normalization for the un-normalized tables for RDBMS related projects.

5. Project Selection Process

Student can implement projects in two streams.

Application Stream

These projects aim at developing an application for attaining a specific or group of tasks in respective domains. The student has to understand the applicability of the project thoroughly and should develop application based on the required features and functionalities. The following are some important application domains. These projects could be done in college or industry. Student can take up any one the following application domains, but not limited to these:

- Database, Data mining and Data warehousing applications
- Networking applications [Mobile, SAN, Security, MANet etc…]
- Business / Enterprise applications [Supply Chain, ERP, CRM etc…]
- Web based applications
- Multimedia applications
- Software Engineering applications
- Grid and Cloud computing applications
- Parallel and distributed computing applications
- E-learning and e-commerce applications
- Gaming applications
- Hardware driver applications
- Mobile applications
- Healthcare applications
- Banking and Finance applications
- Insurance applications

Research Stream

The problem formulation should made it clear to everyone, students should aim to address whom and where it is relevant. Chosen areas can be any of the following or any area of research.

- Public health, Epidemiology & Health Services
- Bio medical.
- Clinical sciences and health practice.
- Neurosciences & Behavioral sciences.
- Cloud services
- Big data
- Data science
- Image processing
- Internet(IOT)
- Any engineering topics where software plays vital role.

One of the most important early step in a research projects is the literature survey. A literature survey is done to identify related research done already and to set the current research work within a conceptual and theoretical context.

6. Problem Formulation

Students should follow the following steps (Respective guides to encourage students to follow these steps while formulating the problem for the project).

- Tailoring the idea to the targeted topic of the work programme.
- Describe the objectives and applications of the project – setting the specific objectives of the topic.
- Set up the project implementation phases and structure of the project – what activities you need to achieve the objectives and what expertise/knowledge is needed.
- Describe the end results (project outputs) and the impact of the project outcome.
- Highlight the added value, the innovative element of your project.
- Chosen project concept should address the main questions: WHY? WHAT? HOW? WHO? WHERE?

- Statement of Problem: the “Why?”
  Summary of the original problem statement.
  Background: Brief description of company and their business relevance or importance of problem. Background information to educate the reader previous related work by others—literature review with credible sources patent search on related problem.
- Objectives: the “What?”
  In the Objectives section, student should translate the customer’s quantitative and qualitative needs into clear, objective design specifications. Define the scope of work and clearly state the project objectives.
- Technical Approach: the “How?”
  Although you may not know all the details of the problem solution, you should know a first design on how you will solve the problem, and you should have some design concepts.
- Intended users: Who?
  This should address who is the user of the system/beneficiary of the work.
- Environment: Where?
  This should address area of domain, your application or work will be useful.

7. Evaluation Process

The project duration is 18 weeks; 16 weeks for development and 2 weeks for preparation of the project report. Students needs to maintain the project dairy, consult their internal guide and update the status of the work and get it reviewed every week. Students are be required to provide their project implementation details, methodology and results to the department. otherwise students will forfeit the claim for having done the project work.

Evaluation process has following steps.

1) **Project Screening and Finalization**
   Student activity: Submission synopsis and finalization.
2) **Evaluation of system study and analysis**
   Student activity: Submission of system requirement specification
2) **Evaluation of project design**

   Student activity: Submission of design document
4) **Evaluation of coding, testing and implementation.**
   Student activity: Submission of draft final project report
5) **Final report submission.**

Project screening

Student projects will be screened based on following points

a) Relevance to current technology
b) Gauging whether project work involves 16 week man hours of work.
c) Place of execution: Industry/Research organization/College
d) Project relevance to Computer Science and Applications
e) Understanding of the project work by the student

Format of the Synopsis can be referred in **Annexure-I**

Finalization of Synopsis

a) Finalization of Synopsis is done based on the previous stage of evaluation

b) Based on recommendation of the panel comprising of all the staff members of the department.
c) Verifying whether suggestions of the previous evaluation incorporated or not.

Format of the Synopsis can be referred in **Annexure – I**

Evaluation of system study and requirement analysis

Evaluation criteria in this step as follows.

a) Whether student understood the problem in depth.
b) Whether scope and objective of the project defined properly.
c) Whether student studied and understands the system thoroughly/completely.
d) Whether functional requirements and non functional requirements defined properly.

SRS document can be referred in **Annexure-II**

Evaluation of project design

In this level evaluated for

a) Architectural Design
b) Detailed Design
c) Database Design
d) External Interface Design
e) Algorithm Design

Design document format as per in **Annexure-III**

Evaluation of coding, testing and implementation

Evaluation of coding, testing and implementation criteria as follows.

a) Pseudo code
b) Test case generation
c) Actual Testing
d) Users Manual
e) Implementation strategy
f) Draft report submission

g) Checking whether the implementation has meet requirements specified in SRS document or not.
h) Demo of the final working model of the system.

Final report format should be followed according **Annexure-VI**

Annexure I: Format of the Synopsis

Application stream

- Title of the Project.
- Problem statement.
- Objective.
- Scope of the project.
- Brief description.
- Project Category (RDBMS/OOPS/Networking/E-learning.,etc.).
- Software requirements.
- Hardware requirements

Research stream

- Title of the Project.
- Problem statement.
- Objective of the project.
- Related work done(list of literature)
- Brief description of proposed work.
- Software requirements.

Note :

Students doing internship program outside the college need to submit the following details.

- Name and address of the company
- External guide name and designation
- Email and contact number of the external guide.

Annexure II: Format of the SRS document

Application stream

Introduction:

- Scope of SRS document
- Definitions, acronyms and abbreviations
- Definitions, acronyms and abbreviations used.
- References.
- Overview.

Overall description:

- Product perspective
  - About your project work.
- Product functions
- User characteristics
  - Characteristics of the intended user.
- General constraints
- Assumptions and Dependencies

Specific requirements:

- External Requirements
- (User Interface/Hardware/Software)
- Functional Requirements
- Non functional requirements
- Other requirements.

Architectural overview

Data flow diagrams

Design constraints

Research stream

Introduction.

Detailed literature review of related work.

Detailed analysis of the proposal work

Conclusion.

Annexure III: Format of Design Document:

Application stream

Introduction
- Scope of design document
- Definitions, acronyms and abbreviations
- References
- Overview

System Architecture
- Architectural design
- User interface design
- Forms design
- Database or file design
- Reports design
- Workflows and algorithms design
- Detailed design of DFDs.
- Activity diagrams
- Use case diagrams
- Sequence diagrams

Component interfaces
- Component design description
- Software requirements mappingCritical requiremnts

Research stream:

- Introduction
- Algorithms/logic used in the related work.
- Algorithms/logic steps involed in the proposed method.
- Conclusion

Annexure IV : Coding detail

Application and Research stream:

Introduction
Coding convention.
Pseudo code of the important algorithms of the project.

Annexure V: Testing report

Application and Research stream:

Introduction
Test process done for the project.
Test cases.

Testcase no	Positive scenario	Required input	Expected output	Actual output	Test pass/fail

Testcase no	Negative scenario	Required input	Expected output	Actual output	Test pass/fail

Annexure VI : Report format.

TITLE PAGE

CERTFICATE by the Department

CERTIFICATE by the EXTERNAL ORGANIZATION

DECLARATION

ACKNOWLEDGEMENTS

ABSTRACT

CONTENT PAGE

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1:

Introduction to the Topic of the Project

Problem definition and Premises

Objectives of the Study / Project

Methodology

Organization of the Dissertation

CHAPTER 2:

History of the Organization (If carried out in an organization)

CHAPTER 3:

Justification for doing this project

CHAPTER 4:

Requirements analysis and specifications document. Refer Annexure II

CHAPTER 5:
Design Document
Refer Annexure III

CHAPTER 6:
Coding
Refer Annexure IV

CHAPTER 7:
Testing
Refer Annexure V

CHAPTER 8:
Experimental results/findings.
Conclusion
Scope for future work (If any)

Limitations of the study (If any)

References [Papers, books, thesis web references (urls)]

List of Publications (if any)

Attach hard copy of the publication.

Note:

- Page numbers from “Abstract” to “List of Tables” to be given in Roman Numerals
- Page numbers to be given in numerals from Chapter 1 to Chapter 7.
- All pages should contain a footer indication the Department of Master of Computer Applications, SJCE, Mysuru and header indicated the title of the project and Month-Year of submission.

Font size should be:

- 16 bold for chapter no and chapter title.
- 14 bold times new roman for sub headings.
- 12 bold times new roman for sub-sub headings.
- 12 times new roman normal for running text.
- Table numbers, figure numbers and photograph numbers should be according to Chapter with appropriate title. Caption should contain figure no and title below the figure. Table no and title should be above the table.
- Spacing should be 1.5 between lines and 2.0 between paragraphs.
- Cross references should be clearly indicated and proper citation should be given Wherever references have been made.
- Project report should be hard bound in Pink color to be submitted. Make 3 Copies. Submit one to Department, one to internal guide and one to yourself.

Marks allotment in evaluation process

The evaluation process is done in four stages.

First Evaluation: Evaluation is conducted at the time of acceptance of the project i.e., during synopsis submission. Students needs to prepare and present the selected project before the panel. Evaluation carries 20 marks. The main components to be evaluated are,

Sl. No	Evaluation of Synopsis	Panel Marks	Guide Marks
1	Role of Innovation / Creativity, Research Element, challenges in the Problem.	2	2
2	Literature survey / Existing system analysis.	2	2
3	Clarity about the problem	2	2
4	Attendance	2	2
5	Question and Answer	2	2

Note:

If total marks is less than 50% of the maximum mark, then after a week student need to re-present the project before the panel for reconsideration of the project or may propose a different project. After the panel clearance students can start the project.

Second Evaluation: Evaluation is conducted after one month of submission of the synopsis. Students needs to prepare and present on the methodology, analysis and possible outcome of the problem in front of the panel. Evaluation carries 20 marks. The main components to be evaluated are, understanding of the problem, system study and analysis done.

Sl.No	Evaluation of SRS	Panel Marks	Guide Marks
1	Analysis of the Problem and understanding	2	2
2	Specification of the requirements	2	2
3	Progress of the project	2	2
4	Attendance	2	2
5	Question and Answer	2	2

Third Evaluation:

Evaluation is conducted after one month of second evaluation.. Students needs to present the design concepts of the project in front of the panel. Evaluation carries 20 marks. The main components to be evaluated are,

Sl.No	Evaluation of SRS	Panel Marks	Guide Marks
1	Architectural Design	2	2
2	Detailed Design	2	2
3	Work implementation status	2	2
4	Attendance	2	2
5	Question and Answer	2	2

Final Evaluation:

Evaluation is conducted after one month of third evaluation to check coding, testing and implementation stages. Students need to prepare draft final report with demo of the project for the presentation.

Sl.No	Evaluation of SRS	Panel Marks	Guide Marks
1	Coding and implementation efficiency	4	4
2	Work completion	4	4
3	Testing efficiency	4	4
4	Attendance	4	4
5	Question and Answer	4	4

Overall marks distribution:

Total internal assessment marks	Panel member	Guide
100	**50**	**50**

Total marks distribution:

Project	Internal Assessment (Guide (50%) + Panel (50%))	Report Evaluation		Report Evaluation	Viva Voce	Total Marks
		Internal (I)	External (E)	Avg. (Internal and External)		
Major	100	100	100	100	50	250
Mini	30	10	----	10	10	50

Credits distribution for the evaluation for major project.

Evaluation Steps	Credits
First evaluation	**1**
Second evaluation	**1**
Third evaluation	**1**
Final evaluation	**2**
Report Evaluation.{Average of internal and external examiners}	**8**
Viva Voice	**2**
Total	**15**

Note:

1) Mini project will be evaluated for 100 marks and reduced to 50 marks at the end.

2) Mini project will be for 2 credits.