

Kumaun University, Nainital, Uttarakhand

BACHELOR OF COMPUTER APPLICATION

Session 2019-2020

BCA 311: Computer System Architecture

UNIT I

Basic Computer Organization and Design: Register Transfer Language, Arithmetic and Logical, micro-operations, Shift micro-operation. Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference instructions, input-output and interrupt. Design of basic computer, Booth algorithm.

UNIT II

Central Processing Unit: Micro programmed control, Control memory, address sequencing, General Register organization, stack organization, Instruction formats, addressing modes, Data transfer and manipulation, Program Control, RISC, CISC.

UNIT III

Input-Output Organization: Peripheral devices, I/O interface, Asynchronous data transfer, Strobe Control, Handshaking Modes of Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor, and Serial Communication.

UNIT IV

Memory Organization: Memory Hierarchy, Main memory (RAM/ROM chips), Auxiliary memory, Associative memory, Cache memory, Virtual Memory, Memory Management Hardware.

UNIT V

Pipelining: Parallel processing, Amdahl's law, Pipelining, Flynn's classification, space-time diagram, speedup ratio, Arithmetic pipeline, Instruction pipeline.

Recommended Books:

1. M. Mano, Computer System Architecture, Pearson Education 1992
2. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India, 2009
3. M.M. Mano, Digital Design, Pearson Education Asia, 2013
4. Carl Hamacher, Computer Organization, Fifth edition, McGraw-Hill, 2012.

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BCA 312: Programming in Python

UNIT I

Introduction and Overview: Overview of Python Programming: Structure of a Python Program, Elements of Python, Python Interpreter, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings.

UNIT II

Operators and Statements: Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator). Creating Python Programs: Input and Output Statements.

UNIT III

Decision making and Branching: Control statements (Branching, Looping, Conditional Statement, Difference between break, continue and pass, default arguments. Defining Functions.

UNIT IV

Classes and Objects: An introduction to object-oriented programming in Python. objects, operator overloading, overriding, special methods. Inheritance, polymorphism and composition.

UNIT V

Iterators and Generators: Iteration protocol, Iterable objects, generators and generator expressions. Use of generators, assertions. Testing and debugging of a python project.

Recommended Books

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.org 2015
3. Allen Downey, Jeffrey Elkner, Chris Meyers, how to think like a computer scientist: learning with Python, Freely available online.2012

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BCA 313: Operational Research

UNIT I

Introduction to Operations Research: Basics definition, scope, objectives, phases, models and limitations of Operations Research.

Linear Programming Problem: Formulation of LPP, Graphical solution of LPP. Simplex Method, Artificial variables, big-M method, two-phase method, degeneracy and unbound solutions.

UNIT II

Transportation Problem: Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions – Northwest corner rule, least cost method and Vogel's approximation method. Optimality test: the steppingstone method and MODI method.

Assignment Problem: Formulation, Hungarian method for optimal solution. Solving unbalanced problem. Traveling salesman problem as assignment problem.

UNIT III

Sequencing models: Solution of Sequencing Problem, Processing n Jobs through 2 Machines, Processing n Jobs through 3 Machines, Processing 2 Jobs through m machines, Processing n Jobs through m Machines.

UNIT IV

Dynamic programming: Characteristics of dynamic programming, Dynamic programming approach for Priority Management, Employment Smoothening, Capital Budgeting, Stagecoach/Shortest Path, Cargo Loading and Reliability problems.

UNIT V

Simulation: Advantages of Simulation, Limitations of Simulation, Monte-Carlo Simulation, Random Numbers.

CPM and PERT: Drawing of networks, Removal of redundancy, Network computations, Free slack, Total slack, Crashing, Resource allocation.

Recommended Books:

1. P. Sankara Iyer, "Operations Research", Tata McGraw-Hill, 2008.
2. A.M. Natarajan, P. Balasubramani, A. Tamilarasi, "Operations Research", Pearson Education, 2005.
3. J K Sharma, "Operations Research Theory & Applications, 3e", Macmillan India Ltd, 2007.
4. P. K. Gupta and D. S. Hira, "Operations Research", S. Chand & co., 2007.

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BCA 314: Organizational Behaviour

UNIT I

Fundamentals of Organizational Behaviour: Nature, Scope, Definition and Goals of Organizational Behaviour, Fundamental Concepts of Organizational Behaviour, Models of Organizational Behaviour, Emerging aspects of Organizational Behaviour: TQM, Managing Cultural Diversity, Managing the Perception Process

UNIT II

Attitude Values and Motivation: Effects of employee attitudes Personal and Organizational Values Job Satisfaction Nature and Importance of Motivation Achievement Motive Theories of Work Motivation: Maslow's Need Hierarchy Theory, McGregor's Theory 'X' and Theory 'Y'

UNIT III

Personality: Definition of Personality, Determinants of Personality Theories of Personality – Trait and Type Theories, The Big Five Traits, Myers-Briggs Indicator, Locus of Control, Type A and Type B Assessment of Personality

UNIT IV

Work Stress: Meaning and definition of Stress, Symptoms of Stress Sources of Stress: Individual Level, Group Level, Organizational Level Stressors, Extra Organizational Stressors Effect of Stress – Burnouts Stress Management – Individual Strategies, Organizational Strategies Employee Counselling

UNIT V

Group Behaviour and Leadership: Nature of Group, Types of Groups Nature and Characteristics of team building, Effective Teamwork Nature of Leadership, Leadership Styles Traits of Effective Leaders

Recommended Books:

1. Organizational Behavior Text, Cases and Games- By K. Aswathappa, Himalaya Publishing House, Mumbai, Sixth Edition (2005)
2. Organizational Behavior Human Behavior at Work by J. W. Newstrom, Tata McGraw Hill Publishing Company Limited, New Delhi, 12 th Edition (2007)