Dr. A.P.J. Abdul Kalam University, Indore (M.P)

Scheme of Examination
B.Sc.
Semester-III
(w.e.f. July 2016 Onwards)

(Non Grading)

Course Name	Subject	Theory Max. Marks				Practical Max Marks		Total
		Internal		External		Max Marks	Min Marks	
		Max	Min	Max	Min			
Foundation Courses	HINDI+ ENGLISH **FCS 301 HE**	10+05=15	05	50+35=85	28	-	-	100
	Environmental Science **FCS 302 EP**	15	05	35	12	-	-	50
Computer Science	COMPUTER SCIENCE **BSS 301 T**	15	05	85	28	-	-	100
	COMPUTER SCIENCE **BSS 301 P**	-	-	-	-	50	17	50
	MATHEMATICS **BSM 301 T**	25	08	125	42	-	-	150
	PHYSICS **BSP303 T**	15	05	85	28	-	-	100
	PHYSICS **BSP303 P**	-	-	-	-	50	17	50
Total								600

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B.Sc. Under Graduate Semester wise Syllabus

(W.e.f. session 2016 onwards)

Class: - B.Sc.

Semester: - III Semester

Subject: - Computer (BSS 301 T)

Paper: - DATA STRUCTURE USING C

Marks 85+15 CCE

Unit- I

Introduction to Data Structures: Definition of Data structure and Abstract data type

Classification of Data structures: Linear, non-linear, homogeneous, non-homogeneous, static & dynamic.

Arrays: Definition & types of array, Memory representation of one & two dimensional array, Operations: Insertion , Deletion, Traversal

Sparse Matrix: Definition & memory representation.

Unit- II

Stack: Definition, Array implementation of stack (static stack) : Operations PUSH, POP, TRAVERSE.

Applications of stack: Infix, Prefix , Postfix representation and evaluation using stack, Use of stack in recursive implementation.

Queue: Definition, Array implementation of queue (static queue): Operations INSERT, DELETE, TRAVERSE.

Introduction to Circular queue: Definition & implementation, Priority queue, Double ended queue **Applications of queue**

Unit- III

Introduction to Linked List: Definition, advantages, Types of linked list: single, doubly, circular linked list

Operations: Creation, insertion, deletion & traversal of linked list

Unit- IV

Complexity of Algorithms: Time & space complexity, Best-case, worst-case, average-case, Big –oh notation.

Searching Algorithm: Linear or sequential search, Binary search, Interpolation search using array. Complexity of Linear search, Binary search, Interpolation Search **Sorting Algorithm**: Bubble sort, Selection sort, Insertion sort, Merge sort Complexity of sorting algorithm.

Unit- V

Introduction to Tree: Definition, Binary tree: Definition, representation

Operations: Traversal, insertion, deletion **Binary search Tree (BST)**: Definition and creation, Search using BST **Introduction** to B-Tree & B+ tree.

Text Books:

1. Yedidyah Langsam Moshe J. Augenstein, Aaron M. Tenenbaum, "**D**
Structures using C & C++", PHI New Delhi, 2nd Edition.

Reference Books:

1. G.S.Baluja, "**Data Structures Through C**",Dhanpat Rai & Co.,4th Edition
2. Seymour Lipschutz,"**Data Structures**", Schaum's Outline Series, Tata Mc Gr
Hill Publishing Company Ltd.
Adam Drodzek, "**Data Structures & Algorithm in C++**", 2nd
3. Edition

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Practical

Subject: - Computer (BSS 301 P)

Paper: - Practical exercise on Data Structure using C

1 Write a program for address calculation of an element in one and two dimensional array (row major order and column major order).
2 Write a program for insertion, deletion and traversal of elements of an array.
3 Write a program for sparse matrix implementation.
4 Write a program for complete implementation of stack using array with push, pop and traversal operations.
5 Write a program for conversion of an infix expression into postfix representation and evaluation of that postfix form.
6 Write a program for complete implementation of queue using array with insertion, deletion and traversal operations.
7 Write a program for complete implementation of circular queue using array with insertion, deletion and traversal operations.
8 Write a program for complete implementation of double ended queue using array with insertion, deletion and traversal operations.
9 Write a program to create singly link list (creation, insertion, deletion and traversal).
10 Write a program to create doubly link list (creation, insertion, deletion and traversal).
11 Write a program to create circular singly link list (creation, insertion, deletion and traversal).
12 Write a program to create circular doubly link list (creation, insertion, deletion and traversal).
13 Write a program for complete implementation of stack using link list with push, pop and traversal operations.
14 Write a program for complete implementation of queue using link list with insertion, deletion and traversal operations.
15 Write a program for implementation of binary tree (creation, insertion, deletion), with preorder, inorder and postorder traversal.
16 Write a program for implementation of binary search tree (creation, insertion, deletion), with preorder, inorder and postorder traversal.
17 Write a program for implementing graphs and showing depth first search and breadth first search traversals.
18 Write a program for linear search.
19 Write a program for Binary search.
20 Write a program for interpolation search.
21 Write a program for bubble sort.
22 Write a program for selection sort.
23 Write a program for insertion sort.
24 Write a program for merge sort.
25 Write a program for quick sort.

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B.Sc. Under Graduate Semester wise Syllabus

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Class: - B.Sc.

Semester: - III Semester

Subject: - Physics (BSP 303T)

Paper: - Optics

Marks 85+15 CCE

Unit-I

Geometrical Optics

Reflection and refraction: Fermat's Principle, Refraction at a spherical surface, Aplanatic points and its applications, Lens formula, Combination of thin lenses and equivalent focal length.

Optical instruments: Dispersion and dispersive power, chromatic aberration and achromatic combination, different types of aberration (qualitative) and their remedy. Need for multiple lenses in eyepieces, Ramsden and Huygens eye-piece.

Unit-II

Interference of light

The principle of superposition, two slit interference, coherence requirement for the sources, optical path retardations, Lateral shift of fringes, Rayleigh refractometer and other applications. Localised fringes, Young's double slip experiment, Fresnel Biprism, thin films, interference by a film with two non-parallel reflecting surfaces, Newton's rings.

Haidinger fringes (Fringes of equal inclination), Michelson interferometer, its application for precision determination of wavelength, wavelength difference and the width of spectral lines. Intensity distribution in multiple beam interference, Fabry-Perot interferometer and Etalon.

Unit-III

Diffraction: Introduction to Diffraction, Types of Diffraction, difference between Fresnel and Fraunhoffer diffraction.

Fresnel diffraction: Fresnel's theory of half period zone, diffraction at straight edge, rectilinear propagation.

Fraunhoffer diffraction: Diffraction at a slit, phasor diagram and integral calculus methods. Diffraction at a circular aperture and a circular disc, Rayleigh criterion of resolution of images. Resolving power of telescope and microscope. Outline of phase contrast microscopy.

Diffraction Grating: Diffraction at N-parallel slits, Intensity distribution, Plane diffraction grating, Concave grating and its mountings. Resolving power of a grating and comparison with resolving power of prism and of a Fabry Parot etalon.

Unit-IV

Polarisation

Concept of Polarized light, Brewster's Law. Transverse nature of light waves, Polarization of electromagnetic (em) waves, Plane polarised light – production and analysis, Description of Linear, circular and elliptical polarisation.

Propagation of em waves in anisotropic media, uniaxial and biaxial crystals, symmetric nature of dielectric tensor, Double refraction, Hygen's principle, Ordinary and extraordinary refractive indices, Fresnel's formula, light propagation in uniaxial crystal, Nicol prism, Production of circularly and elliptically polarized light, Babinet compensator and applications, Optical rotation, Optical rotation in liquids and its measurement through Polarimeter.

Unit-V

Lasers and Photo Sensors

A brief history of lasers, characteristics of laser light, Stimulated and spontaneous processes, Einstein prediction, Relationship between Einstein's coefficients (qualitative discussion only), Pumping schemes, Resonators, Three level and four level energy diagram , Principles and working of Ruby Lasers, He-Ne Laser with energy level Diagram, Ruby laser, He-Ne laser, Applications of lasers, Principle of Holography.

Light Sensors: Photodiodes, Phototransistors, and Photomultipliers.

References Books *(for Unit-I to Unit-IV)***:**

1. Fundamentals of Optics: F.A. Jenkins and H.E. White, 1976, McGraw-Hill.
2. Principles of Optics: B.K. Mathur, 1995, Gopal Printing.
3. Fundamentals of Optics: H.R. Gulati and D.R. Khanna, 1991, S.Chand Publication.
4. University Physics: F.W. Sears, M.W. Zemansky and H.D. Young, 13/e, 1986. Addison-Wesley.
5. Optics: Ajoy Ghatak, McGraw Hill Publications.
6. Principles of Optics: Max Born and Wolf, Pregmon Press.

References Books *(for Unit-V only)***:**

1. An introduction to Lasers – Theory and Applications: M. N. Avadhanalu, S. Chand and Co, Ltd.
2. Solid State Physics: P.K. Palanisamy, Scitech Publications (India) Pvt. Ltd.
3. Principles of Laser : Orazio Svelto, Plenum Press, NewYork
4. Instrument measurement and Analysis: B.C. Narka and K.K. Chaudhary, Tata McGraw Hill Publishing Company 16th reprint Chapter-1.

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B.Sc. Under Graduate Semester wise Syllabus

(w.e.f. session 2016 onwards)

Class: - B.Sc.

Semester: - III Semester

Subject: - Mathematics (BSM 301T)

Paper: - Real Analysis, Differential Equation Abstract Algebra

Marks 85+15 CCE

UNIT-I

Definition of a sequence, Theorems on limits of sequences, Bounded and monotonic sequences, Cauchy's convergence criterion, Series of non-negative terms, Comparison test, Cauchy's integral test, Ratio test, Raabe's test, logarithmic test, Leibnitz's theorem, Absolute and conditional convergence.

UNIT-II

Series Solution of Differential Equations-Power series Method, Bessel' Equation ,Bessel's function and its properties, recurrence and generating relations, Legendre's Equation, Legendre's function and its properties, recurrence generating relations

UNIT-III

Laplace transformations, Linearity of the Laplace transformation, Existence theorem of Laplace transforms, Laplace transforms of derivatives and integrals, Shifting theorem, Differentiation and integration of transforms, Inverse Laplace transforms, Convolution theorem, Applications of Laplace transformation in solving linear differential equations with constant coefficients. Properties of Laplace Transform i.e I & II shifting Theorem, Change of Change , Modulation.

UNIT-IV

Definition and basic properties of group, Order of an element of a group, Subgroups, Algebra of subgroups, Cyclic groups and their simple properties, Coset decomposition and related theorems, Lagrange's theorem and its consequences.

UNIT-V

Normal sub group, Quotient groups, homomorphism and isomorphism of groups, Kernel of homomorphism of groups, fundamental theorem of homomorphism of groups, Permutation groups (even and odd permutations), Alternating groups A_n, Cayley's theorem.

Text Books :

1. R.R. Goldberg, Real Analysis, I.B.H. Publishing Co. New Delhi, 1970.
2. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd. Allahabad.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & sons, 1999.
4. I. N. Herstein – Topics in Algebra, Wiley Eastern Ltd. New Delhi 1977.
5. Sharma and Gupta-Integral Transform, Pragati Prakashan Meerut
   - म.प्र हिन्दी ग्रंथ अकादमी की पुस्तकें

Reference Books:

1. T.M. Apostol Mathematical Analysis Narosa Publishing House New Delhi 1985.
2. Murray R.Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd. New Delhi.
5. P.B. Bhattacharya, S.K. Jain and S.R. Nagpaul, Basic Abstract Algebra, Wiley Eastern, New Delhi, 1997.
6. I. S. L.uther and I.B. S. Passi, Alegebra Vol- I , II, Narosa Publishing Hous