**MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WB**

**Syllabus for Bachelor of Computer Application (BCA) Programme**
(Effective for Students Admitted in Academic Session 2018-2019)

**Detailed Syllabus**

**Semester I**

**Paper: Digital Electronics**
**Code : BCAN-101**
**Contacts Hours / Week : 4L+1CE**
**Credits : 3**

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| **1. Module I: Number Systems & Codes (6L)**<br>Decimal Number, Binary Number, Octal Number, Hexadecimal Number, Conversion – Decimal to Binary, Binary to Decimal, Octal to Binary, Binary to Octal, Hexadecimal to Binary, Binary to Hexadecimal, Octal to Binary to Hexadecimal, Hexadecimal to Binary to Octal; Floating Point Number Representation, Conversion of Floating Point Numbers, Binary Arithmetic, 1's and 2's Complement, 9's and 10's Complement, Complement Arithmetic, BCD, BCD addition, BCD subtraction, Weighted Binary codes, Non-weighted codes, Parity checker and generator, Alphanumeric codes |
| **2. Module II: Logic Gates (2L)**<br>OR, AND, NOT, NAND, NOR, Exclusive – OR, Exclusive – NOR, Mixed logic |
| **3. Module III: Boolean Algebra (4L)**<br>Boolean Logic Operations, Basic Law of Boolean Algebra, Demorgan's Theorem, Principle of Duality |
| **4. Module IV: Minimization Techniques (5L)**<br>Sum of Products, Product of Sums, Karnaugh Map (up to 4 variables) |
| **5. Module V: Multilevel Gate Network (3L)**<br>Implementation of Multilevel Gate Network, Conversion to NAND-NAND and NOR-NOR Gate Networks |
| **6. Module VI: Arithmetic Circuits (5L)**<br>Half Adder, Full Adder, Half Subtractor, Full Subtractor, Carry Look Ahead Adder, 4-Bit Parallel Adder |
| **7. Module VII: Combinational Circuits (5L)**<br>Basic 2-input and 4-input multiplexer, Demultiplexur, Basic binary decoder, BCD to binary converters, Binary to Gray code converters, Gray code to binary converters, Encoder. |
| **8. Module VIII: Sequential Circuits (5L)**<br>Introduction to sequential circuit, Latch, SR Flip Flop, D Flip Flop, T Flip Flop, JK Flip Flop, Master Slave Flip Flop |
| **9. Module IX: Basics of Counters (2L)**<br>Asynchronous (Ripple or serial) counter, Synchronous (parallel) counter |
| **10. Module X: Basics of Registers (3L)**<br>SISO, SIPO, PISO, PIPO, Universal Registers |

**Suggested Readings:**


**1. Digital Circuit & Design, Salivahan, VIKAS**

**2. Digital Design, M. Morris. Mano & Michael D. Ciletti, PEARSON**

**3. Fundamentals of Digital Circuits; Anand Kumar; PHI**

**4. Digital Electronics; Tokheim; TMH**

**5. Digital Electronics; S. Rangnekar; ISTE/EXCEL**

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**Paper: Environment Studies**
**Code : BCAN-102**
**Contacts Hours / Week : 4L+1CE**
**Credits : 2**

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| **1. Module I: Introduction (5L)**<br>1. Introduction to environment and ecology 2. Components of the environment, environmental degradation, natural cycles ofenvironment. |
| **1. Module II: Ecology (2L)**<br>1. Elements of Ecology, Ecological balance, Effects of Aforestation and deforestation |
| **3. Module III: Air Pollution and Control (15L)**<br>1. Atmospheric composition, Segments of atmosphere climate, weather 2. Atmospheric Stability, dispersion of pollutants 3. Sources and effects of air pollutants, primary and secondary pollutants 4. Criteria Pollutants:PM10, Source, Effect, Control 5. CO, $NO_x$, Source, Effect, Control 6. $SO_x$, Source, Effect, Control 7. Lead, Ozone, Source, Effect, Control 8. Green house effect, Control Measures 9. Depletion of ozone layer, Effects of UV exposer, Control Measures |
| **4. Module IV: Water Pollution and Control (10L)**<br>1. Hydrosphere, natural water resources and reserves 2. Pollutants: their origin and effects 3. COD and BOD test, NBOD and CBOD 4. River / lake / ground water pollution 5. Control Measures of water pollution 6. Drinking water and waste water treatment |
| **5. Module V: Land Pollution (5L)**<br>1. Lithosphere, pollutants (municipal, industrial, commercial, agricultural, hazardous solid wastes) their origin and effects 2. Collection and disposal of solid waste, recycling and treatment methods |
| **6. Module VI: Noise Pollution (3L)**<br>1. Sources, effects, standards andcontrol |

**Suggested Readings:**

**1. Environmental Chemistry by A. K. Dey, New Age international**
**2.Environmental Engineering by G.M. Masters, Prentice Hall India**

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**Paper: C Programming**
**Code : BCAN-103**
**Contacts Hours / Week : 4L+1CE**
**Credits : 4**

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| **1. Module I: Programming Basics (2L)**<br>Problem analysis, Flowchart, algorithms, Pseudo codes, structured programming, Example of Flowchart and Algorithm representation, Brief History of Development of C language, Features of C language, Process of compiling and running a C program. |
| **2. Module II: Variable and Constants (4L)**<br>Definition of Tokens, variables, Constant, Classification of constants, data types (Primary data types, User defined data types, Derived data types) |
| **3. Module III: Operators and Expressions (6L)**<br>Different types of Operators (Arithmetic, Relational, Logical, Assignment, Increment and Decrement, Conditional, Bitwise, Special), expressions, type conversion, Operator precedence, associatively rules on operators. |
| **4. Module IV: Formatted Input/output (4L)**<br>scanf() Format code, printf() Format code, reading and writing character variable, character testing functions (isdigit(), islower(), isupper(), tolower(), toupper()). |
| **5. Module V: Decision Making And Branching (5L)**<br>If statement, if..else, Nested if ..else, else if ladder, switch, ternary operator, goto statement (forward and backward jump) |
| **6. Module VI: Looping (5L)**<br>Different types of loop (while, for, do), entry control loop , exit control loop, Applying break and continue within loop. |
| **7. Module VII: Array (4L)**<br>One dimensional array , Two dimensional array, Example using integer and floating array. |
| **8. Module VIII: String (3L)**<br>Character Array, Library functions related to string ( strcat(), strcmp(), strcpy(), strlen() ) |
| **9. Module IX: Function (4L)**<br>Definition, Standard library functions, user-defined functions, recursion, scope of variables in function (auto, extern, static, register) |
| **10. Module X: Pointer And Header File (3L)**<br>Pointer Definition, pointer expression, pointer to an array, pointer to a function. Definition of Header file, Use of header files, Different header files. |

**Suggested Readings:**

1. Programming in ANSI C by E Balagurusamy
2. Programming With C, Gottfried, TMH
3. The C Answer Book, Tondo, PHI
4. Programming & Problem Solving Through C Language, EXCEL BOOKS

**Syllabus for Bachelor of Computer Application (BCA) Programme**
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**Paper: Basic Mathematical Computation**
**Code : BMN-101**
**Contacts Hours / Week : 4L+1CE**
**Credits : 3**

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| **1. Module I: Linear Algebra (12L)**<br>Determinant and its properties (up to third order), Minor and cofactors, Matrices, addition, multiplication and transpose of a matrix, Symmetric and skew-symmetric matrices and their properties, Adjoint, Inverse matrix, Solution of linear equations in three variables by Cramer's rule and matrix inversion method, Permutation and Combinations, Binomial theorem. |
| **2. Module II: Two Dimensional Geometry (8L)**<br>Locus, Straight lines, Circle, Conic section. Transformation of axes, Plane polar curves |
| **3. Module III: Differential Calculus (12L**<br>Limits of function and continuity, fundamental properties of continuous functions (without proof), Derivatives, Geometric meaning of derivative, successive differentiation, Rolle's theorem, Mean value theorems, Taylor's and Maclaurin's theorem, Taylor's series, Functions of several variables, Limit and Continuity, Partial derivatives, Total differential, Euler's theorem on homogeneous functions of two variables. Tangents and normals |
| **4. Module IV: Integral Calculus (8L)**<br>Indefinite integrals, Definite integrals and their elementary properties, Definite integral as the limit of sum, Idea of improper integrals. Area under a plane curve |

**Suggested Readings:**


1. **Higher Algebra, S. K. Mapa, Levant Books.**
2. **Advanced Higher Algebra, Chakravorty and Ghosh, U N Dhar Pvt. Ltd.**
3. **Co-ordinate Geometry, S. L. Loney**
4. **Integral Calculus, Das and Mukherjee, U N Dhar Pvt. Ltd.**
5. **Differential Calculus, Das and Mukherjee, U N Dhar Pvt. Ltd.**
6. **Advanced Engineering Mathematics, E Kreyszig, Wiley**