SYLLABUS

FOR

Bachelor of Computer Application (BCA) Programme

H. N. B. GARHWAL UNIVERSITY SRINAGAR (GARHWAL)

S. No	Course No.	Subject	Evaluation – Scheme								Credit
			Period			Sessional			Examination		
			L	T	P	TA	CT	TOT	ESE	Sub. Total	
Theory											
1.	SET/CSE/BCA/DSE4	DSE4A	4	1	-	10	20	30	70	100	5

DES4A.1 Software Project Management

Introduction and Software Project Planning Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

Project Organization and Scheduling Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts. Project Monitoring and Control Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index (SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

Software Quality Assurance and Testing Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

Project Management and Project Management Tools Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

References:

1. Software Project Management by M. Cotterell
2. Information Technology Project Management

3. Management Information and Control by 6. Software Project Managemnet by S. A. Kelkar

DES4A.2 NATURAL LANGUAGE PROCESSING

Introduction to Natural Language Understanding: The study of Language, Applications of NLP, Evaluating Language Understanding Systems, Different levels of Language Analysis, Representations and Understanding, Organization of Natural language Understanding Systems, Linguistic Background: An outline of English syntax.

Introduction to semantics and knowledge representation, Some applications like machine translation, database interface.

Grammars and Parsing: Grammars and sentence Structure, Top-Down and Bottom-Up Parsers, Transition Network Grammars, Top-Down Chart Parsing. Feature Systems and Augmented Grammars: Basic Feature system for English, Morphological Analysis and the Lexicon, Parsing with Features, Augmented Transition Networks.

Grammars for Natural Language: Auxiliary Verbs and Verb Phrases, Movement Phenomenon in Language, Handling questions in Context-Free Grammars. Human preferences in Parsing, Encoding uncertainty, Deterministic Parser.

Ambiguity Resolution: Statistical Methods, Probabilistic Language Processing, Estimating Probabilities, Part-of-Speech tagging, Obtaining Lexical Probabilities, Probabilistic Context-Free Grammars, Best First Parsing. Semantics and Logical Form, Word senses and Ambiguity, Encoding Ambiguity in Logical Form.

References:

1. Akshar Bharti, Vineet Chaitanya and Rajeev Sangal, NLP: A Paninian Perspective, Prentice Hall, New Delhi
2. James Allen, Natural Language Understanding, 2/e, Pearson Education, 2003
3. D. Jurafsky, J. H. Martin, Speech and Language Processing, Pearson Education, 2002
4. L.M. Ivansca, S. C. Shapiro, Natural Language Processing and Language Representation
5. T. Winograd, Language as a Cognitive Process, Addison-Wesley

DES4A.3 Unix & Shell Programming

Basic Unix Commands: The Unix editors and vi; Redirection, Piping, Tees and filters; The Unix Utilities grep, sed, etc.

Overview of Unix Architecture: The kernel and the Shell; Processes and Time Sharing files and Directories; Peripheral Device as files.

Introduction the Shell Scripts: The Bourne and C-shells; Shell variables, scripts meta-characters and environment; the if and case statements; for, while and until loops.

System calls and the 'C' library: Discussion of the Unix system calls and 'C' library functions, the standard I/O Package; file handling; math library; command line parameters etc. The Unix 'C' interface; 'C' files and Graphics.

Introduction of systems Administration under Unix: The system Manger OLE and functions.

Different Tools: Debugging language development, System development different print formatting UNIX Tools.

Bourne Shell: Shell meta characteristics, shell variable, scripts, facilities, commands and environments, shell archive, idea about restricted shell, ROLC program.

Korn Shell: Shell variables and scripts, built in EDITOR, built in integer arithmetic, string manipulation capabilities, Command Aliasing, Array Job control.

C-Shell: Shell variables and scripts, shell facilities, history Integer Arithmetic Decision making and job control.

References:

1. Stephan Prata   :   Advanced Unix – A Programmers Guide – BPB PUB.
2. Kernighlan & Pike :   The Unix Programming Environment – PHI.
3. The Unix System Manuals.

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Theory											
2.	SET/CSE/BCA/DSE5	DSE5A	4	1	-	10	20	30	70	100	5

DES5A.1 Compiler Designing

Compiler Structure: Compilers and Translators, Various Phases of Compiler, Pass Structure of Compiler, Bootstrapping of Compiler.

Programming Language: High level languages, lexical and syntactic structure of a language, Data elements, Data Structure, Operations, Assignments, Program unit, Data Environments, Parameter Transmission. Lexical Analysis: The role of Lexical Analyzer, A Simple approach to the design of Lexical Analyzer, Regular Expressions, Transition Diagrams, Finite state Machines, Implementation of Lexical Analyzer, Lexical Analyzer Generator: LEX, Capabilities of Lexical Analyzer.

The Syntactic Specification of Programming Languages: CFG, Derivation and Parse tree, Ambiguity, Capabilities of EFG.

Basic Parsing Techniques: Top-Down parsers with backtracking, Recursive descent Parsers, Predictive Parser, Bottom-up Parsers, Shift-Reduce Parsing, Operator Precedence Parsers, LR parsers (SLR, Canonical LR, LALR) Syntax Analyzer Generator: YACC

Intermediate Code Generation: Different Intermediate forms: Three address code, Quadruples & Triples, Syntax Directed Translation mechanism and attributed definition. Translation of Declaration, Assignment, Control flow, Boolean expression, Array References in arithmetic expressions, procedure calls, case statements, postifix translation.

Run Time Memory Management: Static and Dynamic storage allocation, stack based memory allocation schemes, Symbol Table management.

Error Detection and Recovery: Lexical phase errors. Syntactic phase errors, semantic errors.

Code Optimization and Code Generation: Local optimization, Peephole optimization, Basic blocks and flow Graphs, DAG, Data flow analyzer, Machine Model, Order of evaluation, Register allocation and code selection.

References:

1. Alfred V Aho, Jeffrey D. Ullman, "Principles of Compiler Design", Narosa

2. A.V. Aho, R. Sethi and J.D.Ullman, "Compiler Principle, Tech & tools" AW

3. H.C. Holub "Compiler Design in C", Printice Hall Inc.

4. Apple, "Modern Computer Implementation in C: Basic Design" Cambridge Press

5. Modern Compiler Design: Dick Grune, Wiley dreamtech India Pvt. Ltd.

6. Starting Out with Modern Compiler " David Gaddis Wiley dreamtech India Pvt. Ltd.

DES5A.2 Human- Computer Interaction

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design. A brief history of Screen design,

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

Design process – Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

Screen Designing:- Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

Software tools – Specification methods, interface – Building Tools.

Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.

References:

1. Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson Education

2. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech,

3. User Interface Design, Soren Lauesen , Pearson Education.

DES5A.3 Unified Modeling Language

Introduction: The Evolution of Technology, Structured Analysis and Design, Object-Oriented Technologies, Comparison between the main technologies.

The Unified Process and Features: Unified Process, Static Structure: Process Representation, Dynamic Structure: iterative development, an architecture-centric process, A use-case-driven process, Use case models, Notations and Terminology.

Process Components (Workflows): Business Modeling Workflow, Requirement Workflow, Analysis and Design Workflow, Deployment workflow.

Understanding Object –Oriented Technologies, Current status of Object Technologies, The static object model- Class, Collaborations and Object Diagrams, Generalization, Composition, Aggregation, Multiplicity & Association with concept and examples.

Use Case Analysis: Discussion on use cases, terminology, notations and analysis, what they are and aren't, Use case- an example, Use case- formal Scenario template.

Static chart Diagram: Composite states, nested states, Events, Simple transitions.

UML Activity and sequence diagrams: Usage and Syntax, Guarded Transitions, Synchronization Bars, Swim lanes Purpose, Proper Usage of Activity diagram. Transition time sequence diagram: Objective and Modeling guidelines, Objective Interaction, Sequence diagram- UML notation, Object and Stereotypes.

References:

1. UML distilled by Martin Fouler- Pearson Education.
2. Object –Oriented Modeling by James Raumbaugh, PHI.
3. UML a nutshell by Dan Pillone, O'Reilly Publication.
4. The elements of UML by Scott Amber, Cambridge University Press.
5. Designing Object-Oriented Software by Rebecca Wirf Brock, PHI.

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3.	SET/CSE/BCA/SEC4	SEC 4A	2	-	-	10	20	30	70	100	2

SEC 4A.1 Android Programming

Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.

Overview of object oriented programming using Java: OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project
– Hello Word, run on emulator, Deploy it on USB-connected Android device.

User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes.

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners(Combo boxes),Images, Menu, Dialog.

Database: Understanding of SQLite database, connecting with the database.

References:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

SEC 4A.2 XML Programming

Introduction: Understanding Mark-up Languages, Introduction to XML and its Goals.

XML Basics: XML Structure and Syntax, Document classes and Rules.

Other XML Concepts: Scripting XML, XML as Data, Linking with XML.

XML with Style: XSL –Style Sheet Basics, XSL basics, XSL style sheets.

References:

1. William J. Pardi , XML in action web technology, Microsoft Press, 1999
2. Michael J. Young ,Step by Step XML , Microsoft Press, 2002

SEC 4A.3 PHP Programming

Introduction to PHP: PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.), PHP with other technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP , Expressions, scopes of a variable (local, global), PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator. PHP operator Precedence and associatively

Handling HTML form with PHP: Capturing Form Data, GET and POST form methods, Dealing with multi value fields, Redirecting a form after submission.

PHP conditional events and Loops: PHP IF Else conditional statements (Nested IF and Else), Switch case, while ,For and Do While Loop, Goto , Break ,Continue and exit

PHP Functions: Function, Need of Function , declaration and calling of a function, PHP Function with arguments, Default Arguments in Function, Function argument with call by value, call by reference, Scope of Function Global and Local

String Manipulation and Regular Expression: Creating and accessing String , Searching & Replacing String, Formatting, joining and splitting String , String Related Library functions, Use and advantage of regular expression over inbuilt function, Use of preg_match(), preg_replace(), preg_split() functions in regular expression

Array: Anatomy of an Array ,Creating index based and Associative array ,Accessing array, Looping with Index based array, with associative array using each() and foreach(), Some useful Library function

References:

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.

2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.

3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.

4. Luke Welling, Laura Thompson, PHP and MySQL Web Development", 4th Edition, Addition Paperback, Addison-Wesley Professsional,2008.

5. David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.