# ASSAM SCIENCE AND TECHNOLOGY UNIVERSITY

## Guwahati

## Course Structure and Syllabus

## Bachelor of Computer Application (BCA)

## 3rd Semester

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## Course Structure and Syllabus

## Bachelor of Computer Application (BCA)

## 3rd Semester

| Sl.No. | Subject Code | Subject Name | L | T | P | C |
|---|---|---|---|---|---|---|
| **Theory** | | | | | | |
| 1 | BCA171301 | Computer Architecture and Organization | 3 | 2 | 0 | 4 |
| 2 | BCA171302 | Database Management System | 3 | 2 | 0 | 4 |
| 3 | BCA171303 | Object Oriented Programming in Java | 3 | 2 | 0 | 4 |
| 4 | BCA171304 | Environmental science | 3 | 2 | 0 | 4 |
| **Practical** | | | | | | |
| 5 | BCA171315 | Laboratory-III (Java and Basic Sql lab) | 0 | 0 | 10 | 5 |
| **TOTAL** | | | 12 | 8 | 10 | **21** |
| Total Contact Hrs: 30; **TotalCredits:21** | | | | | | |

**Paper : BCA171301**
**Subject Name: Computer Architecture and Organization**
**L-T-P-C: 3-2-0-4**

| UNIT | | Content | Weeks |
|---|---|---|---|
| 1 | | **Introduction**<br>Basic structure of a digital computer; registers, bus, assembly and machine language programming, micro operations (arithmetic, logic and shift). | 2 |
| 2 | | **Processor Organization:**<br>Instruction set, types, formats, addressing modes, stack, subroutine, ALU, Instructions cycle, Hardwired and Micro programmed control, Pipelining, Flynn's classification, RISC and CISC paradigms | 3 |
| 3 | | **Memory Organization**<br>Memory Hierarchy, ROM and RAM chips, Auxiliary memory, Associative memory, Cache memory, Cache mapping techniques, Caching Algorithms, Introduction to virtual memory | 3 |
| 4 | | **Input-Output Organization**<br>Peripheral devices, Interface, Interrupt Type, Priority Interrupt, Synchronous vs. Asynchronous Controllers, I/O transfer techniques: Program controlled, Interrupt controlled and DMA, Input-output processor | 3 |
| 5 | | **Micro Processor and Micro Controllers**<br>Overview of Microprocessor and Microcontrollers | 1 |
| **Books**: | 1. | Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition "Computer Organization",McGraw-Hill | |
| | 2. | William Stallings, Computer Organisation and architecture, Pearson | |
| | 3. | Mano M.M: Computer system Architecture, PHI (EEE) | |

**Paper code : BCA171302**
**Paper Name: Database Management system**
**L-T-P-C: 3-2-0-4**

| UNIT | | Content | Weeks |
|---|---|---|---|
| 1 | | Introduction : What is DBMS , Traditional File Approach vs. DBMS approach advantage of using DBMS ,DBMS User, Role of DBA | 2 |
| 2 | | Entity Relationship models: ER diagrams, generalization, specialization, aggregation. Database models - Network model , Hierarchical model , and Relational model, Data Flow Diagram. | 3 |
| 3 | | Relational algebra (Select, Project, Cross, Product, theta join, equi join, natural join, outer join), Set Operation, SQL constructs (Select ... From… Where… Group by ….. Having… Order by….), Insert, Delete, Update, View, Definition and use, nested quires, Constraints considers(NOT NULL , UNIQUE, Check Primary key. Foreign key). | 3 |
| 4 | | Relational Data Base Design : Integrity constraints ( domain constraints , referential , assertions , triggers , functional dependencies ) , Normalization (using FDs ) | 3 |
| 5 | | Transactions : Concept , state , ACID properties | 2 |
| **Books**: | 1 | Elmarsi and Navathe, fundamentals of Database Systems , Norsa publishing Company,1989 | |
| | 2 | J.D . Ullman , Principles of Database Systems , Galgotia Publishing Private Limited | |
| | 3 | Silberschatz, Korth and Sudersan , Principles of Database Systems Mc GrawHill Publication | |
| | 4 | C.J .Date An Introduction to Database systems , Vol - I And Vol II Addison - Wesley Publishing Company. | |

**Paper** : **BCA171303**

**Subject Name** : **Object Oriented Programming in Java**

**L-T-P-C: 3-2-0-4**

| UNIT | | Content | Weeks |
|---|---|---|---|
| 1 | | **Introduction:** Java's History, Importance of Java for the Internet, Java's Magic : Byte-code, Its Features Java Virtual Machine Concepts,<br>Primitive Data Type And Variables, Java Operators, Expressions, Statements and Arrays.<br>**Object Oriented Concepts:** Class and Objects:-Class Fundamentals, Creating objects, Assigning object reference variables; Introducing Methods, static methods, Constructors and types of constructor, Overloading constructors; *this* Keyword; Using Objects as Parameters, Argument passing, Returning objects, Method overloading. | 4 |
| 2 | | **Inheritance and Polymorphism:** Inheritance Basics, Access Control, Multilevel inheritance, Method Overriding, Abstract Classes, Polymorphism, *final* keyword<br>**Packages:** Defining Package, CLASSPATH, Package naming, Accessibility of Packages, using package members. | 3 |
| 3 | | **Interfaces:** Implementing Interfaces, Interface and Abstract Classes<br>**Exceptions Handling:** Exception , Handling of Exception, Using try-catch, Catching multiple exceptions , Using finally clause , Types of Exceptions, Throwing Exceptions. | 3 |
| 4 | | **Multithreading Programming:** The Java Thread Model, Understanding Threads, Creating a Thread, Creating Multiple Threads, Thread Priorities.<br>**Creating Applets in Java:** Applet Basics, Applet Architecture, Applet Life Cycle, Simple Applet Display Methods, The HTML APPLET Tag Passing Parameters to Applets. | 3 |

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|---|---|---|---|
| **Books:** | 1. | E. Balaguruswami, **Programming with Java**, Second Edition, Tata McGraw-Hill Publication | |
| | 2. | Herbert Schildt, **The Complete Reference Java 2**, Fifth Edition, Tata McGraw-Hill Publication | |

**Paper code : BCA171304**
**Paper Name: Environmental Science**
**L-T-P-C: 3-2-0-4**

| UNIT | Content | HOURS |
|---|---|---|
| 1 | **Concepts Of Environmental Sciences :**Definition of environment, scope and importance of environment studies; Need for public awareness; Structure and functions in an ecosystem. | 4 |
| 2 | **Natural Resources :**Renewable and Non-renewable Resources; Forest, water, minerals, Food and land (with example of one case study); Energy, Growing energy needs, energy sources (conventional and alternative) | 5 |
| 3 | **Biodiversity And Its Conservation :**Biodiversity at global, national and local levels; India as a mega-diversity nation; Threats to biodiversity (biotic, abiotic stresses), and strategies for conservation. | 4 |
| 4 | **Environmental Pollution :**Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear; Pollution prevention; Management of pollution – Rural /Urban/Industrial waste management [with case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management. | 5 |
| 5 | **Social Issues And Environment**: From unsustainable to sustainable development.Problems relating to urban environment- Population pressure, water scarcity, industrialization; remedial measures<br>Climate change- Reasons, effects (global warming, ozone layer depletion, acid rain) with one case study;<br>Legal issues- Environmental legislation (Acts and issues involved), Environmental ethics. | 6 |

**Text/Reference Books:**

1. Agarwal, K.C., Environmental Biology, Nidi Publication Ltd**.**, Bikaner, 2001.
2. Bharucha Erach, Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmadabad, 2002.
3. Dr R J Ranjit Daniels. And Dr Jagadish Krishnaswamy.-- Environmental studies-2010-Willey India .

**Paper** : **BCA171315**

**Subject Name** : **Laboratory-III (Java and Basic SQL Lab)**

**L-T-P-C: 0-0-10-5**

| UNIT | PARA | Content |
|---|---|---|
| 1 (75%) | 1.1 | Simple Programs using Operator and Expressions |
| | 1.2 | Programs on Decision making statements, Looping Statements, |
| | 1.3 | Programs based on Classes & Objects |
| | 1.4 | Programs based on Inheritance |
| | 1.5 | Program based on package and multithreading |
| | 1.6 | Program based on Exception Handling |
| 2 (25%) | 2.1 | **Basic SQL statements** : Create, Insert, Update, Select, Delete, Alter table structure etc. using MySQL/Oracle |
| **Books:** | 1. | E. Balagurusamy, **Programming with Java**, Third Edition, Tata McGraw-Hill Publication |
| | 2. | SQL, PL/SQL: The Programming Language Of Oracle, Ivan Bayross, BPB Publication |

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