1.3.2 - Number of courses that include experiential learning through project work/field work/internship during the year

Programme /Curriculum/ Syllabus of the Course- BCA and B.Sc (CS)

BCA 5.3-DSE-3: Elective-3: 3. INTERNET OF THINGS

Total: 48 Hours

UNIT 1:
What is IoT, Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and IoT, IoT Challenges, IoT Network Architecture and Design, Drivers Behind New Network Architectures, Comparing IoT Architectures, A Simplified IoT Architecture, The Core IoT Functional Stack, IoT Data Management and Compute Stack.

(8 Hrs)

UNIT 2:
Smart Objects: The "Things" in IoT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria, IoT Access Technologies.

(10 Hrs)

UNIT 3:
IP as the IoT Network Layer, The Business Case for IP, The need for Optimization, Optimizing IP for IoT, Profiles and Compliances, Application Protocols for IoT, The Transport Layer, IoT Application Transport Methods.

(10 Hrs)

UNIT 4:
Data and Analytics for IoT, An Introduction to Data Analytics for IoT, Machine Learning, Big Data Analytics Tools and Technology, Edge Streaming Analytics, Network Analytics, Securing IoT, A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVE and FAIR, The Phased Application of Security in an Operational Environment.

(10 Hrs)

UNIT 5:
IoT Physical Devices and Endpoints - Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming. IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi with Python, Wireless Temperature Monitoring System Using Pi, DS18B20 Temperature Sensor, Connecting Raspberry Pi via SSH, Accessing Temperature from DS18B20 sensors, Remote access to RaspberryPi, Smart and Connected Cities, An IoT Strategy for Smarter Cities, Smart City IoT Architecture, Smart City Security Architecture, Smart City Use-Case Examples. **(10 Hrs)**

Text Books:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1 stEdition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978- 9386873743)
2. Srinivasa K G, "Internet of Things",CENGAGE Leaning India, 2017

Reference Books:

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014. (ISBN: 978-8173719547)
2. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224)

BCA 5.5-SEC-1: MINI PROJECT-I

BCA 6.4-DSE-4: Elective-3: 3. OPERATION RESEARCH

Total: 48 Hours

UNIT 1:

Linear Programming Problems: Origin and development of operations Research, Liner programming Problem-formulation of Linear Programming problem, Graphical solution. Theory of simplex method. Use of artificial variables and their solution, Duality theory and Sensitivity Analysis.

(12 Hrs)

UNIT 2:

Transportation Problem: Mathematical formulation of transportation problem, Initial Basic Feasible solution, North West corner rule, Matrix minima method, Vogal approximation method, for balanced Transportation Problem only.

(10 Hrs)

UNIT 3:

Assignment Problem: Mathematical formulation of on Assignment Problem, Assignment algorithm and simple illustrations.

(8 Hrs)

UNIT 4:

Network Analysis: Basic components of Network, Rules Ofdrawing Network diagram, Time calculation in Networks, Critical Path Method and Project E1valuation and Review Techniques, Algorithm and flow chart for CPM & PERT.

(10 Hrs)

UNIT 5:

Theory of Games: Two-Person Zero – sum Games, The Maxmin and Minmax principle, Saddle point and values of the Game, Game without Saddle points, Mixed strategies, Solution for 2x2games,Graphical method Dominance property, Linear programming method and their solutions.

(8 Hrs)

Text Books:

1. Taha, Operations Research, 7/e, Pearson Education
2. Hamady A. Taha, Operations Research, Collin Mac Millan 1982.
3. Kani Swarup, P.K. Gupta and Man Mohan, Operation Research, Sultan Chand and Sons, 4793/23, Darya Ganj, New Delhi-110 002

Reference Books :

1. Billey E.Gillett, Introduction to Operations Research, Himalya Publishing House, Delhi 1979
2. Frederick S. Hiller,Gaxald J. Deibermann, Operation Research, Holden Day Inc. 1974
3. Narag A.S., Linear Programming and Decision Making, Sultan Chand and Sons.

BCA 6.5-SEC-2: MINI PROJECT-II

Programme /Curriculum/ Syllabus of the Course- **M.Sc Mathematics**

Course Structure and Scheme of Examination

M.A. / M.Sc. MATHEMATICS

IV – SEMESTER

(w.e.f. 2012-13)

Sl. No.	Paper & Title	Credits	No. of Hrs/ week Theory/ Practical	Duration of exam in Hrs Theory/ Practical	Internal Assessment Marks Theory/ Practical	Marks at the Exams	Total Marks
	IV Semester (w.e.f. 2012-13)						
4.1 CT	Functional Analysis	4	4	3	25	75	100
4.2 CT	4.2CT(a) Fuzzy Topology OR 4.2CT(b) Dimension Theory OR 4.2CT(c) Relativity OR 4.2CT(d) Ring Theory OR 4.2CT(e) Galois Theory OR 4.2CT(f) Number Theory	4	4	3	25	75	100
4.3 CT	4.3CT(a) Graph Theory OR 4.3CT(b) Differentiable Manifolds OR 4.3CT(c) Nevanlinna Theory OR 4.3CT(d) Geometric Function Theory OR 4.3CT(e) Group Theory OR 4.3CT(f) Commutative Algebra	4	4	3	25	75	100
4.4 CT	Differential Equations-III	2	2	2	15	35	50
4.5 CT	Differential Geometry-II	2	2	2	15	35	50
4.6 CT	Integral Transforms and Integral Equations	2	2	2	15	35	50
4.7 CP	Programming Lab - III	2	4	3	15	35	50
4.8 CPW	Project Work	4	4		25	75	100
	Total of IV Semester	24					600
	Grand total of all semesters (I to IV)	90					2250

3. D. Porter and D. S. G. Stirling: Integral equations, Cambridge University Press (1998)
4. F. B. Hildebrand: Methods of Applied Mathematics, Prentice Hall (1990)
5. S. J. Farlow: Partial Differential Equations for Scientists and Engineers, John Wiley and Sons (1998)
6. W. A. Strausi: Partial Differential Equations, John Wiley and Sons (2000)
7. R. V. Chaurchill: Fourier series and b.v.p. McGraw Hill int. (1990)
8. R. S. Pathak: A course in Distribution Theory and Applications, Narosa, Publishing House (2001)

4.7 CP - PROGRAMMING LAB-III **(2 Credits)**

(Based on M.A. / M.Sc. 3.5 CT, 4.4 CT and 4.6 CT)

4.8 CPW – Project Work **(50 Hrs. / 4 Credits)**

(Max. Marks 75 + 25 = 100, Credits – 04)

Dissertation – 75 + Viva-Voce – 25

Extra-Curricular activities such as sports, literary and cultural activities are also conducted under the auspices of this club.

8.6 Special Encouragement:

Students interested in research activities are encouraged by providing them with an opportunity to work in the research laboratories and USIC under the guidance of the faculty members.

M.Sc. Course in Physics

Choice Based Credit System (CBCS)

(2018 Scheme)

Teaching and Evaluation Scheme

Sem. No	Course code	Title of the Paper	Credit	Teaching Hrs/week	Duration of Exam. in hours for Theory/ Practical	Max M		
						Semester -End Exam	IA	Total
	Compulsory	**Courses**						
I	PH CT1.1	Mathematical Methods in Physical Sciences	4	4	3	75	25	100
	PH CT1.2	Classical Mechanics	4	4	3	75	25	100
	PH CT1.3	Electronics (General)	4	4	3	75	25	100
	PH CT1.4	Condensed Matter Physics (General)	4	4	3	75	25	100
	PH CP1.5	**Practical– I** Electronics and Condensed Matter Physics (General)	4	4		4	75	100
	PH CP1.6	**Practical– II** Atomic & Molecular and Nuclear & Particle Physics (General)	4	4	4	75	25	100
	Compulsory Courses							
II	PH CT2.1	Quantum Mechanics-I	4	4	3	75	25	100
	PH CT2.2	Atomic & Molecular Physics (General)	4	4	3	75	25	100
	PH CT2.3	Nuclear & Particle Physics (General)	4	4	3	75	25	100
	PH ET2.4	**Open Elective Course:** Modern Physics	4	4	3	75	25	100
	PH CP2.5	**Practical–III** Electronics and Condensed Matter Physics (General)	4	4	4	75	25	100

	PH CP2.6	**Practical– IV** Atomic & Molecular and Nuclear & Particle Physics (General)						
III	**Compulsory Course:**							
	PH CT3.1	Quantum Mechanics-II	4	4	3	75	25	100
	Specialization Courses:							
	PH ST3.2	Electronics-I/ Condensed Matter Physics-I/ Atomic & Molecular Physics-I/ Nuclear & Particle Physics-I	4	4	3	75	25	100
	PH ST3.3	Electronics-II/ Condensed Matter Physics-II/ Atomic & Molecular Physics-II/ Nuclear & Particle Physics-II	4	4	3	75	25	100
	PH ET3.4	**Open Elective Course**: a. Instrumental Methods OR b. Physics of Nanomaterials	4	4	3	75	25	100
	PH SP3.5	**Practical** Electronics-I/ Condensed Matter Physics-I/ Atomic & Molecular Physics-I/ Nuclear & Particle Physics-I	4	4	4	75	25	100
	PH SP3.6	**Practical** Electronics-II/ Condensed Matter Physics-II/ Atomic & Molecular Physics-II/ Nuclear & Particle Physics-II	4	4	4	75	25	100
IV	**Compulsory Courses:**							
	PH CT4.1	Classical Electrodynamics	4	4	3	75	25	100

	PH CT4.2	Statistical and Thermal Physics	4	4	3	75	25	100
		Specialization Courses:						
	PH ST4.3	Electronics-III/ Condensed Matter Physics-III/ Atomic & Molecular Physics-III/ Nuclear & Particle Physics-III	4	4	3	75	25	100
	PH ST4.4	Electronics-IV/ Condensed Matter Physics-IV/ Atomic & Molecular Physics-IV/ Nuclear & Particle Physics-IV	4	4	3	75	25	100
	PH SP4.5	**Practical** Electronics-III/ Condensed Matter Physics-III/ Atomic & Molecular Physics-III/ Nuclear & Particle Physics-III	4	4	4	75	25	100
	PHSPJ4.6	**Project:** Electronics/ Condensed Matter Physics/ Atomic & Molecular Physics/ Nuclear & Particle Physics	6	6	4	75 (Dissertation) + 50(Viva-voce)	25	150

Total No. of Credits, 98

Total No. of Maximum Marks, 2450

FOURTH SEMESTER

Description of Papers	Credits	No. of Hrs/ week Theory/ Practical	Duration of exam. in Hrs Theory/ Practical	Internal Assessment Marks Theory/ Practical	Marks at the exams.	Total Marks
A. Core Subjects						
Inorganic Chemistry						
CHGT–4.1: Inorganic Chemistry	4	4	3	25	75	100
CHGT–4.2: Organic Chemistry	4	4	3	25	75	100
CHGT–4.3: Physical Chemistry	4	4	3	25	75	100
CHGP–4.4: Project Work* Inorganic Chemistry/Organic Chemistry/Physical Chemistry	6	4	8	25	125**	150
Practical						
CHG(Pr)–4.5: Lab Course in Inorganic Chemistry	2	4	4	10	40	50
CHG(Pr)–4.6: Lab Course in Organic Chemistry	2	4	4	10	40	50
CHG(Pr)–4.7: Lab Course in Physical Chemistry	2	4	4	10	40	50
Total	24	28	21	130	395	600

** Project Evaluation:
Dissertation – 75 Marks
Presentation/ Viva-Voce – 50 Marks

iii. Viva-Voce & Journal : 05 marks
iv. Internal assessment : 10 marks
Total : 50 marks

CHGP-4.4: Project Work

The project work may include implant training in Industries/short term work in the Department/other educational institutions/R&D organizations/Data mining/Review of current literature/ Theoretical methods/computer applications. Experimental work may involve studies on synthesis/measurements/study of properties/characterization by physical methods/activities for reported/unreported research or any suitable combination thereof

In case of the students who would work outside the campus, the supervising staff member may visit to the work place at least once during the period and may be eligible for TA-DA as per the University ruless