KANNUR UNIVERSITY

BCA PROGRAMME

Semester	Course Title*	Credit	Total Credits
I	Common Course— English I	4	19
	Common Course — English II	3	
	Common Course — Additional Language I	4	
	General Awareness Course I — 1 A11 BCA-Informatics for Computer Applications	2	
	Core Course I — 1 B0l BCA Programming In C	2	
	Complimentary elective (Mathematics I)	4	
II	Common Course — English III	4	22
	Common Course — English lV	3	
	Common Course — Additional Language II	4	
	Core Course II — 2B02BCA Digital Systems	3	
	Core Course III — 2B03BCA Object Oriented Programming Using C++	2	
	Core Course IV — 2B04BCA Lab I: Programming In C*	1	
	Core Course V — 2B05BCA Lab II: Programming In C++*	1	
	Complementary Elective (Mathematics II)	4	
III	General Awareness Course 11 - 3A1 2BCA Data Structures	4	18
	General Awareness Course III — 3A13 BCA Database Management System	4	
	Core Course VI — 3B06BC An Introduction to Microprocessors	3	
	Core Course VII — 3B07BCA Java Programming, Shell Programming & Linux Administration++	3	
	General Awareness Course V — 4AI5BCA Lab III: Data Structure and DBMS	0	
	Core Course Xl — 4B11BCA Lab IV: Java Programming, Shell Programming & Linux Administration**	0	
	Complementary Elective (Mathematics II1)	4	
IV	General Awareness Course IV — 4A14BCA Discrete Mathematical Structures	4	21
	Core Course VIII -4B08BCA Software Engineering	**3**	
	Core Course IX — 4B09BCA Computer Organization	3	
	Core Course X — 4B l OBCA Linux Administration	3	
	General Awareness Course V — 4A15BCA Lab III: Data Structure and DBMS**	2	
	Core Course X l — 4B1l BCA Lab IV: Java Programming, Shell Programming & Linux Administration **	2	
	Complementary Elective (Mathematics IV)	4	
V	Core Course Xl l — 5B12BCA Operating Systems	3	16
	Core Course Xl l l — 5B13 BCA Enterprise Java Programming	4	
	Core Course XlV — 5B l4BCA- Python Programming	2	
	Core Course XV — 5B15BCAWeb Technology	2	
	Core Course XVI — 5Bl 6BCA Discipline Specific Elective I	3	
	Core Course XXI— 6B2l BCA Lab V: Enterprise Java Programming***	0	
	CoreCourseXXII—6B22BCALabVI: Python Programming'	0	
	CoreCourseXXIII—6B23BCALabVII: Web Technology**•	0	
	General Elective Course	2	
VI	Core Course XV II — 6B17 BCA Design and Analysis of Algorithm	4	24
	Core Course X VIII — 6Bl8BCA Introduction to Compiler	3	
	Core Course Xl X — 6B19BCA Data Communication & Networks	3	
	Core Course XX — 6B20BCA Discipline Specific Elective II	3	
	Core Course XXI— 6B2l BCA Lab V: Enterprise Java Programming***	2	
	Core Course XXII— 6B22BCA Lab Vl: Python Programming*	3	
	Core Course XXIII— 6B23BCA Lab VII: Web Technology* • •	2	
	Core Course XXIV — 6B24BCA Project	4	
	Total		**120**

Semester I

GENERAL AWARENESS COURSE I: 1A11BCA INFORMATICS FOR COMPUTER APPLICATIONS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
I	1A11BCA	3	2	3

COURSE OUTCOME

CO1: Understand the basic concepts and functional knowledge in the field of Informatics.
CO2: Equip the students with fundamentals of Computer.
CO3: Awareness about social issues and concerns in the use of digital technology
CO4: Skills to enable students to use free software.

Unit I:

Concept of Hardware and Software: Computer Languages – Machine Language, Assembly Language, High-level Language, Language translators: Compiler, Interpreter, Assembler, Features of good language.

(12Hrs)

Unit II:

Basic Computer Organization: Von Neumann model, Input Unit, Output Unit, Storage Unit, Control Unit, Memory hierarchy, RAM, ROM, PROM and EPROM, cache memory and registers. Secondary storage devices. Storage capacity: bit, byte, nibble.

(10Hrs)

Unit III:

Introducing Input output devices with examples. Introduction to operating System: need of OS, Types of OS, Functions of OS (introduction only). Introduction to Computer Networks: definition and applications.

(12Hrs)

Unit IV:

Introduction to Linux: Basic commands in Linux such as listing files, viewing contents in files, creating and deleting directories, moving and copying files and/or directories, man pages, setting permissions on files/directories and vi editor. Steps to install Linux OS.

(10Hrs)

Unit V:

IT & Society- issues and concerns- digital divide, IT & development, free software movement, cyber ethics, cybercrime, cyber threats, cyber security, privacy issues, cyber laws, cyber addictions, guide lines for proper usage of computers, internet and mobile phones.

(10Hrs)

COMMON COURSE I Communicative English

Name of the Course	Communicative English
Course Code	1A01 ENG
Semester Assigned	1
Number of Credits	4
Contact Hours per Week	5
Total Contact Hours	90
Prescribed Textbook	*Equip*: English for Undergraduates by Cambridge University Press

Course Outcomes

1. Understand and apply the rubrics of English grammar
2. Recognize and apply the basic patterns in English vocabulary
3. Read and elicit data, information, inferences and interpretations based on a given material in English
4. Develop the ability to speak in English in real life situations
5. Elicit necessary information after listening to an audio material in English
6. Compose academic and non-academic writings including letters, paragraphs and essay on a given topic and CV's for specific purposes

Content Specifications

Module 1 (Grammar and Usage)- 2 Hours/Week

Grammar

Articles, Modals, Tenses, Voices, Subject- Verb Agreement, Direct & Reported Speech,

Usage

Question Tags, Types of Words, Phrasal Verbs and Idiomatic Expressions.

Module 2 (Listening and Speaking) -2 Hours/Week

Listening

What is Communication? Phonemes in English, Syllables and Word Stress, Listening to News Bulletins, Listening to Instructions and Directions, Listening to Lectures, Listening to Speeches

Speaking

Greetings and Introductions, Small Conversations, Talking on Telephone, Making Requests, Making Enquiries, Making Suggestions, Expressing Gratitude, Complaining.

Module 3 (Reading and Writing)- 1 Hour/Week

Reading

Reading Official Letters and Profiles, Reading Advertisements, Reading News Reports, Reading Charts, Reading Online Content.

Writing

Writing Paragraphs, Taking and Making Notes, Essay and Academic Writing, Writing Letters, Writing Resumes.

COMMON COURSE 2. Readings on Kerala

Name of the Course	Readings on Kerala
Course Code	1A02 ENG
Semester Assigned	1
Number of Credits	3
Contact Hours per Week	4
Total Contact Hours	72
Prescribed Textbook	*Multiple Modernity*: Readings on Kerala published by Hornbill Publications

Course Outcomes

1. Understand the basic facts and patterns regarding the cultural evolution of Kerala through articles, poems, stories, life writings and historical narratives.
2. Acquaint with the life and works of the illustrious leaders of Kerala Renaissance and the major events.
3. Assimilate the notion of Kerala as an emerging society and critically examine the salient features of its evolution.
4. Understand the evolution and contemporary state of the concept of "gender" with reference to Kerala
5. Understand the form and content of Kerala's struggle against "casteism" and for "secularism"
6. Develop an awareness about the ecological problems and issues in Kerala

Content Specifications

Module 1- (2 Hrs/Week)

1. "Conversation": SreeNarayana Guru
2. "Curing Caste": Sahodaran Ayyappan
3. Excerpts from "Eri": Pradeepan Pambirikkunnu
4. Excerpts from Kelu: N. Sasidharan, E.P. Rajagopalan
5. Excerpts from "Parting from the Path of Life": Cherukad Govinda Pisharodi

Module 2- (2 Hrs/Week)

1. "Not an Alphabet in Sight": Poykayil Appachan
2. "Kuttippuram Palam": Idasseri
3. "Courageous Act": Anasuya Menon
4. "Vaikom Satyagraha": K. N.Panikkar
5. "The Voice": Suresh Menon

COMMON COURSE I :
സാഹിത്യഗണങ്ങൾ
(പഠനമണിക്കൂർ -90)

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
I	1A07-2MAL	5	4	3

COURSE OUTCOME

CO1.മലയാളഭാഷയുടെയും സാഹിത്യത്തിന്റെയും വികാസപരിണാമത്തിൽ വിവിധ സാഹിത്യജനുസ്സുകൾ ചെലുത്തിയ സ്വാധീനത്തെക്കുറിച്ചുള്ള അവ ബോധം രൂപപ്പെടുത്തുക.

CO2. സാഹിത്യാസ്വാദനത്തിനും സാഹിത്യപാഠങ്ങളുടെ വിശകലനത്തിനും വിദ്യാർത്ഥികളെ പ്രാപ്തരാക്കുക.

CO3. നാടകം/സിനിമ തുടങ്ങിയ കലാരൂപങ്ങളുടെ ആസ്വാദനത്തോടൊപ്പം അവയുടെ ഭാവതലത്തെ വിമർശനാത്മകമായി സമീപിക്കാനുള്ള പ്രാപ്തി നേടുക.

CO4. വിദ്യാർത്ഥികൾക്കിടയിൽ വായനയും കലാരൂപങ്ങളുടെ ആസ്വാദനവും തുടർപ്രക്രിയയായി മാറ്റാനുള്ള പ്രേരണ നൽകുക.

യൂണിറ്റ് 1 (പഠനമണിക്കൂർ -25)

കവിത

1. സൂര്യകാന്തി- ജി.ശങ്കരക്കുറുപ്പ് (ജി.യുടെ തെരഞ്ഞെടുത്ത കവിതകൾ)
2. കറുത്തചെട്ടിച്ചികൾ- ഇടശ്ശേരി (ഇടശ്ശേരി സമ്പൂർണ്ണകൃതികൾ, മാതൃഭൂമി)
3. ചോറുണ്- ഒ.എൻ.വി (ഒ.എൻ.വിയുടെ തെരഞ്ഞെടുത്ത കവിതകൾ, ഡി.സി. ബുക്സ്)
4. ഇവനെക്കൂടി- സച്ചിദാനന്ദൻ (സച്ചിദാനന്ദന്റെ കവിതകൾ, ഡി.സി. ബുക്സ്)
5. വൈക്കോൽപ്പാവ- ലോപ. ആർ - (വൈക്കോൽപ്പാവ, ഡി.സി. ബുക്സ്)

യൂണിറ്റ് 2 (പഠനമണിക്കൂർ -23)

നാടകം/സിനിമ

1. ഹിംസാടനം- എൻ. ശശിധരൻ (ലിപി പബ്ലിക്കേഷൻസ്)
2. പൊന്തൻമാട- ടി.വി. ചന്ദ്രൻ (സിനിമാപഠനം മാത്രം, തിരക്കഥ പഠിക്കേണ്ടതില്ല)

യൂണിറ്റ് 3 (പഠനമണിക്കൂർ -20)

നോവൽ

1. ഒരു സാദുനോട്ടക്കാരന്റെ ഭക്ഷണപര്യവേക്ഷണങ്ങൾ- വിനു എബ്രഹാം (ഹരിതം ബുക്സ്)

യൂണിറ്റ് 4. (പഠനമണിക്കൂർ -22)

പഠനം

1. മറ്റൊരുവിധമായിരുന്നെങ്കിൽ- കല്പറ്റ നാരായണൻ മറ്റൊരുവിധമായിരുന്നെങ്കിൽ, ലിപി പബ്ലിക്കേഷൻസ്)
2. ബഷീർ-സന്യാസം, വിപ്ലവം,ജീവിതം- എം.എ റഹ്മാൻ (ബഷീർ ഭൂപടങ്ങൾ, ബുക്ക്പോയിന്റ്)

ADDITIONALCOMMON COURSE : VII-2

नया साहित्य (NAYA SAHITHYA)

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
I	1 A07-2HIN	5	4	3

COURSE OUTCOME

CO1 : Understand the style of hindi prose.

CO2 : Understand history of hindi prose.

CO3 : Develop critical thinking

CO4 : Analise hindi prose and hindi criticism.

Unit I :

1. ईर्ष्या तू न गई मेरे मन से – रामधारी सिंह दिनकर
2. यदि महाभारत फिर से लिखा जाए – शरद् जोशी

(25 Hrs)

Unit II :

1. एक कुत्ता और एक मैना - हज़ारी प्रसाद द्विवेदी,
2. ये हैं प्रोफसर शशांक – विष्णुकांत शास्त्री

(25Hrs)

Unit III:

1. साँप – अज्ञेय
2. माँ पर वही लिख सकता कविता – चन्द्रकान्त देवताले
3. चंपा काले काले अच्छर नहीं छिबहती – त्रिलोचन शास्त्री

(25 Hrs)

Unit IV:

1. फर्क नहीं पड़ता – केदार नाथ सिंह
2. स्त्री – सुशीला टाक भौरे

(15 Hrs)

CORE COURSE I: 1B01BCA PROGRAMMING IN C

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
I	1B01BCA	2	2	3

COURSE OUTCOME

CO1: Understanding the basic concepts inprogramming.
CO2: Familiarize the basic syntax and semantics of C language.
CO3: Familiarize with advanced features ofc.
CO4: Develop skill inprogramming

Unit I:

Algorithms and Flow charts: Definitions, Symbols, Program:structure, top-down design, source code, object code, executable file, file extensions. Importance of C; Basic structure of C, programming style, executing a C program. Character set, C tokens, Keywords, identifiers, Constants, data types, declaration of variables, arithmetic operators , logical operators, Relational operators, Assignment operators, Increment and decrement operators, conditional operators, Bitwise operators. Precedence and order of evaluation.type conversion in expression. common programming errors, program testing and debugging, programefficiency.

(9 Hrs)

Unit II:

Managing Input output operation: reading a character, writing a character, formatted input output. Branching statements-if, if..else, nested if...else, else...if ladder, switch statement, go to statement. Looping statements- while, do...while, for loop. Break and continue statements.

(7 Hrs)

Unit III:

Arrays: One dimensional arrays, two dimensional arrays, Initializing array elements, Multidimensional arrays. Strings: declaration and initializing, reading and writing. Arithmetic operations on character. String handling functions, Functions: Library and user defined, defining a function, calling a function. Parameter passing techniques, Scope and life time of variables in function, recursive functions, arrays andfunctions.

(**7 Hrs)**

Unit IV:

Structure and union: definition, giving values to members, initialization. Array of structures, array within structure, structure within structure, union. Pointers: accessing the address of a variable, declaration and initializing pointers, accessing a variable through its pointers, pointer arithmetic, pointers and arrays (pointer to array and array of pointers), pointers and character string, pointer and functions. Dynamic memory allocation: malloc(), calloc(), free(),realloc().

(6 Hrs)

Unit V:

File Management: Text and binary files, Defining and opening a file, closing a file, input and output operations on file, error handling, random access file. Command line arguments.

(7 Hrs)

COMPLEMENTARY ELECTIVE COURSE 1:
MATHEMATICS FOR COMPUTER SCIENCE I

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HOURS	MARKS		
					END SEM EXAM	INTERNAL	TOTAL
I	1C01 MAT-CS	4	3	3	40	10	50

COURSE OUTCOMES

CO1	Understand Successive differentiation and Leibnitz's theorem for the nth derivative of the product of two functions
CO2	Understand Fundamental theorem – Rolle's theorem, Lagrange's mean-value theorem and Cauchy's mean value theorem.
CO3	Understand Taylor's theorem, expansions of functions – Maclaurin's series, expansion by use of known series and Taylor's series.
CO4	Understand the method of finding limits of Indeterminate forms.
CO5	Understand Polar, Cylindrical and Spherical co-ordinates.
CO6	Understand Rank of a matrix, elementary transformation of a matrix, equivalent matrices, elementary matrices, Gauss-Jordan method of finding the inverse, normal form of a matrix and partition method of finding the inverse.
CO7	Understand solution of linear system of equations – method of determinants – Cramer's rule, matrix inversion method, consistency of linear system of equations, Rouche's theorem, procedure to test the consistency of a system of equations in n unknowns, system of linear homogeneous equations.
CO8	Understand Linear transformations, orthogonal transformation and linear dependence of vectors.
CO9	Understand methods of curve fitting, graphical method, laws reducible to the linear law, principles of least squares, method of least squares and apply the principle of least squares to fit the straight line $y = a+bx$, to fit the parabola $y=a+bx+cx^2$, to fit $y = ax^b$, $y =ae^{bx}$ and $xy^n=b$

1C01 MAT-CS: Mathematics for Computer Science I

Unit I Differential Calculus – Differentiation and Successive Differentiation (18 Hours)

Text: Differential Calculus, Shanti Narayan and P.K. Mittal

Quick review of basics of differentiation – Derivatives of standard functions, rules of differentiation, parametric differentiation. *(Questions should not be asked in the End Semester Examinations from the above sections for quick review)(*Relevant portions from sections 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10)

Text: Higher Engineering Mathemaics (41rd edition), B.S. Grewal,

Successive differentiation, standard results, preliminary transformations, use of partial fractions, Leibnitz's theorem for the nth derivative of the product of two
Sections 4.1, 4.2

Unit II: Differential Calculus – Applications of Derivatives (22 Hours)
Text: Higher Engineering Mathematics (41st edition), B.S. Grewal, Khanna Pub.

Fundamental theorem – Rolle's theorem, Lagrange's mean-value theorem, Cauchy's mean-value theorem, Taylor's theorem (Generalised mean value theorem)(without proof), expansions of functions – Maclaurin's series, expansion by use of known series, Taylor's series, Indeterminate forms - form 0/0, form ∞/∞, form reducible to 0/0 form - form $0.\infty$, form $\infty-\infty$, forms 0^0,1^∞, ∞^0 (Sections 4.3, 4.4, 4.5).

Unit III Linear Algebra - Matrices and System of Equations, Linear Transformations (20 Hours)

Text: Higher Engineering Mathematics (41st edition), B.S. Grewal, Khanna Pub.

Rank of a matrix, elementary transformation of a matrix, equivalent matrix,s elementary matrices, Gauss-Jordan method of finding the inverse, normal form of a matrix, partition method of finding the inverse, solution of linear system of equations – method of determinants – Cramer's rule, matrix inversion method, consistency of linear system of equations, Rouche's theorem, procedure to test the consistency of a system of equatios in n unknowns, system of linear homogeneous equations. Linear transformations, orthogonal transformation, vectors – linear dependence
Sections 2.8, 2.9, 2.10, 2.11, 2.12, 2.13

Unit IV Fitting of Curves

Text: Higher Engineering Mathematics (41st edition), B.S. Grewal, Khanna Pub.

Introduction, graphical method, laws reducible to the linear law, principles of least squares, method of least squares, to fit the straight line $y=a+bx$, to fit the parabola $y=a+bx+cx^2$
Sections 24.1, 24.2, 24.3, 24.4, 24.5

Semester II

Common Course III - 2A03 ENG Readings on Life and Nature

Name of the Course	Readings on Life and Nature
Course Code	2A03 ENG
Semester Assigned	2
Number of Credits	4
Contact Hours per Week	5
Total Contact Hours	90
Prescribed Textbook	*Nature Matters* by MainSpring Publishers

Course Outcomes

1. Understand the basic themes and issues related to ecology through articles, poems, stories, life writings and historical narratives.
2. Assume ecologically friendly attitudes in events related to everyday life.
3. Identify the specific ecological problems related to Kerala.
4. Identify the major ecological movements around the world and within the country.
5. Ability to express specific opinions when confronted with ecology/development binary.
6. Identify the major or minor ecological issues happening around the student's native place.

Contents

Module – I (2 hours/week)

1. Environmental Studies: Definition, Scope and Importance
2. Concept of an Ecosystem
3. The Fish – Elizabeth Bishop
4. Trophic Cascade – Camille T. Dungy
5. The Rightful Inheritors of the Earth – Vaikom Muhammad Basheer

Module – II (2 hours/week)

1. Biodiversity
2. Disaster Management: Floods, Earthquakes, Cyclones, Landslides
3. Real Estate - Sebastian
4. The Truth about the Floods – Nissim Ezekiel
5. Matsyagandhi – Sajitha Madathil

Module – III (1 hour/week)

1. Role of an Individual in Prevention of Pollution
2. Environmental Values
3. The End of Living - The Beginning of Survival – Chief of Seattle
4. Going Local – Helena Norberg-Hodge

Common Course IV 2A04 ENG Readings on Gender

Name of the Course	Readings on Gender
Course Code	2A04 ENG
Semester Assigned	2
Number of Credits	3
Contact Hours per Week	4
Total Contact Hours	72
Prescribed Textbook	*Plural Perspectives* by Macmillan Publishers

Course Outcomes

1. Understand the basic themes and issues related to gender through articles, poems, stories, life writings and historical narratives.
2 Understand the divergent approaches towards gender issues.
3. Understand gender as a social construct and also as a site of struggle.
4. Critically engage with certain seminal topics that have become a part of gender studies.
5. Understand the basic gender issues faced by Kerala.
6. Appreciate and use gender sensitive and politically right terms and usages in everyday life.

Contents

Module – I (2 hours/week)

1. "An Introduction"- Kamala Das (Poem)
2. "Kitchen Rags"- Vijila Chirappadu (Poem)
3. "Dakshayani Velayudhan: A Life Sketch"- Meera Velayudhan (Biography)
4. "Learning to be a Mother: - Shashi Deshpande (Essay)
5. "Is this Desirable"- Lalithambika Antharjanam (Story)

Module – II (2 hours/week)

1. "Still I rise"- Maya Angelou (Poem)
2. "I am not that Woman"- Kishwar Naheed (Poem)
3. "Structural Violence and the Trans Struggle for Dignity"- Gee Imaan Semmalar(Essay)
4. "Gender Justice and Media"- Ammu Joseph
5. "Clothing Matters: Visiting the Melmundusamaram in Keralam"- K M Sheeba

COMMON COURSE II
ഗദ്യമാത്യകകൾ
(പഠനമണിക്കൂർ- 90)

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2A08-2MAL	5	4	3

COURSE OUTCOME

CO1. വിവിധഗദ്യരൂപങ്ങളുടെ ഘടന, പ്രമേയം, ആഖ്യാനം എന്നിവ സാമാന്യമായി പരിചയപ്പെടുകയും ആസ്വാദനശേഷി വളർത്തുകയും ചെയ്യുക.

CO2. ജീവിതമെഴുത്ത് രൂപങ്ങളായ ആത്മകഥ, ജീവചരിത്രം, സ്മരണ തുടങ്ങിയവയുടെ വായനാനുഭവം രൂപപ്പെടുത്തുക

CO3. സഞ്ചാരസാഹിത്യമാത്യകകൾ പരിചയപ്പെടുകയും യാത്രയുടെ അനുഭവം, ആഖ്യാനം, വിപണനം, രാഷ്ട്രീയം എന്നിവ വിമർശനബുദ്ധ്യാ വിലയിരുത്തുകയും ചെയ്യുക.

CO4. അനുഭൂതികളുടെ ആവിഷ്കൃതരൂപങ്ങളെ അടുത്തറിയുകയും ഉപരിവായനയിൽ താൽപ്പര്യമുണ്ടാക്കുകയും ചെയ്യുക.

CO5. യാത്രകൾ സംഘടിപ്പിക്കുകയും യാത്ര അനുഭവിക്കുകയും ആസ്വാദനക്കുറിപ്പുകൾ തയ്യാറാക്കുകയും ചെയ്യുക.

യൂണിറ്റ് -1 (പഠനമണിക്കൂർ- 25)

1. സ്ത്രീജന്മം- കെ സരസ്വതിയമ്മ (പെൺബുദ്ധിയും മറ്റ് പ്രധാനകഥകളും- ഡി.സി.ബുക്സ്)
2. മോതിരം- കാരൂർ (ഡി.സി.ബുക്സ്)
3. കോമ്പിപ്പൂശാരിയുടെ വാതിൽ- ഒ.വി വിജയൻ (ഡി.സി.ബുക്സ്)
4. മോഹമഞ്ഞ- കെ. ആർ.മീര (കറന്റ് ബുക്സ്)
5. ആദം- എസ്. ഹരീഷ് (ഡി.സി.ബുക്സ്)

യൂണിറ്റ് -2 (പഠനമണിക്കൂർ- 20)

ആത്മകഥ

1. ജീവിതപ്പാത - ചെറുകാട്

(കുട്ടിക്കാലം എന്ന ഭാഗത്തെ ഗ്രാമവൃക്ഷത്തിലെ കുയിൽവരെയുള്ള 6 അധ്യായങ്ങൾ മാത്രം) (കറന്റ് ബുക്സ്)

യൂണിറ്റ് -3

ജീവചരിത്രം (പഠനമണിക്കൂർ- 20)

1. ചങ്ങമ്പുഴ നക്ഷത്രങ്ങളുടെ സ്നേഹഭാജനം- പ്രൊഫ. എം.കെ. സാനു (ആദ്യത്തെ 4 അധ്യായങ്ങൾ മാത്രം) (ഡി.സി.ബുക്സ്)

യൂണിറ്റ് 4- (പഠനമണിക്കൂർ- 25)

യാത്രാവിവരണം

1. കൂ.. കൂ.. കൂ.. കൂ.. തീവണ്ടി- അനിതാ നായർ (മാതൃഭൂമി ബുക്സ്)

ADDITIONAL COMMON COURSE :VIII-2

साहित्य और प्रयोग(SAHITYA AUR PRAYOG)

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2A08- 2HIN	5	4	3

COURSE OUTCOME

CO 1 : Understand the stories.

CO2 : Understand the importance of letter writing and translation.

CO3 : Develop communicative skill in hindi.

CO4 : Develop creative writing skill in hindi.

Unit I :

कहानी

1.प्रेमचन्द -परीक्षा

2.फणीश्वरनाथ रेणु - पंचलाइट

3.मन्नु भण्डारी - यही सच है

4.मैत्रेयी पुष्पा - बिछडे हुए

(30 Hrs)

Unit II :

पत्र लेखन का महत्व – वाणिज्यिक या व्यावसायिक पत्र लेखन – उसकी विशेषताएँ – व्यावसायिक पत्र का स्वरूप – व्यावसायिक पत्र के प्रकार – पूछताछ संबंधी – व्यापारिक प्रस्ताव, माल मंगाने के आदेश संबंधी – संदर्भ पत्र – शिकायती –तकादे या भुगतान संबंधी – बैंक और बीमा संबंधी – आवेदन पत्र –परिपत्र।

(20 Hrs)

Unit III:

अनुवाद – उसकी आवश्यकता और महत्व – साहित्यिक अनुवाद – समाचार पत्रों के लेख का अनुवाद – वैज्ञानिक लेख तथा सामाजिक शास्त्र से संबंधित लेखाओं का अनुवाद – किसी परिच्छेद का हिन्दी से अंग्रेज़ी में तथा अंग्रेज़ी से हिन्दी में अनुवाद।

(20 Hrs)

Unit IV:

व्याकरण – संज्ञा – सर्वनाम – लिंग – वचन – पुरुष – विशेषण – क्रिया – काल — कारक — मुहावरे एवं कहावतें (निम्नलिखित तालिका से ही शब्दों को चुनिए)

CORE COURSE II: 2B02BCA DIGITAL SYSTEMS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2B02BCA	3	3	3

COURSE OUTCOME

CO1: Introduce the basic and important concepts of Digital Principles and applications
CO2: Familiarize with basic building blocks of Digital systems, Digital Logic and Digital Circuits
CO3: Design simple combinational digital systems.
CO4: Familiarize different number systems, codes and data representation in digital systems

Unit I:

Introductory Digital Concepts: Digital and Analog Quantities – Binary Digits, Logic Levels and Digital Waveforms - Basic Logic - Digital IC. Number Systems: Decimal, Binary, Hexa-decimal and Octal – Conversions -CODES: BCD,ASCII, Excess-3, GRAY and UNICODE. BINARY ARITHMETIC: Addition, Subtraction. Data Representation(textbook 2): Data types - Complements (1's and 2's)– FixedPoint representation – Floating Point representation.

(10 Hrs)

Unit II:

Logic Gates: Inverter-AND-OR-NAND-NOR-XOR-XNOR-positive and Negative logic- Examples of IC gates. Boolean Algebra and Logic simplification: Boolean operations and Expressions – Laws and Rules of Boolean Algebra – DeMorgan's Theorem – Boolean analysis of Logic Circuits – Simplification, Standard forms and Truth tables of Boolean Expressions – K-Map , SOP, POS Minimization.

(12 Hrs)

Unit III:

Combinational Logic Circuits: Basic Combinational Logic Circuits – Implementing Combinational Logic – Universal Property of NAND and NOR gates. Functions of Combinational Logic: Basic overview – Basic Adders-Parallel Binary Adders- Comparators-Decoders-Encoders-Code Converters – Multiplexers – Demultiplexers- Parity generators/checkers.

(12 Hrs)

Unit IV:

Flip Flops: Latches – Edge triggered Flip flops – Master Slave Flip flops-operating characteristics. Counters: Asynchronous counters - Synchronous counters – UP/Down synchronous counters – Design of Synchronous counters

(10Hrs)

Unit V:

Shift Registers: Basic Shift Registers Functions - Serial in/Serial Out Shift Registers - Parallel In/Parallel out Shift Registers Bidirectional Shift Registers – Shift Register Counters. Memory: Basics of Semiconductor memories – RAM – ROM – PROM – EPROM – Flash Memories

(10 Hrs)

CORE COURSE III: 2B03BCA OBJECT ORIENTED PROGRAMMING USING C++

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2B03BCA	2	2	3

COURSE OUTCOME

CO1: Understanding OOPsconcepts such as inheritance and polymorphism and their implementation usingC++.

CO2: Ability to develop programs in C++

Unit I:

Principles of object-oriented programming; OOP paradigm; Basic concepts of OOP; Benefits; applications. Introduction to C++, Structure of C++ program; Tokens, Keywords, identifiers and constants; Data types, symbolic constants; type compatibility; declaration and dynamic initialization of variables; reference variables. Operators, manipulators; type cast operators; Expressions, implicit conversions; operator overloading; operator precedence; Control structures.

(9Hrs)

UnitII:

Functions; function overloading; friend and virtual functions; Math library functions. Structures; Specifying a class; Defining member functions; making an outside function inline; nesting of member functions; private member functions; arrays within a class; memory allocation for objects; static data members; static member functions; arrays of objects; objects as function arguments; friendly functions; returning objects; const member functions; pointer to members; Localclasses.

(7 Hrs)

Unit III:

Constructors and destructors; dynamic initialization of objects; copy constructor; Dynamic constructors; const objects; Destructors. Operator overloading – definition; overloading unary operators; overloading binary operators; overloading binary operators using friends; manipulation of strings using operators; rules for overloading operators. Type conversions.

(7 Hrs)

Unit IV:

Inheritance – defining derived classes; making a private member inheritance; Types of inheritance; virtual base classes; abstract classes; constructors in derived classes; Nesting of classes. Pointers; Pointers to objects; Pointers to derived classes; virtual functions; pure virtualfunctions.

(6 Hrs)

Unit V:

C++ streams; stream classes; unformatted I/O operations; Formatted console I/O operations; Managing output with manipulators. Files – classes for file stream operations; Opening and closing a file; file modes; file pointers and their manipulations; Sequential input and output operation.

(7 Hrs)

CORE COURSE IV: 2B04BCA LAB I - PROGRAMMING IN C

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2B04BCA	I SEM 2 Hrs II SEM 0 Hrs	1	3

CORE COURSE V: 2B05BCA LAB II - PROGRAMMING IN C++

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
II	2B05BCA	2	1	3

COMPLEMENTARY ELECTIVECOURSE 2:

2C02 MAT-CS: Mathematics for Computer Science II

Unit I Differential Calculus – Partial Differentiation

Text: Differential Calculus, Higher Engineering Mathematics (41st edition), B.S. Grewal, Khanna Pub.

Partial Differentiation: Functions of two or more variables, limits, continuity, partial derivatives, homogeneous functions, Euler's theorem on homogeneous functions, total derivative, differentiation of implicit functions, change of variables.

Sections 5.1, 5.2, 5.4, 5.5, 5.6

Unit II Integral Calculus – Integration and Integration by Successive Reduction

Text: Integral Calculus, Santhi Narayanan and P.K. Mittal, S. Chand and Co.

Quick review of basics of Integration (*Questions should* ***not*** *be asked in the End Semester Examinations from the above sections for quick review*)

Sections 8.1, 8.2, 8.3, 8.4, 8.5

Integration of Trigonometric Functions: Integration of $sin^n x$, where n is a positive integer, evaluation of the definite integral $\int_0^{\frac{\pi}{2}} sin^n x\, dx$, Integration of $cos^n x$, evaluation of the definite integral $\int_0^{\frac{\pi}{2}} cos^n x\, dx$,Integration of $sin^p x cos^q x$,evaluation of the definite integral $\int_0^{\frac{\pi}{2}} sin^p x\, cos^q x dx$, integration of $tan^n x$, integration of $cot^n x$, integration of $sec^n x$, integration of $cosec^n x$

Sections 4.1, 4.1.1, 4.2, 4.2.1, 4.3, 4.3.1, 4.4.1, 4.4.2, 4.5.1, 4.5.2

Unit III Integral Calculus – Applications of Integration and Multiple Integrals

Text: Thomas' Calculus (12th edition), Maurice D. Weir and Joel Hass, Pearson India Education Services

Substitutions and the area between curves, arc length, Polar coordinates, areas and length in polar coordinates

Section 5.6, 6.3, 11.3, 11.5

Double and Iterated Integrals over rectangles, double integrals over general regions, area by double integration, double integrals in polar form, triple integrals in rectangular co-ordinates

Sections 15.1, 15.2, 15.3, 15.4, 15.5

Unit IV Linear Algebra - Eigen Values and Cayley-Hamilton Theorem

Text: Higher Engineering Mathematics (41st edition), B.S. Grewal

Eigen values, eigen vectors, properties of eigen values, Cayley- Hamilton theorem (without proof), reduction to diagonal form, similarity of matrices, powers of a matrix, reduction of quadratic form to canonical form, nature of a quadratic form

Sections 2.13, 2.14, 2.15, 2.16, 2.17, 2.18.

Semester III

GENERAL AWARENESS COURSE II: 3A12BCA DATA STRUCTURES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
III	3A12BCA	4	4	3

COURSE OUTCOME

CO1: Understand theconceptofdatastructuresanditsrelevanceincompu ter science.
CO2: Familiarize with selected linear and nonlinear datastructures.
CO3: Enhance skill inprogramming.

Unit I:

Data structures: Definition and Classification. Array: - Operations; Number of elements; Array representation in memory. Polynomial representation with arrays; Polynomial addition. Sparse matrix: Addition of sparse matrices. The concept of recursion.examples – factorial and Tower of Hanoiproblem.

(12 Hrs)

Unit II:

Sorting algorithms: Insertion, bubble, selection, quick and merge sort; Comparison of Sort algorithms. Searching techniques: Linear and Binary search.

(15 Hrs)

Unit III

Stack: Operations on stack; array representation. Application of stack- i. Postfix expression evaluation. ii. Conversion of infix to postfix expression. Queues: Operation on queue. Circular queue; Dequeue, and priority queue. Application of queue: Job scheduling.

(15 Hrs)

Unit IV:

Linked list – Comparison with arrays; representation of linked list in memory. Singly linked list- structure and implementation; Operations – traversing/printing; Add new node; Delete node; Reverse a list; Search and merge two singly linked lists. Stack with singly linked list. Circular linked list – advantage. Queue as Circular linked list. Head nodes in Linked list – Singly linked list with head node – Add / delete nodes; Traversal / print. Doubly linked list– structure; Operations –Add/delete nodes; Print/traverse. Advantages.

(15 Hrs)

Unit V:

Tree and Binary tree: Basic terminologies and properties; Linked representation of Binary tree; Complete and full binary trees; Binary tree representation with array. Tree traversal: Recursive inorder, preorder and postorder traversals. Binary search tree - Definition and operations (Create a BST, Search, Time complexity of search). Application of binary tree: Huffmanalgorithm.

(15 Hrs)

GENERAL AWARENESS COURSE III: 3A13BCA DATABASE MANAGEMENT SYSTEM

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
III	3A13BCA	4	4	3

COURSE OUTCOME

CO1: Understand the basic concepts inDBMS.
CO2: Skill in designingdatabase.
CO3: Familiarization of different DBMSmodels. **CO4:** Skill in writing queries usingMySQL.

Unit I:

Introduction – purpose of Database systems. View of Data, data Models, transaction management, database structure, DBA, Data Base Users.

(12 Hrs)

Unit II:

E-R model, Basic concepts; design issues; Mapping Constraints; Keys; Primary, Foreign, candidate, E-R diagram; Weak entity set; Extended E-R features. Normal forms – 1NF, 2NF, 3NF and BCNF; functional dependency, Normalization.

(15 Hrs)

Unit III:

Relational model – Structure of Relational database.Relational Algebra; Fundamental operations; Relational calculus; Tuple and domaincalculus.

(15 Hrs)

Unit IV:

SQL: database languages; DDL; create, alter, Drop, DML, Insert into, Select, update, Delete, DCL commands, Data types in SQL; Creation of database and user.Case study: MySQL.

(15 Hrs)

Unit V:

Developing queries and subqueries; Join operations; Set operations; Integrity constraints, views, Triggers, functions and Sequences. Case study: MySQL

(15 Hrs)

CORE COURSE VI:3B06BCA INTRODUCTION TO MICROPROCESSORS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
III	3B06BCA	4	3	3

COURSE OUTCOME

CO1: Familiarize with 8085 architecture.
CO2: Familiarize with 8086 architecture.
CO3: Skill in writing assembly language programs.
CO4: Understand Interrupts and DMA techniques.

Unit I

Introduction: History of Microprocessors, Introduction to 8-bit microprocessor - 8085,Architecture of 8085, Bus organization of 8085, Internal Data Operations and 8085registers.

(15Hrs)

Unit II

Introduction to 16-bit microprocessor – 8086, Architecture of 8086, Functional BlockDiagram, Register Organization of 8086, Signal Description of 8086, Physical MemoryOrganization, Memory Mapped and I/O Mapped Organization, General Bus Operation, I/OAddressing Capability.

(15 Hrs)

Unit III

Addressing Modes of 8086, Machine Language Instruction Format, AssemblyLanguage Programming of 8086, Instruction Set of 8086-Data transfer instructions,Arithmetic and Logic instructions, Branch instructions, Loop instructions, Processor Controlinstructions, Flag Manipulation instructions, Shift and Rotate instructions, Stringinstructions, Assembler Directives and operators.

(15 Hrs)

Unit IV

Introduction to Stack, STACK Structure of 8086, Interrupts and Interrupt ServiceRoutines, Interrupt Cycle of 8086, Non-Maskable and Maskable Interrupts.

(12 Hrs)

Unit V

Data transfer schemes – Programmed IO, Interrupt driven IO and DMA.Programmable Peripheral Interface 8255-features, architecture, DMA Controller 8257-features, architecture, Programmable Interrupt Controller 8259A -features,architecture

(15Hrs)

CORE COURSE VII:3B07BCA JAVA PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
III	3B07BCA	4	3	3

COURSE OUTCOME

CO1: Learn the features of java
CO2: Understand the concept of error handling
CO3: Learn about multi - threading
CO4: Experience the GUI Programming.

Unit I

Introduction to Java programming : Java technology; history; java as a new paradigm; features of java; Java Development Kit; Java Language fundamentals; wrapper classes; arrays; strings; StringBuffer classes.

(12 Hrs)

Unit II

Java classes, variables, methods and constructors; Overloading and overriding; Modifiers; Packages; Interfaces.

(15 Hrs)

Unit III

Exception handling: Basics; handling exceptions in java; (Try, catch, finally, multiple catch, nested try, throw); Exception and inheritance; Throwing user defined exceptions; Advantages of exception handling.Multithreading: Overview; Creating threads; thread life cycle; Priorities and scheduling; synchronization; Thread groups; communication of threads; Sample programs.

(15 hrs)

Unit IV

Files and I/O streams: Overview; Java I/O; file streams; FileInputStreamand FileOutputStream; Filter Streams; RandomAccessFile; Serialization; Applets : Introduction; Application vs. applets; Applet lifecycle; Working with Applets; The HTML APPLET tag; the java.applet Package; Sample programs.

(15 Hrs)

Unit V

The Abstract Window Toolkit: - Basic classes in AWT; Drawing with Graphics class; Class hierarchy; Event handling;AWT controls (Labels, Buttons, checkbox, radio buttons; choice control; list, textbox, scroll bars); Layout Managers. The menu component hierarchy; Creatingmenus; Handling events from menu items.

(15 Hrs)

GENERAL AWARENESS COURSE IV: 4A14BCA DISCRETE MATHEMATICAL STRUCTURES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4A14BCA	4	4	3

COURSE OUTCOME

CO1: Fundamental mathematical concepts and terminology for Computer Science
CO2: Acquire knowledge in Mathematical Logic
CO3: Gain knowledge in Boolean Algebra and Group Theory
CO4: Awareness about the importance of Graph Theory in Computer Science

Unit I

Sets and Mathematical Logic: Set Theory - Types of sets, Set operations, Principles of Inclusion and Exclusion. Mathematical Logic - Propositional Calculus - Statement, Connectives, Conditional and Biconditional, Equivalence of Formula, Well Formed Formula, Tautologies, Normal Forms, Theory of Inference for the Statement Calculus, Predicate Calculus, Theory of Inference for the Predicate Calculus.

(12 Hrs)

Unit II

Functions and Relations: Functions – Types of Functions, Composition of Functions and Inverse Functions. Relations - Relations and Their Properties, Functions as relations, Closure of Relations, Composition of relations, Equivalence Relations and Partitions. Partial Ordering, Hasse Diagram.The Pigeonhole Principle.

(15 Hrs)

Unit III

Lattices and Boolean Algebra - Lattices and Algebraic Systems, Principles of Duality, Basic Properties of Algebraic Systems Defined by Lattices, Distributive Lattices and Complemented Lattices. Boolean Lattices and Boolean Algebras.Boolean Functions and Boolean Expressions.

(15 Hrs)

Unit IV

Group Theory – Definition and Elementary Properties - Permutation Groups, Cyclic Groups – Subgroups - Cosets,Semigroup and Monoid.Homomorphism and Isomorphism.Rings, Integral Domains and Fields.

(15 Hrs)

Unit V

Graph Theory- Basic concepts- Introduction, Directed Graph, Undirected Graph, Connected and Disconnected Graphs, Bipartite Graph, Complete Bipartite Graph, Isomorphic Graphs, Subgraph. Paths and Circuits.Shortest Paths in Weighted Graphs-Dijkstra's Algorithm.Eulerian Paths and Circuits, Hamiltonian Paths and Circuits.Storage representation and manipulation ofgraphs.Minimum Spanning Trees.

(15 Hrs)

COMPLEMENTARY ELECTIVE COURSE 3:

MATHEMATICS FOR COMPUTER SCIENCE III

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HOURS	MARKS		
					END SEM EXAM	INTERNAL	TOTAL
III	3C03 MAT-CS	5	3	3	40	10	50

COURSE OUTCOMES

CO1	Understand Ordinary differential equations, Geometrical meaning of $y'=f(x, y)$ and Direction Fields.
CO2	Understand Methods of solving Differential Equations: Separable ODEs, Exact ODEs, Integrating Factors, Linear ODEs and Bernoulli Equation.
CO3	Understand Orthogonal Trajectories, Existence and Uniqueness of Solutions.
CO4	Understand Second order ODEs, Homogeneous Linear ODEs of second order, Homogeneous Linear ODEs with constant coefficients, Differential Operators, Euler-Cauchy Equation, Existence and Uniqueness of Solutions – Wronskian, Non homogeneous ODEs and Solution by variation of Parameters
CO5	Understand Laplace Transform, Linearity, first shifting theorem, Transforms of Derivatives and Integrals, ODEs, Unit step Function, second shifting theorem, Convolution, Integral Equations, Differentiation and integration of Transforms and to solve special linear ODE's with variable coefficients and Systems of ODEs
CO6	Understand Fourier series, arbitrary period, Even and Odd functions, Half-range Expansions.
CO7	Understand Partial Differential Equations and to solve PDEs by separation of variables and by use of Fourier series.

3C03 MAT-CS: Mathematics for Computer Science III

Unit I First Order Ordinary Differential Equations
Text: Advanced Engineering Mathematics (10th edition), E. Kreyszig, 2015
Basic concepts, Geometrical meaning of $y'=f(x, y)$. Direction Fields (numerical method by Euler excluded), Separable ODEs (modelling excluded) Exact ODEs, Integrating Factors, Linear ODEs, Bernoulli Equation (population dynamics excluded) Chapter 1 Sections 1.1, 1.2, 1.3, 1.4, 1.5

Unit II: Second Order Ordinary Differential Equations
Text: Advanced Engineering Mathematics (10th edition), E. Kreyszig, Wiley, 2015
Homogeneous Linear ODEs of second order, Homogeneous Linear ODEs with constant coefficients, Differential Operators, Euler-Cauchy Equation, Existence and Uniqueness of Solutions – Wronskian (statement of Theorems only, proofs omitted), Non homogeneous ODEs, Solution by variation of Parameters.
Sections 2.1 to 2.10 *except* 2.4, 2.8 and 2.9

Unit III: Laplace Transforms and its Applications
Text: Advanced Engineering Mathematics (10th edition), E. Kreyszig, Wiley
Laplace Transforms: Laplace Transform, Linearity, first shifting theorem (s-Shifting), Transforms of Derivatives and Integrals, ODEs, Unit step Function, second shifting theorem (t- Shifting), Convolution, Integral Equations, Differentiation and integration of Transforms, special linear ODE's with variable coefficients, Systems of ODEs, Laplace Transform, General Formulas, Table of Laplace Transforms.
Chapter 6 Sections 6.1, 6.2, 6.3, 6.5, 6.6, 6.7, 6.8, 6.9 (Proofs omitted)

Unit IV Fourier Series and Partial Differential Equations
Text: Advanced Engineering Mathematics (10th edition), E. Kreyszig, Wiley
Fourier series, arbitrary period, Even and Odd functions, Half-range Expansions. (Proofs omitted)
Chapter 11 Sections 11.1, 11.2

Partial Differential Equations - Basic Concepts, solution by separation of variables, use of Fourier series Sections 12.1, 12.3

Semester IV

GENERAL AWARENESS COURSE IV : 4A14BCA
DISCRETE MATMMATICAL STRUCTURES

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4A14BCA	*4*	*4*	*8*

COURSE OUTCOME

CO1: Fundamental mathematical concepts and terminology for Computer Science

CO2: Acquire knowledge in Mathematical Logic

COC: Gain knowledge in Boolean Algebra

CO4: Awareness about the importance of Graph Theory in Computer Science

Unit I :
Set Theory: Basic concepts- Venn diagram- Cartesian product. Functions: injective, subjective, bijective. Mathematical Logic - Propositional Calculus - Statement, Connectives, negation, conjuction, disjunction, conditional, biconditional, statement & equivalence formula- Well Formed Formula (WFF)- Tautologies, Normal Forms, Rules of inference. (15 Hrs)

Unit II:
Functions and Relations: Functions — Types of Functions, Composition of Functions and Inverse Functions. Relations - Relations and Their Properties, Functions as relations, Closure of Relations, Composition of relations, Equivalence Relations and Partitions. Partial Ordering, Hasse Diagmm.The Pigeonhole Principle. (15 Hrs).

Unit III:
Boolean algebra: Definition, laws, Boolean functions and expressions- representation of Boolean expressions- applications of Boolean algebra. (10 Hrs).

Unit IV:
Graph theory l:Basic concepts- path- circuit- subgraph- bipartite graph- complete bipartite graph- Isomorphic graph-. Trees: Definition- spanning tree- minimal spanning tree (MST)- DFS- BFS- incidence matrix - Traveling salesman's problem. (12 Hrs).

Unit V:
Graph theory 11: Planar graph- Shortest Paths in Weighted Graphs- Euler's Paths and Circuits, Hamiltonian Paths and Circuits. Storage representation and manipulation of graphs. Coloring chromatic number. (12 Hrs).

GENERAL AWARENESS COURSE V: 4A15BCA LAB -III
DATA STRUCTURES & DBMS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EKAM HRS
IV	**4A15BCA**	**III SEM** 3 **Hrs, IV SEM 2 Hrs**	2	3

Program List

Section A: DATA STRUCTURE

1. Add two polynomials.
2. Sequential and binary search : Print number of comparison in each case for given datasets.
3. Insertion sort: number of comparisons and exchanges for given data sets.
4. Bubble sort: Print number of comparisons and exchanges for given data sets.
5. Selection sort: Print number of comparisons and exchanges for given data sets .
6. Quick sort.
7. Stack operation: addition and deletion of elements
8. Queue operation: addition and deletion of elements
9. Conversion of infix expression to postfix.
10. Menu driven program: to add / delete elements to a circular queue. Include necessary error messages.
11. Singly linked list operations : add a new node at the beginning, at the end, after ith node, delete from beginning, end, print the list.
12. Circular linked list : add a new node at the beginning, at the end, after ith node, delete from beginning, end, print the list.
13. Doubly linked list : add a new node at the beginning, at the end, aner ith node, delete from beginning, end, print the list.
14. Implement tree traversal.
15. Merge two sorted linked list.

Section B: DBMS

Minimum 10 exercises covering SQL related topics. Sample exercises are given below:

SQL -1

Create table students with fields sno, sname, sex, mark with sno as primary keyand assign suitable coostraints for each attribute.Insert five records into the table.

1. Alter the table by adding one more field rank.
2. Display all boy students with their name.
3. Find the Average mark
4. Create a query to display the sno and sname for all students who got More than the
5. average mark. Sorts the results in descending order of mark.
6. Display all girl student names for those who have marks greater than 20 and less than 40.

SQL -2

Create a table department with fields ename, salary, dno, dname, place with dno asprimary key.Insert five records into the table.

1. Rename the field 'place' with 'city'
2. Display the employees who got salary more than Rs.6000 and less than10000 /-
3. Display total salary of the organization
4. Display ename for those who are getting salary in between 5000 and 10000.
5. Create a view named 'Star' with field ename, salary &place
6. Display ename and salary with salary rounded with 10 digits'*'

sqL -3

Create a table department with fields dno, dname, dmanager and place with dno asprimary key.

Create a table emp with fields eno, ename, job, dno, salary, with eno as primary key.Set duo as foreign key.

Insert five records into each table.

1. Display the ename and salary, salary with ascending order
2. Display ename and salary for eno=20,
3. Display the manager for the accounting Department
4. Display the name,salary and manager of all employees who are getting salary * 5000
5. Write the queries using various group functions.
6. Write the queries using various Number functions.

SQL -4

Create a table emp with fields eno,ename, job, manager and salary, with eno as primary key. Insert values into the table.

1. Display ename, salary from emp who are getting salary more than average salary of
2. the organization.
3. ADD 20% DA as extra salary to all employees. Label the coloumn as 'New Salary'
4. Create a query to display the eno and ename for all employees who earn more thanthe average salary. Sort the results in descending order of salary.
5. Create a view called emp view based on the eno, ename from emp table change theheading for the ename to 'EMPLOY'.
6. Write a query that will display the eno and ename for all employees whose namecontains a 'T'.

SQL-5

Create a table department with fields duo, ename, salary, Designation, dname and place with duo as primary key. Insert values into the table.

1. Write the queries using various Character functions in ename field.
2. Create a query to display the employee number and name for all employees who eammore than the average salary. Sort tire results in descending order of salary.
3. Display all employees who got salary between 5000 &10000
4. Display ename, salary, Designation for those who got salary more than 5000 or hisDesignation is ‘clerk’.
5. Display ename and designation those who are not a clerk or manager.
6. Display the names of all employees there the third letter of their name is an ’A’

SQL -6

Create a table Customer with fields cid, cname, date of birth and place
Create table loan with fields loanno, cid and bname assigning suitable constraint.
Create table depositor with fields accno, cid, balance and bname assigning suitable constraints.
Insert S Records into eachtable.

1. Add one more field amount to loan table. Update each record. Display cname forcid=2.
2. Calculate Rs 150 extra for all customers having loan.The added loan amount will
3. display in a new coloumn.
4. Display loanno, ename and place of a customer who is residing in Kannur city.
5. Display all information from loan table for loanno 2,8,10.
6. Display all customers who have both loan and deposit.

CORE COURSE XI: **4B11BCA LAB- IV: JAVA PROGRAMMING, SMLL PROGRAMMING & LINUX ADMINISTRATION**

SEMESTER	COURSE **CODE**	**HOURS PER WEEK**	**CREDIT**	EXAM **HRS**
IV	**4B11BCA**	**HI** SEM 2 **Hrs,** IV SEM 3 Hrs	2	3

Program List

Java Programming Lab cycle - **maintained as it is**
Shell **Programming Lab cycle** — maintained as it is

LINUX **ADMINISTRATION** - **(Lab cycle for Linux** configuration part)

1. Linux installation, up gradation, Installation and removal of packages and Installation of a peripheral devices (Printer) — Installation steps and configuration
2. Starting and stopping services in run level. The service command
3. Managing process- viewing status, killing, restarting etc using ps.
4. Adding and deleting user accounts, changing passwords.
5. Changing the environment variables like PATH
6. Scheduling jobs using cron
7. Mounting and unmounting external file systems
8. Setting the value of umask, changing the permissions, changing owner and groups
9. Archiving and Backup using tar. Restoring backup
10. Compressing and uncompressing files using any one tool

CORE COURSE VIII: 4B08BCA OPERATING SYSTEMS

SEMESTER	**COURSE CODE**	**HOURS PER WEEK**	**CREDIT**	**EXAM HRS**
IV	**4B08BCA**	**4**	**3**	**3**

COURSE OUTCOME

CO1: Understand the basic concepts, structure and functions of operating systems. **CO2:** Understand the principles behind the techniques in resource management **CO3:** Knowledge about the basic design of the OS

Unit I

OPERATING SYSTEMS OVERVIEW: Operating System Definition, Functions, OS as a resource

manager, Types of OS, Evolution of OS, OS Structure, Operating system operations, Process Management, Memory Management, Storage Management, Protection and Security, Operating System Services, User Operating System Interface, System Calls, OS design and implementation, Operating System Structure. (Text 1)

(14 Hrs)

Unit II

PROCESS MANAGEMENT:Processes: Process Concept, Process Scheduling, Operations on Processes, Interprocess Communication. CPU Scheduling: Basic concepts, scheduling criteria, Scheduling algorithms. Deadlocks: System Model,Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock. (Text 1)

(18Hrs)

Unit III

MEMORY MANAGEMENT:Memory management: Single contiguous allocation,Partitioned allocation, Relocatable partitioned, Paging, Demand paging, Segmentation, Segmentation and demand paging, Otherschemes. (Text 2)

(14 Hrs)

Unit IV

STORAGE MANAGEMENT: Mass Storage Structure: Overview, Disk Scheduling: (FCFS, SSTF, SCAN, C-SCAN , Look) , Disk Management. RAID Structure. (Text 1)

14 Hrs)

Unit V:

File System interface: File Concepts, Directory and Disk Structure.
Protection: Protection: Goals of protection, principles of protection, domain of protection, access matrix. (Text 1)

(12 Hrs)

CORE COURSE IX: 4B09BCA COMPUTER ORGANIZATION

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4B09BCA	4	3	3

COURSE OUTCOME

CO1: Understand the basic operation of a computer system.
CO2: Understand the organization and design of basic digital computer
CO3: Introduce the concepts of microprogramming and design simple combinational digital systems.
CO4: Understand the organization of memory and techniques that computers use to communicate with I/O devices

Unit I

Functional Units and Basic operational Concepts of a digital computer (Textbook 2). Register Transfer and Micro operations: Register Transfer Language-Register Transfer- Bus and memory Transfer. Basic Computer Organization and Design: Instruction Codes
– Computer Registers-Computer Instructions-Timing and Control-Instruction cycle- Memory Reference

Instructions-I/O and Interrupt-Complete Computer Description- Design of Basic Computer.

(**18Hrs**)

Unit II

Micro Programmed Control: Control Memory – Address sequencing – Microprogram Example -Design of Control Unit. Central Processing Unit – General Register Organization – Stack Organization - Instruction Formats – Addressing modes – Data Transfer and Manipulations- Program Control – Reduced Instruction set computer(RISC).

(**18Hrs**)

Unit III

Input Output Organization: Peripheral Devices – Input/output Interfaces – Asynchronous Data Transfer – Modes of transfer –Priority Interrupt – Direct Memory Access (DMA) - Input Output Processor - Serial Communications.

(**12Hrs**)

Unit IV

Memory Organization: Memory Hierarchy – Main memory – Auxiliary Memory – Associative Memory – Cache memory – Virtual Memory.

(**12Hrs**)

Unit V

Pipelining: Parallel processing – Pipelining – Instruction pipeline. Multiprocessors: Characteristics of multiprocessors – Inter connection structures – Inter Processor Arbitration.

(**12 Hrs**)

CORE COURSE X: 4B10BCA LINUX ADMINISTRATION

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
IV	4B10BCA	4	3	3

COURSE OUTCOME

CO1: To learn basic Linux commands and understand the file system structure
CO2: To understand the Boot loaders and the configuration files
CO3: To learn different system services, maintenance and configuring these
CO4: To experience Shell Scripting

Unit I

Linux OS: History, Features and benefits of Linux, basic concepts of multi user system, open source, free Software concepts, Types of users in Linux, Types of files. **BASICS** : login, password, creating an account, shell and commands, logout, changing password, files and directories, relative and absolute pathnames, directory tree, current working directory, referring home directory, creating new directories, copying files, moving files, deleting files and directories , wild cards, hidden files, cat command

(18Hrs)

Unit II

Vi editor: different modes-command mode, insert mode, last line mode, vi Editing commands – moving within a file, deleting, editing,Copy and Paste Commands, Saving and Closing the file, redirecting input/output-filter, pipes. **File permissions:** user, group, ls command (long listing),changing file permission.

(15Hrs)

Unit III

Shell Scripting: Types of shell, Basic shell configuration for bourne and bash shell: /etc/profile, /etc/bashrc, ~/.bash_profile, ~/.bash_login, ~/.profile, ~/.bashrc, ~/.bash_logout, ~/.bash_history. Bourne shell scripts, script execution, variables and parameters, Control structures - Shell if then else, Shell if then elif, Shell for loop, Shell while loop, Shell until loop , Shell case, Shell function.

(15Hrs)

Unit IV

Linux Boot process: LILO - boot process, /edc/lilo.conf file, GRUB - /etc/grub.conf file runlevels, rc files, startup scripts. **Mounting: mounting** file systems, structure of /etc/fstab. **Linux Administration** : Major services in Linux system - init, /etc/inittab file, login from terminal, syslog and its configuration file /etc/syslog.conf, periodic command execution: at and cron, crontab file , GUI, X windows. Starting and stopping different services – service command.

(12Hrs)

Unit V:

System Maintenance: tmpwatch command, logrotate utility. **Backup and Restore**: types of backup - full, differential, incremental, cp, tar commands. **Linux Installation: Partitioning**, MBR, SWAP, file system mount points, rpm utility - installation of packages

(12Hrs)

4C04 MAT-CS: Mathematics for Computer Science IV

Unit I

Text: A First Look at Graph Theory, John Clark and Derek Allan Holton, Allied Pub.

The definition of a graph, graphs as models, More definitions (problems on isomorphism excluded), vertex degrees, subgraphs, paths and cycles, matrix representation of graphs, trees and connectivity – definition and simple properties (Proofs of theorems 2.1, 2.2, 2.3, 2.5 and that of corollary 2.4 are excluded) (Problems involving proofs are excluded)

Sections 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 2.1

Unit II Linear Programming

Text: Operations Research (18th thoroughly revised edition), Kantiswaroop, P.K. Gupta and Manmohan, Sultan Chand & Sons.

Mathematical formulation of daily life situations – simple cases only (Questions should be avoided for end semester examination from this topic)

Canonical and standard form, Graphical solution method, Simplex method – computational procedure (Proofs of theorems are excluded)

Sections 2.1, 2.2, 2.3, 2.4, 3.2, 4.3

Unit III Linear programming

Text: Operations Research (18th thoroughly revised edition), Kantiswaroop, P.K. Gupta and Manmohan, Sultan Chand & Sons.

Transportation problem – introduction, transportation table, loops, solution to a Transportation Problem, finding an initial basic feasible solution, transportation algorithm (MODI method)

(Proofs of theorems excluded)

Sections 10.5, 10.6, 10.8, 10.9, 10.13

Unit IV Numerical Analysis

Text: Introductory Methods of Numerical Analysis (fifth edition), S.S. Sastry PHI Learning

Numerical Integration-

Numerical Integration, Trapezoidal Rule, Simpson's 1/3-Rule

Chapter 6 Sections 6.4, 6.4.1, 6.4.2

Numerical Solutions of Ordinary Differential Equations: Introduction, Solution by Taylor's series, Euler's method, Modified Euler's method, Runge-Kutta methods.

Sections 8.1, 8.2, 8.4, 8.4.2, 8.5

Semester V

CORE COURSE XII: 5B12BCA SOFTWARE ENGINEERING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5B12BCA	3	3	3

COURSE OUTCOME

CO1: Understand the basic processes in software Development lifecycle.
CO2: Familiarize with different models and theirsignificance.
CO3: Familiarize with requirement engineering and classical software designtechniques.
CO4: Familiarize with various software testing techniques andtools.

Unit I

Introduction to software engineering-Definition, program versus software, software process, software characteristics, brief introduction about product and process, software process and product matrices; Software life cycle models – Definition, waterfall model, increment process model, evolutionary process model, selection of the life cycle model.

(10Hrs)

Unit II

Software Requirement Analysis and Specification – Requirements engineering, types of requirements, feasibility studies, requirement elicitation, various steps of requirement analysis, requirement documentation, requirementvalidation.

(10Hrs)

Unit III

Software design – definition, various types, objectives and importance of design phase, modularity, strategy of design, function-oriented design, IEEE recommended practice for software designdescriptions.

(12Hrs)

Unit IV

Objected Oriented Design – Analysis, design concept, design notationsand specifications, design methodology.

(8Hrs)

Unit V

Software Testing – What is testing, Why should we test, who should do testing? Test case and Test suit, verification and validation, alpha beta and acceptance testing, functional testing , techniques to design test cases , Boundary value analysis, equivalence class testing, decision table based testing; structural testing , path testing , Graph matrices , Data flow testing , levels of testing ,unit testing , integration testing, system testing , validationtesting

(14Hrs)

CORECOURSE XIII: 5B13BCA ENTERPRISE JAVA PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5B13BCA	4	4	3

COURSE OUTCOME

CO1: Understand the Enterprise Java platform

CO2: Learn APIs and runtime environment for developing and running large scale Projects.

CO3: Develops programming skills in multi – tiered, scalable, reliable and secure Network application.

CO4: Understand the structure of a web application.

Unit I

Java Database Connectivity: JDBC architecture; Drivers, JDBC-ODBC bridge, native API partly java driver, Net Protocol all Java driver, Native protocol all Java driver; Connecting to Database; statements; Large data types; Dates and Times; Handling Errors; SQL warning; Metadata, database meta data, result set meta data

(15 Hrs)

Unit II

Remote Method Invocation: RMI architecture; RMI Object services; Naming/registry service, object activation service, distributed garbage collection; Defining Remote objects; Key RMI classes for remote object implementations; Stubs and skeletons; Accessing remote object as a client; Remote method arguments and return values; Dynamically loaded classes; Configuring clients and servers for remote class loading;

(15 Hrs)

Unit III

Java Servlets: Life cycle; HTTP Servlets, forms **and** interaction; **POST,** HEAD and other requests; Servlet requests; Servlet responses; Error handling, status codes; Custom Servlet Initialization; Thread safety; Cookies; Session tracking

(15 Hrs)

Unit IV

Common Object Request Broker Architecture: Introduction to CORBA, CORBA architecture, CORBA versus Java RMI, IDL Compiler, Interface definition language, IDL stub, IDL Skelton interface, Object Request Broker; Naming service; Inter-ORB communication.

(12 Hrs)

Unit V

Creating CORBA objects; Creating IDL modules, interfaces, data members and methods; IDL and Java; Simple server class, helper class, holder class, client stubs and server skeltons; Writing the implementation class; Initializing ORB, Registering with a naming service; Adding objects to a naming context; Finding remote objects; Initial ORB references; Getting objects from other Remote objects.

(15 Hrs)

CORE COURSE XIV:5B14BCA PYTHON PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5B14BCA	2	2	3

COURSE OUTCOME

CO1: Learn Python for expressing computation
CO2: Familiarize with functions and modules in python
CO3: Understand object-oriented programming concepts in Python
CO4: Learn the techniques for database connectivity and GUI programming in Python

Unit I

Basic Elements and Control Statements: Features of Python, Different Methods to Run Python, Basic Elements (Objects, Expressions, Numerical Types, Strings, Variables), Comments, Indentation in Python, Input and Output in Python, import function, Operators in Python, Branching (if, else, elif), Iteration (while, for), range and enumerate functions, Tuples, Lists, Sets, Dictionaries, Built-in methods of lists, sets and dictionaries, Mutable and Immutable Objects.

(8 Hrs)

Unit II

Functions, Modules and Exception Handling: Functions Definition, Function Calling, Function Arguments (Required, Keyword, Default), Recursion, Modules, Built-in Modules, Creating Modules, File Handling (Opening, Closing, Writing, Reading), Exceptions, Built-in Exceptions (IndexError, OverflowError, ZeroDivisionError, RuntimeError), Exception Handling.

(8 Hrs)

Unit III

Object Oriented Programming, Arrays and Data Visualization: Class Definition, Object Creation, Built-in Attribute Methods, Object Oriented Programming Features of Python. Arrays in Python, Numpy Module, ndarray, Creating Arrays (array, zeros, ones, empty, linspace, arrange, random), Two-Dimensional Array, Indexing, Slicing, Iterating, Copying, Splitting, Shape Manipulation (reshape, transpose, resize), Arithmetic Operations on Arrays. Data Visualization in Python matplotlib Module, pyplot, plot(),scatter, bar charts, Formatting, figure(), subplot(), text(), xlabel(), ylabel(), title(), Plotting Simple Mathematical Functions (sin x, x^2).

(8 Hrs)

Unit IV

Connecting to Database: Connecting to a Database, Basic Operations on Database (Crater, Insert, Update, Delete), Fetching Data from a Database, Transaction Control.

(6 Hrs)

Unit V

GUI Programming: GUI Programming using Tkinter, Tkinter Widgets (Label, Message, Entry, Text, Button, tkMessagebox, RadioButton, Checkbutton, Listbox, Menu, Menubutton, Scale, Scrollbar, Canvas), Layout Managers.

(6 Hrs)

CORE COURSE XV:5B15BCA WEB TECHNOLOGY

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5B15BCA	2	2	3

COURSE OUTCOME

CO1: Enable students to program for the World Wide Web using HTML, JavaScript, PHP and MySQL.
CO2: Create static and dynamic web pages PHP and MySQL.
CO3: Impart basic knowledge in relational databases, SQL and, Client-server model.

Unit I

Introduction to internet and web, An overview of internet programming –WWW design issues. Introduction to HTML-structure of HTML, tags, attributes, syntax of tags, starting and ending tags, html doc elements-<html>, <title>,<body>,physical style tags, listing, labeling, grouping, <img>-<a>

(8 Hrs)

Unit II

Table tags-<tr>,<td>,<th> attributes-height, width, rowspan, colspan, border, color. Form-tag attributes-type-passwd, submit, radio, check, method, action. Frame-<frame>, <frameset>, <iframe>,<noframe> and other important tags and attributes.

(6 Hrs)

Unit III

Javascript-datatypes, variables, function, object, array.Client-side object hierarchy and document. objectModel, <script>, event handlers, javaScript in urls. Windows and frames dialog boxes, status line, navigator object, opening Windows, closing windows, Location object, historyobject. - Date object- math object- Accessing form object**.**

(11 Hrs)

Unit IV

Introduction to PHP, advantages of PHP, PHP basics- operators and Flow Control, strings and arrays, creating functions**.**

(7 Hrs)

Unit V

Objects, Web Techniques, HTTP Basics, Databases, Using PHP to access database, Client-server model.

(4 Hrs)

CORE COURSE XVI: 5B16BCA-E01 INFORMATION SECURITY

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
V	5B16BCA-E01	4	3	3

COURSE OUTCOME

CO1: To understand the need of information security and to master information security Concepts, mechanisms and services as well as issues related to information Security.

CO2: To be familiar with cryptography and its categories.
CO3: Distinguish public and private key crypto systems and familiarize the rsa crypto System.
CO4: To attain the knowledge of digital signature and its security services.

Unit I

Introduction to Information Security- The need for Security, Principles of security - confidentiality, Authentications, Integrity, Non-repudiation.Types of attacks- Passive attacks, Active attacks, Virus, Worm, Trojan horse. Introduction to Cryptography, Steganography, Secret Sharing.

(14Hrs)

Unit II

Traditional symmetric Key Ciphers: Introduction-Kirchhoff's principle, cryptanalysis, categories of traditional ciphers; Substitution Ciphers – mono alphabetic ciphers, polyalphabetic ciphers; Transposition Ciphers - keyless and keyed transposition ciphers, Stream and Black Ciphers - stream ciphers, block ciphers.

(16Hrs)

Unit III

Introduction, DES Structure - initial and final permutations, rounds, cipher and reverse cipher, examples; DES Analysis - properties, design criteria, DES weaknesses; Multiple DES - double DES, triple DES; Security of DES - brute-force attack, differential cryptanalysis, linear cryptanalysis.

(16Hrs)

Unit IV

Principles of Public Key Cryptosystems- Public Key Cryptosystem, Applications of Key Cryptosystems, Requirement for Public Key Cryptosystem, Public Key Cryptanalysis.RSA Algorithm–Description of the Algorithm, Computational Aspects, Security of RSA.

(13Hrs)

Unit V

Comparison- inclusion, verification method, relationship, duplicity; Process- needs for keys, signing the digest; Service- message authentication, message integrity, nonrepudiation, confidentiality; Attacks on Digital Signature- attack types; Digital Signature Schemes- RSA digital signature schemes

(13Hrs)

CORE COURSE XVII: 6B17BCA DESIGN AND ANALYSIS OF ALGORITHM

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6B17BCA	4	4	3

COURSE OUTCOME

CO1: Knowledge about important computational problems.

CO2: Knowledge to design the algorithm.

CO3: Knowledge to analyze a given algorithm.

CO4: Acquire knowledge to analyzealgorithm control structures and solving recurrences.

Unit I:

Algorithm Design: Introduction, Steps in developing algorithm, Methods of specifying an algorithm, Decisions prior to designing based on the capabilities of the device, based on the nature of solutions, based on the most suitable data structures. Model of Computation: RAM model and PRAM model.

(10 Hrs)

Unit II:

Important Problem Types: Sorting, Searching, String matching, Graph problems, Combinatorial problems, Geometric problems, Numerical problems. Basic Technique for Design of Efficient Algorithm: Brute Force approach, Divide-and-Conquer approach, Greedy approach, Dynamic Programming, Backtracking, Branch-and-Bound technique.

(20 Hrs)

Unit III:

Algorithm Analysis: Importance of algorithm analysis, Time and Space Complexity. Growth of Functions: Asymptotic notations, Cost estimation based on key operations- big Oh, big Omega, little Oh, little Omega and Theta notations.

(8 Hrs)

Unit IV:

Analysing Algorithm Control Structures, Solving Recurrences: Substitution Method, Iteration Method, The Recursion Tree Method, Master's Theorem. Problem Solving using Master's Theorem Case 1, Case 2 and Case 3. Best case, worst case and average case performance analysis.

(20 Hrs)

Unit V:

Study of the structure of algorithms: Strasser's algorithm, Huffman coding, Kruskal's algorithm and Prim's algorithm.

(14 Hrs)

CORE COURSE XVII: 6B18BCA INTRODUCTION TO COMPILER

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6B18BCA	4	3	3

COURSE OUTCOME

CO1: Knowledge about Compiler
CO2: Knowledge about various phases of compiler design.

Unit I:

Introduction to compiling - definition of compiler, Classification of Compiler: Single pass, Multi pass, Load and Go. Parts of Compilation: Analysis and Synthesis. The phases of a compiler: Lexical Analyser, Syntax Analyser, Semantic Analyser, Intermediate code generator, Code optimizer, Target Program, Symbol table manager.

(15 Hrs)

Unit II:

Programming language basics - lexical analysis – role of lexical analyzer – input buffering - specification of tokens – recognition of tokens using finite automata.

(15 Hrs)

Unit III:

Syntax analysis – role of parser – error handling and recovery – definitions of parsing, top-down parsing and bottom-up parsing - context free grammars – derivations - parse tree – ambiguity – associativity and precedence of operators - writing a grammar.

(12 Hrs)

Unit IV:

Intermediate code generation – DAG – three address code – addresses and instructions – quadruples – triples – Static Simple Assignment form – types and declarations – type expressions - type equivalences – declarations – type checking – rules – type conversion.
(15 Hrs)

Unit V:

Run time environments – storage optimization – static Vs dynamic allocation – stack allocation of space - activation trees and records – calling sequences. Code generation – issues in the design of a code generator – the target language – a simple target machine model. Code optimization - the principal sources of optimization – data flow analysis – abstraction – data flow analysis schema – data flow schemas on basic blocks.

(15 Hrs)

CORE COURSE XIX: DATA COMMUNICATION & NETWORKS

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6B19BCA	3	3	3

COURSE OUTCOME

CO1: Understand the basics of datacommunication
CO2: Familiarize with OSI referencemodel
CO3: Familiarize students with layers of communicationmodel
CO4: Understand the concepts of networksecurity

Unit I

Introduction to data communication, important elements /components of data communication, Data transmission- Analog, Digital. Transmission media- Guided media, Unguided media. Synchronous / Asynchronous data transmission.Line configuration – Simplex, Half duplex, Duplex.Network topologies – star, Bus, ring, Mesh.Computer networks, Use, network hardware, network structure- point to point connection, multicast, broadcast, classification of networks-LAN, WAN, Man. Network software – protocol hierarchies. design issues for layers, interfaces and services- connection oriented, connection less.

(12Hrs)

Unit II:

Reference models, the OSI reference model, TCP / IP reference model. Comparison between OSI and TCP / IP models.Data Link Layer, Design issues, Services to network layer, Framing- character count, character stuffing, bit stuffing, physical layer coding violation. Error control, flow control, Elementary data link protocols- unrestricted simplexprotocol,simplexstopandwaitprotocol,simplexprotocolforanoisychannel.

(12Hrs)

Unit III:

Network layer, design issues, services to the transport layer, routing algorithms- adaptive, non-adaptive algorithms, optimality principle, dijkstras shortest path routing algorithm, flow based routing, hierarchical routing, congestion control algorithms – the leaky bucket algorithm, the token bucketalgorithm.

(10Hrs)

Unit IV

Transport layer, design issues, connection management-addressing, establishing and releasing connection, transport layer protocols- TCP,UDP

(10Hrs)

Unit V

Application layer, network security, traditional cryptography, substitution ciphers, transposition ciphers, fundamental principles, secret key algorithm, dataencryption standard, DES chaining, DES breaking.Public key algorithm, RSAalgorithm.

(10Hrs)

CORE COURSE XXI: 6B21BCA LAB V:

ENTERPRISE JAVA PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6B21BCA	V SEM 3 HRS VI SEM 2 HRS	2	3

COURSE OUTCOME

CO1: Can write and execute simple JDBC Programs. **CO2:** Can write and execute simple RMI Programs. **CO3:** Can Write and execute simple servlet programs. **CO4:** Can write and execute simple CORBA programs.

Sample Program List

A list of 10 Programs are given below. Each student has to complete and record all the exercises. A detailed problem statement shall be prepared by the faculty concerned.

1. JDBC program to insert, Delete and Update records into Employee table.
2. JDBC program to connect to Student table. Implement the record scrolling functions – first(), last(), next(), previous(), beforeFirst(), afterLast(), absolute() and relative().
3. JDBC program to display database metadata.
4. JDBC program to display Resultset metadata.
5. RMI program for Complex number operation.
6. RMI program for Bank operation.
7. Create an HTML form to read student details such as Roll, name,age, sex, qualification, percentage of marks etc. Write a servlet program that displays the same details.
8. Create an HTML form that reads a file name from the user. Write a servlet program that displays the contents of the file, specified by the user.
9. Session handling servlet that displays total number of visits to that page.
10. CORBA program for arithmetic operation.

CORE COURSE XXII: 6B22BCALAB VI: PYTHON PROGRAMMING

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6B22BCA	V SEM 3 HRS VI SEM 2 HRS	3	3

COURSE OUTCOME

Sample Program List

1. Write a program to find the largest from a list of numbers
2. Write a program to generate first n perfect numbers
3. Write a program to perform the binary search
4. Write a program to find the square root of a number using bisection search method.
5. Write a program to generate Fibonacci series using recursion
6. Write a program to find the LCM and GCD of 2 numbers
7. Write a program to perform merge sort
8. Write a program which reads the contents of a file and copy the contents to another file after changing all the letter to upper case. Exceptions should be handled.
9. Write a program to find the prime numbers in a list of numbers.
10. Write a python program to perform the following
    a) Create table students with fields name,sex,rollno,marks
    b) Insert some rows into the table
    c) Update the marks of all students by adding 2 marks
    d) Delete a student with a given rollno
    e) Display the details of a student with a given rollno
11. Create a simple Login window using Tkinter
12. Create a plot for the mathematical function x^2. The title of the plot and the axes should be labelled.

CORE COURSE XXIII: 6B23BCA LAB VII WEB TECHNOLOGY (LAB -VII)

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6B23BCA	V SEM 2 HRS VI SEM 2 HRS	2	3

COURSE OUTCOME

Guidelines

1. Follow standard coding method
2. The output of the program should be neatly formatted
3. Practice all the programs in the lab

CORE COURSE XXIV: 6B24BCA PROJECT

SEMESTER	COURSE CODE	HOURS PER WEEK	CREDIT	EXAM HRS
VI	6B24BCA	5	4	3