

**Guideline for
RESEARCH PROGRAMME
DOCTOR OF PHILOSOPHY (Ph.D.)**



DR. C.V. RAMAN UNIVERSITY

(Established by Government of Chhattisgarh Act No. 13 of 2005
and approved vide UGC Act 2(f) 1956)



Accredited with B+ Grade by NAAC.



Ministry of Human Resource Development
Government of India

Ranked under 200 top Universities by NIRF

Web : www.cvru.ac.in

Kargi Road Kota Distt. – Bilaspur (Chhattisgarh) India

Ph: +91-7753-253801, 09617779322 Fax : 07753-253728

About the University

Dr. C.V. Raman University is located in state of Chhattisgarh on the Bilaspur Amarkantak highway about 25 kms from Bilaspur. The campus is spread over nearly 50 acres of well-developed land in a serene environment providing on excellent surrounding for teaching and learning well equipped with all the facilities, faculties and department.

Dr. C.V. Raman University is one of the pioneer University in the State of Chhattisgarh. It has been Setup on 3rd November 2006 and inaugurated on 14th October 2007 in a tribal Scheduled area of the Chhattisgarh state with a view to take up education research, training and extension activities in this under developed region of the state.

At present, the university runs eight (8) faculties with 30 Teaching Departments in which 54 UG, PG & Diploma programmes are being conducted. The University works as per the norms of the regulatory bodies & is recognized by UGC and approved by AICTE, NCTE, BCI & DEB for its various courses running successfully. Being the member of AIU & ISO:2008 certified, accredited with B+ grade by NAAC, & ranked under top 200 universities by NIRF, the University has already paved the way of its huge experiences in its chapter of 10 years through its spectacular achievements in the field of education, sports, music, science, language, industries and administration. By organizing various activities such as workshops, Seminars, conferences & other personality development career oriented programmes, the University has proved its accountability & rapid growth & is gradually moving towards the golden path to reach the height of excellence. Recently UGC & MHRD allotted Pt. Deendayal Upadhyay Kaushal Kendra (DDUKK) to University for running B.Voc. and M.Voc. programmes, as the University had already been working with NSDC through CVRU-NSDC Academy by running skill oriented programmes to fulfill the mission of skill India. Besides this the University provides research programmes (M.Phil./Ph.D.) in different Departments of the University.

Besides all these educational developments, CVRU made a major development by launching its community radio station, "90.4FM Radio Raman" that broadcasts educational and entertainment based content, along with recorded lectures to far flung areas.

The university has gained a lot of goodwill and prestigious awards like the Chhattisgarh Achievers Awards 2013 for 'Best University of the Year', Rajiv Gandhi Achievers Awards for 'Education', The Best University Award by 'Sadhna News', World Education Summit Awards 2014 for 'Innovation in Open and Distance Learning' and an accreditation by NILET in 2014. It is known for its plethora of opportunities beyond the classroom education wherein sports and extra-curricular activities effectively inculcate a sense of team spirit along with developing leadership qualities among all students and make them go 'Beyond learning'.

Vision & Mission

To be transformed into a University of global standards imparting world class education through skilled manpower which can make a significant contribution to the nation building and cater to the needs of the society by creating an intellectual domain that initiates, nourishes and perpetuates values of humanity conscious co-existence & achievement of excellence.

Dr. C.V. Raman University is the University whose whole mission is to provide access and opportunity to students from all sectors of the country's diverse population as well as from other countries by providing quality education thereby improving the socio-economic status of the society. The Prime mission of CVRU is also to promote excellence in value based education and skill based teaching-learning.

Objectives

- To make provisions for research, advancement and dissemination of knowledge.
- To create & nurture higher levels of intellectual abilities
- To provide quality education that enables students to achieve bright professional careers.
- To establish state of the art facilities for the students
- To maintain the standards of degree, diploma, certificate & other academic distinctions in accordance with the norms laid down by concerned regulatory bodies.

Programme Offered by the University:

Faculty name	Department	Courses
Engineering & Technology	Department of Civil Engineering	BE
	Department of Computer Science Engineering	Diploma, BE, M.Tech(CS)
	Department of Electrical Engineering	Diploma, BE, M.Tech(PS)
	Department of Electrical & Electronics Engineering	BE
	Department of Electronics & Communication Engineering	BE, M.Tech(DC, VLSI)
	Department of Information Technology Engineering	BE, M.Tech(SE)
	Department of Mechanical Engineering	Diploma, BE, M.Tech(PE)
Education & Physical Education	Department of Education	B.Ed., M.Ed
	Department of Physical Education	BPE, MPE
Information Technology	Department of Information Technology	DCA, BCA, PGDCA, M.Sc.(IT)
Commerce & Management	Department of Commerce	B.Com.(CA), B.Com, M.Com
	Department of Management	BBA, MBA, PGDBM
Sciences	Department of Physics	B.Sc.(Hon.), M.Sc.
	Department of Chemistry	B.Sc.(Hon.), M.Sc.
	Department of Mathematics	B.Sc.(Hon.), M.Sc.
	Department of Botany	B.Sc.(Hon.), M.Sc.
	Department of Zoology	B.Sc.(Hon.), M.Sc.
	Department of Microbiology	B.Sc.(Hon.), M.Sc.
	Department of Biotechnology	B.Sc.(Hon.), M.Sc.
Arts	Department of Geography	BA, MA
	Department of Political Science	BA, MA
	Department of Economics	BA, MA
	Department of History	BA, MA
	Department of Sanskrit	BA, MA
	Department of Hindi	BA, MA
	Department of English	BA, MA
	Department of Social Work	MSW
Department of Library Science	B.Lib., M.Lib.	
Law	Department of Law	BA.LLB, LLB, LLM
Mass Communication Science	Department of Journalism & Mass Communication	BJMC, MJMC
Skill	Skill Development	Diploma, B.Voc.

Facilities available at CVRU

1. Central library

- Well qualified and experienced staff to take care of the smooth library working.
- A collection of around 40,000 text and reference books on varied subjects to cater to the needs of variety of users.
- Subscription to 217 journals and periodicals giving an insight to the latest developments.
- Around 600 CDs and floppies containing learning material, software and CBTs.
- Well-furnished Reading Halls.
- Coverage by Intercom System and Dialup services.
- Aesthetic Interiors
- Adequate seating arrangement.
- Separate CD and Floppy (E-Documents) Section.

2. Infrastructure Facilities

- Sufficient classroom with smart class facility.
- Air- conditioned conference hall of 300 seating capacity with Audio-Video Projection & Video conference facility.
- Air-conditioned hall in new administrative building with the capacity of 100 and also 1 board room for conducting meetings.
- Moot court of 50 seating capacity.

3. Sports facilities -

- **Playgrounds:** A playground each for cricket & football Games and Basketball, Volleyball & Badminton Courts separately.
- One Gymnasium is available in boy's hostel.

4. Hostel Facilities:

For Boys

Number of boy's hostels available in campus is 2 with each block of capacity of 250 inmates and each block contains 1, 3 & 4 seater rooms. Facilities available in hostels are Wi-Fi, Infirmary, Mess & Dining Hall, Common Room, indoor game facility.

For Girls

Number of girls hostels available in campus is 1 with a of capacity of 80 inmates and contains 1, 3 & 4 seater rooms. Facilities available in hostels are Wi-Fi, Dining Hall, Common Room,.

5. Canteen:

We have one canteen and one NESCAFE available in camps.

6. Medical Facility :

The university has its own health center and dispensary comprising of two full time medical superintendents, i.e., one chief medical officer Dr. Avijit Royzada (M.D.) and one medical supervisor to cater to the needs of the medical services. The CVRU health center and the dispensary of the university within its premises offers full time medical facilities for the students, faculties, non-teaching staff, administrative staff and other employees of the university. The dispensary provides service in the hostels also extends its emergency services too throughout the campus. All the students, staff, faculty and other employees of the university are provided medicines at free of cost. One medical officer and one assistant medical officer along with a medical compounder are appointed to take care of CVRU health center and helps to avail the medical facility for each and every one in the university premises. The health center of the university consists of the complete first aid facility, primary medical treatment facility as well as some of the diagnostic equipment and sufficient pharmaceutical medical store.

The following facilities are available in the medical dispensary:

- Sphygmomanometer
- ECG machine
- Stethoscope
- Stretcher and wheel chair
- Patient table
- Well managed medical almirah for proper medicine storage
- Blood pressure instrument
- Blood sugar testing instrument (Glucometer)
- Electronic BP-Measuring machine
- Weight-machine
- Biochemical lab for Hb-test & blood group test.
- Nursing table
- Clinical laboratory facility
- Pulse-oxymeter machine
- Sterilizer machine
- Electric water heater

Besides this, we are also having an MOU with the Sai Baba Nursing Home, at Ring Road, Bilaspur in which for the special cases emergency and serious treatment, the students of our university are recommended and referred for the further treatment free of cost to the nursing home.

7. Banking Facility

A branch of “**Bank of India**” with an **ATM facility is inside the University Campus** and the other 2 ATM Punjab National Bank, & State Bank of India are at the University Entrance Gate and also one stationary shop is available inside the campus for the benefit and academic requirements of the students.

8. Transport Facilities

The university runs a fleet of 14 busses to help students and staff members’ employee to and fro from regions around the city. The bus service is available over a 35km radius around the institute. A nominal fee is collected for the transportation at a yearly basis. Details of the routes and their respective timings are also available. This service is offered to provide hassle-free and safe transportation. Parents are urged to convince their wards to travel in the college busses only in view of safety issues on the highway. We also provide special pre-arranged transportation services for field trips and sporting events within the state.

Research Programme (Ph.D)

Dr. C.V. Raman University offers Ph.D. Programme through various disciplines. Award of Ph.D degree will be made on the basis of academic achievements in research work and published work as well as the papers presented in seminars, conferences etc. in various disciplines.

The University also encourages interdisciplinary areas through a system of co-supervision and provides excellent opportunities for such programmes. The research work shall be an original work characterized either by the discovery of facts, or by a fresh approach towards the interpretation and application of facts. It shall demonstrate the candidates capacity for critical examination and sound judgment and shall represent original contribution to the existing knowledge.

The degree of Doctor of Philosophy (Ph.D) is awarded for research work in areas recognized by the academic departments of the University. The degree of Doctor of Philosophy (Ph.D) will be awarded in the discipline of the department in which the candidate is registered.

⇒ **Disciplines& subjects offering Ph.D Programme are:**

Disciplines	Subjects
Engineering and Technology	<i>Mechanical Engineering, Electrical Engineering, Electronics & Communication Engineering, Computer Science Engineering</i>
Science	<i>Physics, Chemistry, Mathematics, Botany, Zoology, Microbiology, Biotechnology</i>
Commerce & Management	<i>Commerce & Management</i>
Physical Education	<i>Physical Education</i>
Arts	<i>Geography, Political Science, Economics, History, Sanskrit, Hindi, English, Social Work, Sociology</i>
Information technology	<i>Information Technology & Computer Application</i>
Law	<i>Law</i>

⇒ **Eligibility:**

For Ph.D. Programme:

A candidate for the degree of Doctor of Philosophy must, at the time of application, hold Master's degree with at least 55% marks (50% marks in case of SC/ST/PH/VH/category candidates) or an equivalent grade of Deemed University or any other University incorporated by any law for the time being in force and recognized by the University.

⇒ **Admission Procedure:**

The entrance exam for admission to Ph.D. programme consists of one theory paper of 100 marks having two sections. The duration of examination will be of 2 hours.

Section I- Contains 40 questions (multiple choices) to assess the candidate's general awareness, verbal ability, quantitative ability, data interpretation, analysis, synthesis, reasoning, basics of computing and research aptitude (40 marks)

Section II consisting of 30 questions (multiple choices) to assess the candidates capability of defining certain concepts & knowledge from the relevant discipline in which he/she seeks registration as indicated in application form(60 marks).

⇒ **Fees Structure:**

The fee structure of Ph.D. programme will be as per fee fixation committee of Govt. of Chhattisgarh or as decided by Board of Management (BoM) of the University.

⇒ **Syllabus for Entrance exam:**

The syllabuses for entrance exam are as follows:

(1) Discipline: Engineering and Technology

Subject Name	Subject Code
(i) Mechanical Engineering	01
(ii) Electrical Engineering	02
(iii) Electronics & Communication Engineering	03
(iv) Computer Science Engineering	04

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Mechanical Engineering

Unit I: Engineering Mechanics: Trusses and frames; kinematics and dynamics, impulse and momentum principle and Work Power and Energy, D'Alembert principle.

Strength of Materials: Stress-strain relationship , Mohr's circle shear force and bending moment diagrams; SFD, BMD of beams ; deflection of beams; torsion of circular shafts; Euler's theory of columns; strain energy methods; Analysis of thermal stress and thermal strain.

Unit II: Theory of Machines: Displacement, velocity and acceleration analysis ,gear trains; flywheels; governors. Kinematic & dynamic analysis. Free and forced vibration; effect of damping; vibration isolation; resonance, critical speeds of shafts.

Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N Diagram; principles of the design of machine elements such as bolted, riveted and welded joints, shafts, spur gears, rolling and sliding contact bearings, brakes and clutches.

Unit III: Thermodynamics: Zeroth, First and Second laws of thermodynamics; thermodynamic system and processes; Carnot cycle; behavior of ideal and real gases, properties of pure substances. Rankine and Brayton cycles with reheat and regeneration.

Heat Transfer: Modes of heat transfer; one dimensional heat conduction, unsteady heat conduction, fins, free and forced convective heat transfer, thermal boundary layer, Heat exchanger.

Refrigeration and air-conditioning: Vapour refrigeration cycle, heat pumps, gas refrigeration, Reverse Brayton cycle; psychometric properties and basic psychometric processes.

Unit IV: Fluid Mechanics: Fluid properties; fluid statics, buoyancy Bernoulli's equation; boundary layer; Elementary turbulent flow; flow through pipes. Principle of impulse and reaction turbine and its velocity diagram.

Unit V: Material science: Iron-carbon equilibrium diagram, Heat treatment processes, TTT diagram

Manufacturing Science: Casting, Welding, Rolling and Extrusion processes.

Unconventional Machining: EDM, ECM, AJM, LBM, USM, EBM, PAM.

Industrial Engg.: Inventory Model, Queuing theory, Motion & Time study, network analysis-CPM, PERT.

Reference Books:

1. Engineering Mechanics & Strength of Material By M. Ramarutham, TMH Publications.
2. Vibration & Theory of machine By S.S.Ratan, S.chand Publications
3. Engineering thermodynamics , Fluid Mechanics & Power plant Engineering By P.K.Nag, TMH Publications
4. Material science & Industrial Engineering By O.P.Khanna, Dhanpat Rai Publications
5. Heat and mass transfer, Refrigeration and Air conditioning By R.k. Rajput S.chand Publications.

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Subject: Electronics & Communication Engineering

Unit-I Electronic Devices & Digital circuit: p-n junction diode, BJT, JFET, MOS capacitor, MOSFET, Special diodes, Analog Circuits: Differential and operational amplifier and its applications, Sinusoidal oscillators; criterion for oscillation; Passive & Active filters, Power supplies. Digital circuits: Logic gates; digital IC families (DTL, TTL, ECL, MOS, And CMOS). Combinatorial circuits: arithmetic circuits, code converters, multiplexers, decoders, PROMs and PLAs. Sequential circuits: latches and flip-flops, counters and shift-registers.

Unit-II Microprocessors, Microcontroller & VLSI: (8085, 8086) processor introduction, 8051 architecture, programming, memory and I/O interfacing. VLSI introduction, integrated circuits fabrication process, oxidation, diffusion, ion implantation, photolithography, MOSFET, BIMOSFET.

Unit-III Communications Techniques & Waveguide: Analog communication systems, SNR calculations for AM and FM for low noise conditions. Digital communication systems: PCM, DPCM, ASK, PSK, FSK. Waveguides: modes in rectangular waveguides; boundary conditions; cut-off frequencies; dispersion relations. Basics of propagation in dielectric waveguide and optical fibers. Basics of Antennas and Wave propagation: Dipole antennas; radiation pattern; antenna gain.

Unit-IV Power Electronics and Control System: Semiconductor power diodes, transistors, thyristors, triacs, GTOs, MOSFETs and IGBTs - static characteristics and principles of operation; Basic control system components; block diagrammatic description, reduction of block diagrams. Open loop and closed loop (feedback) systems and stability analysis of these systems. Signal flow graphs and their use in determining transfer functions of systems

Unit –V Artificial intelligence: Artificial Neural Network, Fuzzy systems, Neuro-fuzzy systems and genetic algorithms, Simulation tools used in electronics and communication Engineering.

Reference book

1. Electronic Devices and Circuits, Salivahanan, TMH education.
2. Microprocessor and Interfacing ,D.Hall, TMH education.
3. The 8051 Microcontroller and Embedded Systems using Assembly and c, Mazidi, PHI.
4. Control System Engineering, L.Nagrath And Gopal, New Pearson Education.
5. Electromagnetic Waves And Antennas ,K.D.Prasad, Khanna Publication.

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject:Electrical Engineering

Unit-IKCL, KVL, node and mesh analysis; sinusoidal steady-state analysis, resonance, Thevenin's, Norton's and Superposition and Maximum Power Transfer theorems, two-port networks, three phase circuits; Gauss Theorem, electric field and potential due to point, line, plane and spherical charge distributions; Ampere's and Biot-Savart's laws; inductance; dielectrics; capacitance.

Unit-IISingle phase transformer, tests,regulation and efficiency; three phase transformers, parallel operation; autotransformer; DC machines, armature reaction and commutation, starting and speed control of motors; three phase induction motors, performance characteristics, starting and speed control; synchronous machines, regulation and parallel operation of generators, motor starting, characteristics.

Unit-IIIBasic power generation concepts; transmission line models andperformance; cable performance, insulation; corona and radio interference; distribution systems; voltage control; power factor correction; symmetrical components; fault analysis; circuit breakers; system stability concepts, swing curves; HVDC transmission.

Unit-IVPrinciples of feedback; transfer function; block diagrams; steady-state errors; Routh and Niquist techniques; Bode plots; lag, lead and lead-lag compensation; controllability and observability.Bridges and potentiometers; PMMC, movingiron, dynamometer and induction type instruments; measurement of voltage, current, power, energy; instrument transformers; digital voltmeters and multimeters; phase, time and frequency measurement.

Unit-VCharacteristics of diodes, BJT, FET; amplifiers; oscillators and feedback amplifiers; operational amplifiers - characteristics and applications; timers; combinational and sequential logic circuits; multiplexer; Schmitt trigger; multi-vibrators; sample and hold circuits; A/D and D/A converters.Thyristors, triacs, GTOs, MOSFETs and IGBTs; phase control rectifiers; bridge converters - fully controlled and half controlled; principles of choppers and inverters; basis concepts of adjustable speed dc and ac drives.

Reference book

1. A course in Electrical and Electronics measurement and Instrumentation : A.K.Sawhney, Dhanpat Rai pbs
2. Control System Engineering : L. Nagrath and Gopal , New age international publications
3. Electric Machinery : P.S. Bhimbra, Khanna Publication
4. Power System Engineering : Nagrath& Kothari, TMH Publication
5. Power Electronics : P.S. Bhimbra, Khanna Publication
6. Network Analysis : Valkenburg, PHI pbs

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Subject: Computer Science and Engineering

Unit-I: Software Systems: Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs. Searching, sorting, hashing. Asymptotic worst case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph search, minimum spanning trees, and shortest paths.

Unit-II: Operating Systems : Processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU scheduling. Memory management and virtual memory. File systems.

Unit-III: Software Engineering: SDLC, planning and managing the project, design, coding, testing, implementation, maintenance. Personal Software Process. Team Software Process. Usability. Agile Methods. Process Models- Iterative, Scrum, XP, and Evo. Requirements Engineering. Software architecture and design patterns. Software metrics. Software reliability. Advanced testing techniques.

Unit-IV: Database Systems: ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control.

Unit-V: Data Communication and Computer Networks: Concept of layering. LAN technologies (Ethernet). Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets, congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP). Basics of Wi-Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.

Reference Books:

1. Data structure –Theory and Problems of Data Structures by Seymour Lipchitz , Tata Mcgraw Hill Education Private Limited
2. Operating System-Operating System Concepts by Abraham Silberschatz (Author), Peter B. Galvin (Author), Greg Gagne (Author) , Wiley
3. Software Engineering-Software Engineering: A Practitioner's Approach By Roger Pressmen , Mcgraw Hill International Edition
4. Database Systems-Data Base System Concepts by by Abraham Silberschatz (Author), Henry Korth (Author), S. Sudarshan (Author),McGraw-Hill Education
5. Computer Networks –Computer Networks By Andrew S. Tanenbaum , Pearson

(2)Discipline: Science

Subjects Name	Subject Code
(i) Physics	01
(ii) Chemistry	02
(iii) Mathematics	03
(iv) Botany	04
(v) Zoology	05
(vi) Microbiology	06
(vii) Biotechnology	07

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Subject:Physics

Unit – I: (Mathematical Physics, Classical Mechanics, Quantum Mechanics, Statistical Mechanics)

Linear differential equations, Fourier series, Fourier and Laplace transforms, Kepler's law and planetary motion, Lagrange and Hamilton's formalisms, Basic Postulates of quantum mechanics, Wave – Particle duality, Heisenberg's uncertainty principle, Schrodinger equation, Macro state and microstates, Phase space, Probability ensembles, Partition function, BE, MB, FD Statistics.

Unit – II: (Atomic & Molecular Physics, Nuclear & Particle Physics)

Spectra of one-and many-electron atoms, Hyperfine structure, LS & JJ coupling, Zeeman, Paschen Back and Stark effect, X-rays, Basic nuclear properties, Liquid drop model, Nuclear shell model, Laws of radioactivity, Nuclear reactor , Elementary particles.

Unit – III: (Solid State Physics, Solid State Devices , Electronics)

Crystal structure of materials, Free electron theory, Band theory of solids, Superconductivity, P-N-Junction Diode, Zener Diode, Transistor, Optoelectronic devices, Photonic devices, Modulation & Demodulation of AM, PM, FM, Digital Logic family, ICs and Microprocessors.

Unit – IV: (Electromagnetic Theory, Electrodynamics, Plasma Physics)

Electrostatic Field, Electromagnetic Induction, Gauss's Law and its applications, Laplace and Poisson equations, Maxwell's equations and electromagnetic waves, Poynting vector, Motion of Charged Particle in electric and magnetic field, Occurance of Plasma, Plasma Oscillation, Debye Shielding, Plasma Heating, Plasma Confinement & Pinch effect, Magnetosonic and Alfvén waves.

Unit – V: (Properties of Matter, Sound & Acoustics, Material Science & Remote Sensing)

Surface Tension, Elasticity, Viscosity, Sound waves, Ultrasonic & Infrasonic Waves, Reverberation, Sabine's Formula, Acoustics of Hall, Introduction of long form of modern periodic table, Classification of materials, Properties of materials, Remote sensing and its applications, Microwave remote sensing dielectric behavior of material.

Reference Books:

1. Mathematical Physics by H.K. Dass published by S.Chand Publication.
2. Solid State Physics by M.A. Wahab published by Narosa Publication.
3. Handbook of Electronics by Gupta & Kumar published by Pragati Edition.
4. Material Science by V. Raghwan published by PHI.
5. Eletrodynamics by G.F. Griffiths published by PHI.
6. Atomic & Molecular Physics by H.Kaur published by Pragati Edition.

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Subject: Chemistry

INORGANIC CHEMISTRY

Unit I-Analytical Principles : - Volumetric Method, Theories of indicator- Acid –Base, Redox, Metallochromic Indicator, complex precipitation, Redox titration. Gravimetric Method:- Mechanism of precipitate, formation, Precipitation from Homogeneous Solution, Co- Precipitation and post Precipitation.

Unit-II-Main group Element:- Boron –Nitrogen compound, S-N compounds, sulphurs Compound Molecular sulphides: such as P_4S_3 , P_4S_7 , P_4S_9 , P_4S_{10}

Unit-III-Metal Complex:- VSEPR Theory, L.F.T. Splitting of d- Orbital in different ligand field , John Teller Effect, M.O. Diagram of complex with and without bond.

Unit-IV:- Nuclear Chemistry- Nuclear Reaⁿ, type of nuclear Reaⁿ , Spontaneous and reduced fission, nuclear fission Reaⁿ , breeder reactor .

Unit-V-Bio-Inorganic Chemistry:-Essential and trace element in Biological Process Metalloporphyrins with special reference to haemoglobin and myoglobin, Na/K pump.

PHYSICAL CHEMISTRY:-

Unit-I-Thermodynamics:-Maxwell Relation, Joule Thomson effect, The third law of Thermodynamics, Joules Thomson Co-efficient for Vander Waal's gas.

Unit-II:-Chemical Kinetics:- Theory of reaⁿ rate, free energy of activation and volume of Activation Thermodynamic formulation of reaⁿ rate, Arrhenius equation and its limitation, Activation energy.

Unit-III-Quantum Mechanics:-Black body radiation, quantum mechanical explanation Photoelectric effect.

Unit-IV-Surface Chemistry:- Catalysis :-Mechanism and theories of homogeneous and heterogeneous catalysis, Acid-base, Enzyme catalysis.

Unit-V-Spectroscopy-I Selection rule, Maxwell Boltzmann distribution, statement of the Born open heimer approximation, degree of freedom, Energy level of a rigid rotor.

ORGANIC CHEMISTRY:-

Unit-I Separation Techniques:-Chromatography:-Chromatography method, Classification of chromatography, separation Theory of Chromatography, Application, Paper chromatography, TLC,column method.

Unit-II-Principles of Organic Chemistry:- Elimination, Substitution Reaⁿ ,Carbocations Carbanions ,Carnations Addition, Electrometric, Mesomeric.

Unit-III- Chemistry of Polymer:-Step-growth, free radical, Addition, ionic Polymerization, Characterization of polymers polyurethenes manufacture and application of Polyolifines.

Unit-IV-Organic Photochemistry:- Energy transfer, Sensitization and quenching, Singlet and triplet state and their reactivity, Photo Reaction of Carbonyl compound and enes dines, arenes ,Norrish reaction of acyclic ketones .

Unit-V-Chemistry of Natural Product:- Biosynthesis of terpenes & alkaloids, carbohydrate Protein and Nucleic Acid.

Reference Books :-

1. Inorganic Chemistry, Gurdeep R.Chatwal,Sham K. Aanand, Himalaya Publishing House
2. Physical Chemistry, Gurdeep R.Chatwal,Sham K. Aanand, Himalaya Publishing House.
3. Organic Chemistry, Advance Organic Chemistry, Dr.Jagdamba Singh L.D.S. Yadav, Pragati Prakashan
4. Unified Chemistry, Tandon, Rathore, Agrawal Shiiv Lal Agrawal & Company.
5. Analytical Chemistry, Gurdeep R.Chatwal,Sham K. Aanand-Himalaya Publishing House.

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Subject: Mathematics

Unit - I

(A) **Linear Algebra** : Finite dimensional vector spaces , Linear transformations and their matrix representations, rank, systems of linear equations, Eigen values and Eigen vectors, minimal polynomial, Cayley-Hamilton Theorem, diagonalisation, Hermitian, Skew-Hermitian and unitary matrices.

(B) **Modern Algebra** : Group, subgroup, Normal group and Normal subgroups, Homomorphism, Isomorphism and Automorphisms, Euclidean domains, Principle ideal domains and unique factorization domains. Prime ideals and maximal ideals in commutative rings, Fields, finite fields.

Unit – II

(A) **Complex Analysis** : Analytic functions, bilinear transformations, complex integration, Cauchy's integral theorem and formula, Liouville's theorem, maximum modulus principle, Taylor and Laurent's series.

(B) **Real Analysis** : Sequences and series of functions, uniform convergence, power series, Fourier series, functions of several variables, maxima, minima; Riemann integration, multiple integrals, line, surface and volume integrals, theorems of Green, Stokes and Gauss; metric spaces, completeness.

Unit - III

Ordinary Differential Equations : First order ordinary differential equations, existence and uniqueness theorems, systems of linear first order ordinary differential equations, linear ordinary differential equations of higher order with constant coefficients, method of Laplace transform.

Unit - IV

Functional Analysis : Banach spaces, Hahn-Banach extension theorem, open mapping and closed graph theorems, principle of uniform boundedness; Hilbert spaces, orthonormal bases, Riesz representation theorem, bounded linear operators.

Unit - V

Probability and Statistics : Mean, Median, Mode, Standard deviation, mean deviation, range, quartile deviation, moment, Probability space, conditional probability, expectation, conditional expectation, Sampling distributions; Testing of hypothesis, standard parametric tests based on normal, Chi-Square and t test, F – distributions.

Reference Books:

1. Mathematical Analysis by Rudin, M
2. Discrete Mathematics by Truss, Pearson Education
3. Linear Algebra by Ramachandra, McGraw Hill Pub.
4. Mathematical Statistics by M. Ray, S-Chand Pub.
5. Abstract Algebra by S. David, Wiley Pub.
6. Ordinary Differential Equation by Garrett, Wiley Pub.

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Subject: Botany

Unit – I: Microbiology and Pathology - Viruses and Bacteria Structure, classification and reproduction. General Account of infection, immunity and serology: Microbes in industry and agriculture. Important plant diseases in India caused by fungi. Modes of infection and methods of control.

Unit – II : Plant Groups and Morphology, anatomy and embryology of Angiosperms - Structure, reproduction, life-history, classification, evolution, ecology and economic importance of algae , fungi, bryophytes, pteridophytes and gymnosperms. Tissues and tissue systems. Morphology and anatomy of stem, root and leaf (including development aspects and anomalous growth), Morphology of flower. Structure of anther and ovule, fertilization and Development of seed.

Unit – III: Physiology : Photosynthesis history, factors, mechanism and importance. Absorption and conduction of water and salts. Transpiration, Major and minor essential elements and their role in nutrition, Nitrogen fixation and nitrate reduction Enzymes, Respiration and fermentation. General account of growth. Plant hormones and their functions. Photoperiodism. Seed dormancy and germination.

Unit – IV: Ecology - Scope of ecology, structure, function and dynamics of ecosystems, Plant communities and succession. Ecological factors. Applied aspects of ecology including conservation and control of pollution.

Unit – V: Taxonomy and Economic Botany - Principles of nomenclature and classification of angiosperms. Modern trends in Taxonomy. General account of important sources of food, fiber , wood and drugs.

Reference Books:

1. Mechanisms of environmental stress resistance in plants, Basra, A.S. & Basra, R.K. 1997. Harwood Academic Publishers, The Netherlands.
2. Plant Physiology, Singh, Pandey and Jain, Rastogi Publication.
3. Ecology and Environment. P.D. Sharma, Rastogi Publication.
4. Plant Pathology. P.D. Sharma, Rastogi Publication.
5. A Textbook of Botany, Singh, Pandey and Jain, Rastogi Publication.
6. Taxonomy of Angiosperms, Singh and Jain- Rastogi Publications.

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Zoology

Unit-I: Non-Chordata and Chordata :A general survey, classification and relationship of the various **Phyla**. **Protozoa** : Study of the structure, bionomics and life history of Paramecium, malarial parasite, Trypanosoma. Protozoa & disease. **Porifera** : Sycon. **Coelenterata** : Structure and life history of Obelia and Sea anemones, Corals, **Helminths**, Structure and life history of Planaria. Fasciola., Medical importance of Nematodes. **Annelida**, Neries, **Arthropoda**, Palaemon **Mollusea**. Unio, Pearl Formation Modifications of nervous system. **Echinodermata**, Asterias and its larva. General organisation and characters, outline classification and inter- relationship of Proto -Chordata. Pisces, Amphibia, Reptilia, Aves and Mammalia. Neoteny and retrogressive metamorphosis. A general study of comparative account of the various systems of vertebrates. Locomotion and respiration in fishes, structure and affinities of Dipnoi. Structural peculiarities of Amphibia. Poisonous and non- poisonous snakes of India, Aerial adaptations of birds. Structural peculiarities and affiniting distribution relation of prototheria and Metatheria.

Unit-II: Ecology and Economic Zoology: Environment : Abiotic factors and their role ; Biotic factors -Inter and Intra-specific relations. Ecosystem, Niogeo-Chemical cycles. Adaptation in fresh water, marine and terrestrial habitats. Pollution in air, water and land. Wild life in India and its conservation. Parasitism, Commensalism and Host parasite relationship. Parasitic protozoan's and helminthes of man. Beneficial and harmful insects.

Unit-III: Cell Biology, Genetic and Embryology -Structure and function of cell and cytoplasmic constituents : structure of nucleus , plasma membrane, mitochondria, Golgi-bodies, endoplasmic reticulum and ribosome's , cell division, mitosis and meiosis. Gene structure and function: Watson-Crick models of DNA, sex-chromosomes and sex -determination. Mendelian laws of inheritance, linkage and crossing over, mutation and evolution, cytoplasmic inheritance genes and diseases. Gametogenesis, fertilization, types of eggs, cleavage, development up to gastrulation in Branchiostoma, frog and chick , Metamorphosis in frog; Formation and fate of extra embryonic membranes in chick; formation of amnion, allantois and classification of placenta in mammals, function, of placenta in mammals.

Unit-IV: Evolution and Systematics - Origin of life, History of evolutionary thought. Lamarckism Darwinism, Sources and nature of organic variation. Natural selection, Isolation. Concept of species and sub-species, principles of classification, zoological nomenclature and international code. Fossils, geological eras, distribution of animal's zoogeographical realms of the world.

Unit-V: Biochemistry and Physiology -Structure of carbohydrates, lipids, amino-acids, proteins and nucleic acids, glycolysis and Krebs cycle, oxidation and reduction . Oxidative phosphorylation , energy conservation and release, ATP, cholesterol. Enzymes and coenzymes, Hormones and their functions. roles of Pituitary, Thyroid, Parathyroid, Pancreas, Adrenal, Testis, Ovary and Pineal body. Composition of blood, blood groups in man , coagulation. oxygen and carbon dioxide transport, nephron and urine formation, mechanism of conduction along axon and across synapse , neurotransmitters, Vision, Hearing and other receptors, mechanism of contraction of skeletal muscle, role. of salivary gland, liver, pancreases and intestinal glands indigestion. Absorption of digested food

Reference Books:

1. M. Kato. The Biology of Biodiversity, Springer.
2. J.C. Avise. Molecular Markers. Natural History and Evolution, Chapman & Hall, New York.
3. E.O. Wilson. Biodiversity, Academic Press, Washington.
4. G.G. Simpson. Principle of Animal Taxonomy. Oxford IBH Pub. Co.
5. E. Mayer. Elements of Taxonomy.
6. E.O. Wilson. The Diversity of Life (The College Edition), W.W. Northern & Co.
7. B.K. Tikadar. Threatened Animals of India, ZSI Publication, Calcutta.
9. Jorgensen, S.E., Fundamentals of Ecological Modelling, Elsevier New York.

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Microbiology

Unit-I: General Microbiology: History of Microbiology. A brief idea of microbial diversity and scope of microbiology. Principles of classification of microbes; morphology, metabolic and molecular criteria for the classification, a brief introduction to major group of bacteria.

Unit-II: Microbial and Enzyme Technology: Enzymes from microbial sources, large scale production of enzymes, recovery of enzymes, enzyme purification methods- enzyme precipitation, separation by chromatography, enzyme reactors.

Microbial Physiology and Biochemistry: Overview; Scope and importance structure and function of biomolecules; Carbohydrates, Proteins, Lipid, Enzymes; Characteristics, Ribozymes, co-enzyme. Metabolism; General concept-application of second law of thermodynamics, redox potential, outline of intermediary metabolism; free energy change of the reaction catabolism-anabolism.

Unit-III: Microbial Genetics: Nucleic acids: Structure, physical and chemical properties of DNA and RNA, extrachromosomal DNA profile, function and evolution. DNA replication, damage and repair, spontaneous and induced mutation, reversion of mutation, Genetic recombination, Molecular models and mechanism, Gene conversion, Gene expression and regulation, Use of microbes in genetic engineering.

Biochemical and Molecular Technology: Electrophoresis, Isolation, Purification, Blotting, DNA amplification: PCR, DNA sequencing Gene silencing, Chromatography, Gel filtration, Ion exchange, Affinity Chromatography, TLC, HPLC, spectroscopy and Microscopy.

Unit-IV: Immunology: Introduction to immune system: Innate and adaptive immune responses; Cells and organs of immune system. Antigen antibody interactions and its applications. Immunology in health and disease- autoimmunity, immunodeficiencies hypersensitivity; Concept of immunotherapy.

Microbial Genomics: Tools for studying DNA/gene, Genomes: Size, physical structure, genome analysis, gene duplication, mapping of genome and functional genomics.

Unit-V: Bioprocess Technology and Engineering: An introduction to fermentation processes- Range of fermentation process, microbial biomass, microbial enzyme, microbial metabolites and transformation processes. Microbial growth kinetics. The isolation, preservation and improvement of industrially important and useful micro-organisms.

Reference Books:

1. Principles and Techniques of Biochemistry and Molecular Biology. Wilson K. and Walker J. (2008). Cambridge University press.
2. Foundations in Microbiology. Talaro K.P. and Talaro A. (2006). McGraw-Hill college Dimensi.
3. Analysis of Biological Molecules: An introduction to Principles, Instrumentation and Techniques, Potter GWH and Potter GW (1995). Kluwer Academic Publisher.
4. Prescott/Harley/Klein's Microbiology, Willey J, Sherwood L. and Woolverton C (2007). McGraw Hill.
5. Experiments in Microbiology, Plant Pathology and Biotechnology. Aneja KR. (2005). New Age International (P) Ltd, Publishers.

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Biotechnology

Unit-I: Biochemistry: Biomolecules and their conformation; Weak inter-molecular interactions in biomolecules; Chemical and functional nature of enzymes; Kinetics of single substrate and bi-substrate enzyme catalyzed reactions; Bioenergetics; Metabolism (Glycolysis, TAC and Oxidative phosphorylation); Membrane transport and pump; Cell cycle and cell growth control; Cell signaling and signal transduction.

Molecular Biology and Genetics: Molecular structure of genes and chromosomes; DNA replication and control; Transcription and its control; Translational processes; Regulatory controls in prokaryotes and eukaryotes; Mendelian inheritance; Gene interaction; Complementation; Linkage, recombination and chromosome mapping; Extrachromosomal inheritance; Chromosomal variation; Population genetics; Transposable elements, Molecular basis of genetics diseases and applications.

Unit-II: Bioprocess Engineering: Kinetics of microbial growth, substrate utilization and product formation: Simple structured models; Sterilization of air and media; Batch, fed-batch and continuous processes; Aeration and agitation; Mass transfer in bioreactors; Rheology of fermentation fluids; Scale-up concept; Design of fermentation media; Various type of microbial and enzyme reactors; Instrumentation in bioreactors.

Unit-III: Plant and Animal Biotechnology: Special features and organization of plant cells; Totipotency; Regeneration of plants; Plant products of industrial importance; Biochemistry of major metabolic pathways and products; Autotrophic and heterotrophic growth; plant growth regulator and elicitors; Cell suspension culture development; methodology, kinetics of growth and production formation, nutrient optimization; Production of secondary metabolites by plant suspension culture; Hairy root cultures and their cultivation. Techniques in raising transgenics.

Unit-IV: Immunology: The origin of immunology; Inherent immunity; Humoral and cell mediated immunity; Primary and secondary lymphoid organ; Antigen; B and T cells and Macrophages; Major histocompatibility complex (MHC); Antigen processing and presentation; Synthesis of antibody and secretion; Molecular basis of antibody diversity; Polyclonal and monoclonal antibody; Complement; Antigen-Antibody reaction; Regulation of immune response; Immune tolerance; Hyper sensitivity; Autoimmunity; Graft versus host reaction.

Unit-V: Recombinant DNA Technology: Restriction and modification enzymes; Vectors; Plasmid, bacteriophage and other viral vectors, cosmid, Ti plasmid, yeast artificial chromosomes; cDNA and genomic DNA library; Gene cloning; Expression of cloned gene; Transposons and gene targeting; DNA labeling; DNA sequencing; Polymerase chain reaction; DNA fingerprinting; Southern and northern blotting; In-situ hybridization; RAPD; RFLP; Site-directed mutagenesis; Gene transfer technologies; Gene therapy.

Reference Books:

1. Principle of Biochemistry, Nelson D and Cox MM. (2009). W.H. Freeman and Company, New York.
2. Analysis of Biological Molecules: An introduction to Principles, Instrumentation and Techniques, Potter GWH and Potter GW (1995). Kluwer Academic Publisher.
3. Instrumental methods of Analysis. Willard, HH and Merritt LL (1986). CBS Publisher and Distributors.
4. Isotopes and radiations in Biology. Thornburn CC (1987). Butterworth and Co. Ltd., London.
5. Prescott/Harley/Klein's, Willey J, Sherwood L. and Woolverton C (2007). McGraw Hill.

(3) Discipline: Commerce & Management

Subject Name	Subject Code
(i) Commerce	01
(ii) Management	02

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Commerce

Unit-I: Accounting: - Basic Accounting concepts, Accounting Standards, Dissolution & Amalgamation, Accounting of company – valuation of shares, Amalgamation, Absorption and Reconstruction of companies. **Business Management:** - Functions & Principles of Business Management, Planning, Organizing, controlling, Motivation and Interpersonal behaviour.

Unit-II: Business Environment:- Economic Environment of Business in India, Consumer Protection and Environmental protection, policy environment, New Industrial policy and its implementation ,liberalization, privatization and globalization, , foreign exchange management Act (FEMA), foreign capital investment in India, World Trade Organization (WTO), International monetary fund (IMF) **Cost and Management Accounting:** - Marginal costing & Break-even Analysis, Standard costing & Budgetary control, costing for decision making, Ratio Analysis, cash flow & Fund flow Analysis.

Unit-III: Business Statistics & Data Analysis:- Types of Data, Collection & Analysis, Sample-needs of sample Methods and Errors of Sample, Normal Distribution, Hypothesis Testing uses of Statistical Average. Correlation & Small Sample Tests, T-Test, F-Tests and Chi-square Tests. **Business Economics:** - Business Cycle Nature, Stages & Principles , Demand Analysis and Elasticity of Demand, Indifference Curve Analysis, Utility Analysis and Law of return., Profit Management, Measurement of profit, Risk & concept of Uncertainty.

Unit-IV: Income Tax & Tax Planning:- Basic concepts, Tax planning Concept, Definition, Importance, Computation of Income from various Heads, computation of Taxable Income of individual & firms, Types of Tax Assessment, Appeal & Revision Tax free Income. **Entrepreneurship:** - Definition of Entrepreneur and origin, Principles of Entrepreneurship, Innovation & Entrepreneurship, Role and achievements Nature and characteristics of Entrepreneur Development programme, Role of Government in Entrepreneurship development, Role of Entrepreneur in socio- Economic Growth.

Unit-V: Financial Management: - Capital Structure, Financial & Operating Leverages, Capital costing & capital Budgeting, Working Capital Management, Dividend Policy. **Indian Financial System:-** Money & Capital Market, functions of stock Exchange in India, Stock Holding Corporation of India, Mutual fund, SEBI, Credit Rating, Reserve Bank of India, NABARD & Rural Bank, Reforms of Banking Sector in India, NPA in Indian Banking System.

Reference Books :-

1. Accounting For Management, Jawahar Lal, Himalaya Publishing House Mumbai, 2012
2. Principles and Practice of Management, Prasad L.M. , Sultan Chand & Sons , 2015
3. Principles and Practice of Management, K. Aswathappa , Himalaya Publishing House Mumbai , 2008
4. Cost & Management Accounting, Maheshwari S.N. , Sultan Chand & Sons , 2014
5. Statistics for Business & Economics, R. P. Hooda , Macmillon, Delhi , 2008
6. Mathematical Analysis for Economics, R. .G. D. Allen , Himalaya Publishing House Mumbai , 2008
7. Income Tax, Dr. S.P Goyal/ Dr. H.C Mehrotra , Sahitya Bhawan publication , 2016
8. Fundamentals of Entrepreneurship, Sanjay Gupta , SBPD Publications , 2015
9. Financial Management, Dr. S.P Gupta , SBPD Publications , 2016
10. The Indian Financial System and Financial Market Operation, Dr. Vasant Desai , Himalaya Publishing House Mumbai , 2012

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Management

Unit- I: Management Process & Organizational Behavior- Overview: Functions and Principles of management; Management Thought and Concepts; Management Decision Making Processes and Types. Understanding and managing Individual Behavior-personality, Perception, Values, Attitudes, Learning and Motivation; Group Dynamics and Team Work. Leadership: Organizational structure; Organizational design; OD Interventions & Change Management. Corporate social responsibility. **Strategic Management-** Overview of Strategic Management: Concept of Corporate Strategy; BCG Model; GE-9 Cell Model ; Value Chain Analysis; SWOT & TOWS Analysis; Porter's Generic Strategies; Competitor Analysis. Overview of Strategy Formulation and Implementation at Corporate and Business level. Strategic Control.

Unit- II: Managerial Economics- Basic Concepts of Demand and Supply; Demand Analysis; Production Function; Cost-Output Relations; market Structures; Pricing theories; Overview of macro-Economics; National Income Concepts; Budgeting. **Quantitative Techniques** Co-relation & Regression Analysis; Overview of Sampling: Sampling distributions; Tests of Hypothesis; Large and small samples. Univariate and Bivariate Data Analysis: t-test, z-test, Chi-square tests; ANOVA. **Overview of Operations Research:** Linear programming; Transportation model; Inventory control; PERT/CPM.

Unit- III: Human Resource management Overview of HRM: Concepts and Perspectives in HRM; HRM in Changing Environment, Overview of HR Planning: Objectives Process and Techniques; Job Analysis ; Recruitment and Selection, Induction; Training and Development; Performance Appraisal, Overview of Industrial Relations: Wage Policy and Determination; Trade Unions; Dispute Resolution and Grievance Management; Labour Welfare . **Finance-**Overview of Financial Accounting; Analysis of Balance Sheet Statement, Overview of Financial Management: Fund Flow Analysis; Management of Working Capital, Overview of Capital Budgeting: Capital Budgeting Decisions; Capital Structure and Cost of Capital. Long-term and Short-term Financing Instruments; Mergers and Acquisitions.

Unit- IV: Marketing Management: Overview of Marketing: Marketing Mix, Market Segmentation, Targeting and Positioning; Overview of Product Management; Product Mix Decisions; Product Life Cycle, New Product Development, Branding; Pricing Methods and Strategies. Overview of Promotional Management: Promotion Mix; Advertising; Personal selling, Issues in Branding, Market Development, advertising and Retailing on Internet.

Unit- V: Production Management: Overview of Production management: Demand Forecasting for Operations; Production Scheduling, Statistical Quality Control; Facility Location; Layout Planning. **Information System-**Overview of MIS: Application of Information Systems in management, System Analysis and Design. Overview of Database Management System; Overview of E-Commerce:

Reference Books:

1. Financial Management , Dr. S. P. Gupta, Sahitya Bhawan Publication, 2016
2. Human Resource Management, VSP Rao, Excel Books, 2nd Ed. , 2008.
3. Management Information System, Wasman S Jawadekar, Tata McGraw Hill, 4th ed., 2009
4. Managerial Economics, D.M. Mithani, Himalaya Publishing House, 6th Rev. Ed., 2013.
5. Marketing Management, S.A. Sherlekar , Himalaya Publishing House, 13th Rev. Ed. 2007.
6. Principles of Management, M. Govindrajana & S. Natrajan, Prentice-Hall of India Private Ltd., 2007.
7. Production & Operations Management, S. N. Chary , Tata McGraw Hill , 5th Ed. 2015.
8. Research Methodology, C.R. Kothari, Gaurav Garg, New Age International Publishers, 3rd Ed. 2014.
9. Statistical Methods, Dr. S. P. Gupta, Sulatan Chand & Sons, 37th Rev. Ed. , 2008.
10. Strategic Management, VSP Rao, V. Hari Krishna, Excel Books, 2003

(4) Discipline: Physical Education

Subject Name

Subject Code

(i) Physical Education

01

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject:Physical Education

Unit- I:Introduction to and definition, aim and objectives of Physical Education, Historical development of ancient and modern Olympic games, Physical Education in India. Individual differences, Heredity and Environment.

Unit- II:Physiology of muscular activity, respiration and blood circulation, Bio-energetic, Athletic injurie and their management, Doping in sports. Sports nutrition and dietary manipulations and athletic diet, Obesity and their management.

Unit- III: Joints and their movements, Plains and axis, Kinetics, Kinematics - linear and angular, Levers, Newton's law of linear and angular motion, Principles of equilibrium and force, Spin and elasticity, Mechanical analysis of various sports activities, Mechanical analysis of running, Jumping, Throwing.

Unit- IV:Learning process – theories and laws of learning, Motivation, theories and dynamics of motivation in sports, Personality, its dimensions, theories, Personality and performance, Psychological factors affecting sports performance – stress, anxiety, and aggression.

Unit- V:Aims, Objectives, characteristics and principles of sports training, Training load and per iodization, Training methods and specific training programme for development of various motor qualities, Short term, long term training plans

Reference book:-

1. व्यायाम क्रिया विज्ञान एवं खेल चिकित्सा शास्त्र, शार्मा आर. के. फ्रेन्डस, पब्लिकेशन नई दिल्ली।
2. Bio-mechanics and its Application in sports, Dr. Rajkumar Sharma .lulu Publication.(on line available)
3. शारीरिक के सिद्धान्त व इतिहास तोमर रमेशचन्द्र, अमित ब्रदर्स ।
4. खेल ट्रेनिंग के वैज्ञानिक सिद्धान्त,फ्रेन्डस, पब्लिकेशन नई दिल्ली,!
5. Sports psychology

(5) Discipline:Arts

Subjects Name	Subject Code
(i) Hindi	01
(ii) English	02
(iii) Sanskrit	03
(iv) Geography	04
(v) Economics	05
(vi) Political Science	06
(vii) History	07
(viii) Social Work	08
(ix) Sociology	09

SUBJECT -हिन्दी

bdkb&1% fgUlh Hkk"kk vkj ml dk fodkl %& अपभ्रंश और पुरानी हिन्दी का संबंध, काव्य भाषा के रूप में अवधि और ब्रज भाषा का उदय और विकास, साहित्यिक हिन्दी के रूप में खड़ी बोली का उदय और विकास , देवनागरी लिपि का विकास और विशेषता ।

fgUlh Hkk"kk iz; ksx ds fofo/k : lk] बोली, मानक भाषा, संपर्क भाषा, राजभाषा और राष्ट्र भाषा, संचार माध्यम और हिन्दी ।

bdkb&2% fgUlh I kfgR; dk bfrgkl %&हिन्दी साहित्य का इतिहास, दर्शन, हिन्दी साहित्य की इतिहास लेखन की पद्धतियां, आदि काल मध्यकाल, आधुनिक काल, हिन्दी संत काव्य, रिति काल, द्विवेदी युग, छायावाद, प्रगतिवाद, प्रयोगवाद ।

bdkb&3% fgUlh I kfgR; dh x | fo/kk; a %&

- fgUlh mi U; kl %&प्रेमचंद्र पूर्व उपन्यास, प्रेमचंद और उनका युग, प्रेमचंद के परवर्ती प्रमुख उपन्यासकार – हजारी प्रसाद द्विवेदी, फणीश्वर नाथ रेणु, श्रीलाल शुक्ल, रांगेय राघव ।
- fgUlh dgkuh %&बीसवीं सदी की हिन्दी कहानी और प्रमुख कहानी आंदोलन ।
- fgUlh ukVd %&हिन्दी नाटक और रंगमंच, विकास के चरण और प्रमुख नाट्यकृतियां – अंधेर नगरी, चंद्रगुप्त, अंधायुग, आधे- अधूरे, आठवांसर्ग ।
- fgUlh fuc/k %&हिन्दी निबंध के प्रकार और प्रमुख निबंधकार – रामचंद्र शुक्ल, हजारी प्रसाद द्विवेदी, कुबेरनाथ राय, विद्यानिवास मिश्र, हरिषंकर परसाई ।
- fgUlh dh vU; fo | k, a %&रेखाचित्र, संस्मरण, यात्रा साहित्य, आत्म कथा, जीवनी और रिपोर्टाज ।

bdkb&4% dk0; "kkL= vkj vkykpuk %&भरतमुनि का रस और उसके प्रमुख व्याख्याकार, रस के अवयव, शब्द शक्तियां, अलंकार एवं उसके विभिन्न प्रकार ।

bdkb&5% Hkk"kk foKku %&भाषा परिवर्तन के कारण, ध्वनि परिवर्तन के कारण व दिषायें, अर्थ परिवर्तन के कारण व दिषायें, वाक्य परिवर्तन के कारण व दिषायें, रूप परिवर्तन के कारण व दिषायें ।

/ nHkZ xFk %&

1. भारतीय साहित्य, डॉ नगेन्द्र , प्रभाव प्रकाशन नई दिल्ली 110002 ।
2. हिन्दी साहित्य की भूमिका, डॉ हजारी प्रसाद द्विवेदी, राजकमल प्रकाशन दरियागंज नई दिल्ली 110002 ।
3. हिन्दी साहित्य का इतिहास, लक्ष्मी सागर वाष्णीय, लोकभारतीय प्रकाशन महात्मागांधी मार्ग इलाहाबाद -1 ।
4. भारतीय एवं पाश्चात्य काव्य सिद्धांत, डॉ. गणपति चंद्र, लोकभारतीय प्रकाशन महात्मागांधी मार्ग इलाहाबाद -1 ।
5. भाषा विज्ञान, प्रो. सरिता वाशिष्ठ , कल्पना प्रकाशन दिल्ली 110033 ।

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject:English

Unit –I: I Literary Forms and Terms

- Poetry: Lyric, Ode, Sonnet, Elegy, Satire, Epic
- Prose: Its Nature
- Drama: Tragedy, Comedy, Farce, Melodrama, One Act Play, Masque etc.
- Catharsis, Hamarattia, Negative Capability, objective Correlative, Satire, Image, Conceit etc.

II English Language teaching

Major trends in English Language teaching

- Approaches in English Language Teaching.
- Method of Teaching English.
- Technique of Teaching English.

Unit- II (a)William Shakespeare

General Questions on the writer and a critical study of the following works :

- Hamlet
- The Tempest

(b) Indian Literature

- Mulk Raj Anand – Untouchable
- Shashi Deshpande - That Long Silence

Unit –III: A critical study of the following poets with reference of the poems shown against each of their poetry.

- Milton : Sonnets
- Pope: Essay on Man
- Johnson: The Vanity of Human Wishes
- Wordsworth: Tintern Abbey, Immortality Ode
- Keats : Odes
- Tennyson: Ulysses

Unit– IV: The works of the following novelists with special reference.

- Dickens : Oliver Twist
- Thomas Hardy: Tess of the D'urbervilles
- Aristotle: Poetics
- Longinus : On the Sublime
- Dryden : Essay on Dramatic Poesie
- Arnold : The Study of poetry

Unit – V(a): A critical study of the 20th century writers and their works.

- E.M. Foster: A Passage to India
- D.H. Lawrence: Son and Lovers
- G.B. Shaw: Saint Joan
- W.B. Yeats: Byzantium, The Second Coming, A Prayer to my Daughter
- T.S. Eliot: The Waste Land

(b): American Literature

- Emerson: The American Scholar
- Thoreau: Civil Disobedience
- Hawthorne: The Scarlet Letter
- Eugene O' Neill: The Hairy Ape

Reference Books:

1. A History of English Literature, Arthur Compton Rickett London, T.C. & E.C. Jack; New York, Dodge publishing co.
2. American Literature, Meenakshi Raman, New Delhi: Atlantic Publishers.
3. English Language Literature, P.D. Wadgaunkar ,New Delhi Bahrai Publications .
4. A Glossary Liteary terms, M.H. Abrams McPeek Publishing.
5. English Grammar and Composition, Wren & Martin, S.Chand Publishing.

Dr. C.V. Raman University, Kota, Bilaspur (C.G.)

Subject: I & II

bdkb&1: वैदिक साहित्य—देवताओं परिचय — इन्द्र, अग्नि, विष्णु, रुद्र, उषस्, सवितृ, वरुण, वृहस्पति। विषयवस्तु—ऋग्वेद, यजुर्वेद, सामवेद, अथर्ववेद, ब्राह्मण, आरण्यक, उपनिषद्, वेदाङ्गों का सामान्य परिचय, निरुक्त, (प्रथम एवं द्वितीय अध्याय) वैदिक एवं लौकिक संस्कृत में अन्तर।

bdkb&2: व्याकरण एवं भाषा विज्ञान —सन्धि, समास, शब्दरूप, धातुरूप, कृदन्त, तद्धित, कारक —सिद्धान्तकौमुदी के अनुसार, भाषा की परिभाषा एवं प्रकार (परिवार मूलक एवं आकृति मूलक) भाषाओं का वर्गीकरण, ध्वनि संबंधी नियम।

bdkb&3 : दर्शन —ईश्वर कृष्ण की सांख्यकारिका— पुरुष—स्वरूप,प्रकृति—स्वरूप, सृष्टिक्रम, सदानन्दका वेदान्तसार—अज्ञान, पञ्चीकरण, अध्यारोप, जीवन मुक्ति, केषव मिश्र की तर्क भाषा, प्रमाण—प्रत्यक्ष, अनुमान,उपमान, षब्द।

bdkb&4 : संस्कृत साहित्य —निम्नलिखित ग्रन्थों का सामान्य अध्ययन—

- पद्य— नैषधीयचरित, शिशुपालवध, रघुवंश, मेघदूत।
- गद्य— कादम्बरी, दशकुमारचरित, हर्षचरित।
- नाटक— अभिज्ञान शाकुन्तलम्, उत्तररामचरित, वेणीसंहार, मृच्छकटिक।

bdkb&5% नाट्यशास्त्र एवं काव्यशास्त्र—

- भरत — नाट्य शास्त्र—प्रथम तथा द्वितीय अध्याय, दशरूपक — प्रथम प्रकाश
- काव्यप्रकाश — काव्यप्रयोजन, काव्यहेतु, काव्यलक्षण, काव्यभेद, काव्यशक्ति,
- अभिहितान्वयवाद, अलंकार — अनुप्रास, उपमा, रूपक, उत्प्रेक्षा, वक्रोक्ति, विभावना, लेश।
- ध्वन्यालोक — प्रथम उद्योत्।

References

1. वैदिक साहित्य और संस्कृति —आचार्य बलदेव उपाध्याय, शारदा संस्थान वाराणसी—5
2. निरुक्त—आचार्य विश्वेश्वर, ज्ञानमण्डल लिमिटेड, वाराणसी।
3. लघुसिद्धान्तकौमुदी— डॉ. अर्कनाथ चौधरी, जगदीश संस्कृत पुस्तकालय जयपुर, राजस्थान।
4. भाषा विज्ञान—डॉ. समीक्षा दवेल, महालक्ष्मी प्रकाशन, आगरा—2।
5. काव्य प्रकाश—आचार्य विश्वेश्वर, ज्ञानमण्डल लिमिटेड, वाराणसी।
6. ध्वन्यालोक—आचार्य जगन्नाथ पाठक, चौखम्बा विद्याभवन वाराणसी—1।
7. संस्कृत साहित्य का इतिहास— डॉ. जगन्नारायण पाण्डेय,जगदीश संस्कृत पुस्तकालय जयपुर, राजस्थान।
8. वैदिक सूक्त संग्रह — डॉ. देवेन्द्र नाथ पाण्डेय, जगदीश संस्कृत पुस्तकालय जयपुर, राजस्थान।
9. भारतीय दर्शन — विक्रमादित्य सिंह, प्रकाशन केन्द्र, रेल्वे क्रासिंग सीतापुर रोड, लखनऊ।
10. वैदिक साहित्य का इतिहास — प्रो. पारसनाथ द्विवेदी, चौखम्बा सुरभारती प्रकाशन, वाराणसी—1।
11. नाट्य शास्त्र — श्री सत्यप्रकाश शर्मा, चौखम्बा सुरभारती प्रकाशन, वाराणसी—1।
12. संस्कृत भाषा विज्ञान — डॉ. कुञ्जबिहारी पाण्डेय,जगदीश संस्कृत पुस्तकालय जयपुर, राजस्थान।
13. दशरूपक—डॉ. भोलाशंकर व्यास, चौखम्बा सुरभारती प्रकाशन, वाराणसी—1।
14. संस्कृत व्याकरणम् — श्रीनिवास शास्त्री, साहित्य भण्डार, सुभास बाजार, मेरठ।

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Geography

Unit – I: Geomorphology: Origin of the Earth – Theories regarding origin of the earth. Fundamental concepts, Endogenetic and Exogenetic forces; Denudation and weathering, Geosynclines, Continental Drift and plate tectonics, Concept of geomorphic cycle, Landforms associated with fluvial, glacial arid, costal and karts cycles.

Unit – II: History of Geographical Thoughts: General character of Geographic knowledge during the ancient period and medieval period, Foundations of Modern Geography. Recent trend in Geography (Remote sensing and Geographical Information System).

Unit – III: Climatology & Oceanography: Composition and structure of the atmosphere, Heat budget of the earth, Distribution of temperature, Atmospheric pressure and general circulation of winds. Ocean deposits, Coral reefs, Temperature and salinity of the oceans, Density of seawater, Tides and ocean currents.

Unit – IV: Population & Settlement Geography: Patterns of distribution, Growth and density of population in world and India, pattern and processes of migration. Site and Situation, types, sizes, Spacing, and internal morphology of rural and urban settlements, City-region, primate city, Rank- size rule.

Unit – V: Geography of India: Physiographic divisions, climate: its regional variations, vegetation types and vegetation regions; Major soil types, Irrigation and agriculture; Population distribution and growth; Settlement patterns; Mineral and power resources, major industries and industrial regions.

Reference Books -

1. Climatology & Oceanography:- D.S. Lal, Chaitanya Publication, Allahabad .
2. Geomorphology:-Savindra Singh, Prayag Publication, Allahabad
3. Agriculture Geography:- Singh & Dillon, Tata McGraw Hill Publication, New Delhi.
4. “Population Geography” R.C. Chandra, Kalyani Publication, New Delhi.
5. “Settlement Geography” :- R.Y. Singh, Rawat Publication, Jaipur.
6. “Bharat Ka Bhugol” :- R. C. Tiwari, Pravalika Publicaiton, Allahabad.
7. “Evaluation of Geography Thought”:- Majid Hussain, Rawat Publication Jaipur.

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Economics

Unit- I

Economic Systems – Capitalism, Socialism and mixed economy.

National Income – Concept and measurement

Consumer behaviour- Law of demand, Elasticity of demand, utility analysis and difference – curve techniques.

Unit –II

Producer's behaviour- Production Function, Laws of Returns, Returns to scale cost curves.

Price Theory – Price determination under different market condition, pricing of factors of production Keynesian and Modern theory of employment Banking objective and instruments of Central Banking, credit policies in a planned developing economy

Unit-III

Types and Principles of Taxation- Principles of Public expenditure, objective and instruments of budgetary and fiscal policy in a planned developing economy.

Unit –IV

International Trade- Theory and policy of International trade, determination of exchange rates, balance of payment

International Monetary Institution – I.B.R.D. and I.M.F. characteristics of under developed economy, human and natural resources, primary, secondary and tertiary sectors in India, mixed economy in India.

Unit-V

Agricultural development- Agricultural Policy, Land reforms, Green revolution and its aftermath.

Industrial development- Industrial Policy, Public and private sectors, Regional distribution of Industries in India.

Pricing policies for agriculture and industrial outputs. Fiscal and monetary policy in India-objectives, recent budgetary trends, bank nationalization in India. Reserve Bank and monetary policy in India. Recent trends in India's foreign trade and balance of payments.

Indian Planning- objectives and strategies, planned growth and distributive justice eradication of poverty, problems of Indian planning.

Reference Books :

1. Economics - Pant J.C. and Agrawal, Sahitya Bhawan Publication, Agra.
2. Economics- Sinha V.C. and Sinha Pushpa, Sahitya Bhawan publication, Agra.
3. Economics- Maheshwari P.D. and Gupta Sheelchand, Kailas pustak sadan Bhopal.
4. Micro Economics- Bansal and Agrawal, Sahitya Bhawan Publication, Agra.
5. Modern Economic Theory- Ahuja H.L., S. chand & company. Ltd.
6. Micro Economics- Tyagi P.k., Sumit Interprises. New Delhi.
7. Public Economics- Maheshwari P.D. and Gupta Sheelchand, Kailas pustak sadan Bhopal.
8. Public Finance- Jain and Agrawal Purnima, Kailas Pustak Sadan, Bhopal.
9. Indian Economy- Rudderdt and Sundaram, S. Chand and Co. Delhi.

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Political Science

Unit-I. Main features of Ancient Indian political thought, Manu and Kautilya; Characteristics of ancient Greek Thought - Plato, Aristotle, General features of Medieval Political Thought - Machiavelli, Hobbes, Locke, Montesquieu, Rousseau, Bentham, J.S. Mill, T.H. Green, Hegel, Marx, Lenin and Mao-Tse-Tung, Laski

Unit- II. Nature and scope of Political Science: as an independent discipline. Politics as a specific human behavior, Traditional Vs. Contemporary approaches to the study. Behaviouralism Systems Theory and other recent approaches, Post-behaviouralism, political analysis: Marxist approach to political analysis. The emergence and nature of the Modern State Sovereignty, The Monistic and Pluralistic thought of Sovereignty: Power and Authority, Nation- States System. Political Obligation-Resistance, Revolutions, Rights, Liberty, Equality, Justice. Theory of Democracy;

Unit- III. Political Ideologies – Idealism, Individualism, Socialism, (Democratic and Fabian) Liberalism, and Marxism. Comparative Politics- Traditional and Structural Functional approach, concept of Political Socialisation, Political communication, Political Development. Party System and Political Procedure – party system, Pressure Groups, Representation and Election, Executive, Legislature, Judiciary, Bureaucracy.

Unit- IV. Constitution of India – formation, Preamble, Fundamental Rights and Directive Principles of State Policy; Union Government-President, Parliament, Prime Minister and Cabinet; Parliament and Parliamentary Procedure; Supreme Court; Judicial Review and Judicial Activism; Indian Federalism, Centre-State Relations, Role of Governor, Panchayati Raj. The Functioning – Role of Class, Caste, Language, Region and Communalism in Indian Politics, Secularism, National Integration, Political Elites, Changing Composition, Political Parties and Political Participation, Planning and Developmental Administration, Socio- Economic changes and their impact on Indian Democracy. Constitutional Amendment. Impact of Information Technology on Administration. Scientific Management Theory : Taylor. Welfare State Approach. Budgeting and Performance Budgeting-Process

Unit- V. Indian Foreign Policy. Determinating Elements, Characteristics, Panchsheel. Relations with Neighbours ; Pakistan, China, Bangla Desh, Nepal, Sri Lanka & Afghanistan. Relations with Super Powers ; SA, USSR/Russia. India and other Organisations- United Nations Organisation, Commonwealth, SAARC, Afro-Asian Solidarity, non-alignment movement, Disarmament, Human Rights, Environmental issues, North-South Dialogue, South-South Dialogue, Nuclear Policy, Liberalization and Globalisation. Estimation of Non-alignment and Relevance.

Reference Books –

- 1- डॉ. के. एन. वर्मा, पाश्चात्य राजनीतिक विचारों का इतिहास
- 2- सुभाष कश्यप, भारतीय राजनीति और संविधान, राजकमल प्रकाशन, नई दिल्ली।
- 3- डॉ. बी. एल. फड़िया – भारतीय शासन एवं राजनीति
- 4- सी. बी. गेना – तुलनात्मक राजनीति एवं राजनीति संस्थाएं
- 5- N.D. Palmer, State Politics in India
- 6- R.Kothari, Politics in India, New Delhi, Orient Longman, 1970
- 7- Dr. B.L. Fadiya- Public Administration
- 8- B.L Fadiya –Bhart ki videsh niti
- 9- B.L Fadiya- International Law
- 10- Dr. J. P. Nema & Dr. K.K. Sharma – Human Right Thory & Practice
- 11- सुभाष कश्यप दल बदल और राज्यों की राजनीति।
- 12- डॉ. पुखराज जैन भारत में लोकतंत्र
- 13- B. L. Fadiya -Advance Political Theory

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject:History

Unit-I. Sources of Ancient Indian History . Indus valley civilisation-origin, extent, Characteristic, features,main trade and contacts, causes of decline. Vedic civilisation – political, social and economic patterns, major religious ideas and rituals. Jainism and Buddhism sects. The age of the Mauryas- extent of administration, social and economic conditions. Ashoka’s policy and reforms. The Indo-Greek conquests, consolidation and decline. The Gupta age: political and cultural aspects. Chalukya, Pallava and the Vardhan Empires. Emergence of the Rajput states-origin, polity and culture.

Unit-II. India under the Sultans of Delhi: Indian society on the eve of Mahamud, Ghazni’s invasions, Establishment of State politics and administrative principles under Mohammad bin Tughlaq and Firoz. The Lodis. Cultural development during the Sultanate- Bhakti Movement, Sufism, art & architecture, literature and the society. The Vijaynagar and the Bahamani Empires: Polity and culture.

Unit-III. Profile of India in 1526 and Babar’s invasion. Achievements of Babar, Humayun and Shershah Suri. National Monarchy under Akbar : New concept of monarchy. Akbar’s religio-political out-look, his relations with the non-Muslims and administrative measures. Age of Jahangir and Shahjahan. Climax and disintegration of the Mughal Empire under Aurangzeb : Aurangzeb’s religious policy, expansion of the Mughal Empire in Deccan, revolts against Aurangzeb, relations with the Marathas, disintegration of the Empire. Mughal Administration. Art, architecture and society under the Mughal Emperors.

Unit-IV. Rise of the British power in Deccan and Bengal; Anglo- French struggle, relations with the Nawabs of Bengal. Anglo-Maratha relations: 1772 A.D. to 1818 A.D. The expansion and consolidation of British rule from 1789 to 1856: With special reference to Wellesley, Lord Hastings, William Bentinck and Dalhousie. Revolt of 1857: Causes, nature and consequences. Salient features of the new British policy under the Crown, Queen’s Proclamation. Mayo’s reforms, British liberalism under Ripon, Curzon’s reforms. British economic policies: Trade, industry and agriculture.

Unit-V Socio-religious Movements- Brahma Samaj, Prarthana Samaj, Arya Samaj, Theosophical Society, Ram Krishna Mission. Indian National Movement-Genesis, establishment of the Indian National Congress, different phases of the Movement (1885-1919), 1919-1939 (Gandhian Phases) Intensification of the freedom struggle (1939-1947). Builders of Modern India: Raja Ram Mohan Roy, Rama Krishna, Dayanand Saraswati, Vivekanand, Tilak, Gokhale, Gandhi and Nehru. Indian constitutional developments- Acts of 1858, 1892, 1909, 1919 and 1935 .

Reference Book-

1. H.C. Roychavadhary-Political History of ancient india.
2. R.C. Majumdar-the Age of impartial unity.
3. Romila thapar-history of India.
4. Irfan Habib, Economic History of Medieval India, 1200-1500.
5. Forguson , History of Indian and Eastern Architecture.
6. Chopra, Puri and Das, Social, Cultural and Economic History of India,
7. Sardesai- G. S : A New History of Maratha’s –Vol I & III .
8. वर्मा एस.के. , आधुनिक भारत का इतिहास।
9. मिश्रा, जगन्नाथ प्रसाद : आधुनिक भारत का इतिहास।

Dr. C. V. Raman University Bilaspur (C.G.)

Subject: Social Work

UNIT – I Social work : Philosophy and Methods Social work meaning Objectives, Scope, Assumptions & Values; History of Social work in U. K. U.S.A and India, Philosophy of Social work, Democratic Equality, Justice Liberty and Humanitarian (Human Rights) Fraternity Matrix, Social Works as a profession.

UNIT – II Methods of Social work social case work- meaning, scope principles, Processes (Psychosocial Study, Assessments, treatment- goal formulation and techniques) ,Evaluation, Follow- up and Rehabilitation. Social Group work meaning objective, Principles, Skills, Programme, Planning and Development and evaluation) Programme, Planning and Development, Role of Social group worker Leadership Development.

UNIT – III Community Organization: meaning Objective, principles Approaches, Roles of Community Organization worker

UNIT – IV Social welfare Administration meaning Scope Auspices- Private and Public, Principles, Basic Administrative Processes and Practice Organisation, budgeting and financial control, reporting.

UNIT – V Social work research Meaning Objectives, types scope Scientific method, selection and formulation of the problem research Design Sampling sources and methods of data collection, processing of data, analysing and interpretation report writing

Reference Books:

1. Rajaram Shashtri – Social Work
2. Mishra. P.D – Community Organization
3. Sachdeva. D.R. – Social Welfare Administration in India
4. Mishra. P.D – Social Case work
5. C.R. Kothari – Research Methodology
6. Methodology in Social Research – Mukherjee, P.N. Dilemma and Perspectives publication, New Delhi. 2000
7. Research Methods in social Science – Somekh B and Lewin, C (eds) Vistaar Publication, New Delhi 2005

Dr. C.V. Raman University, Bilaspur (C.G.)

Subject: Sociology (Ph.D Entrance Test)

1. **Nature of Sociology:** Definition, Basic Concept, Community, Institution, Culture, Social Structure, Structure and Role Their Interrelationship, Social Group.
2. **Social Institution :** Marriage, Family, Education, religion, Socialization, Theories of Socialization
3. **Social Stratification:** Social Differentiation, Forms of Stratification, Caste, Class, Gender, social mobility, Social Change
4. **Structural:** Radcliffe Brown, Levi Straus Functional- Durkheim, Malinowski, parsons, Interactionist – Social action, Max Weber , Pareto Bulmer Conflict – Karl Marx , Dahrendorf
5. **The Challenges of Globalization:** Globalization and Social Development, Globalization and Woman's Development
6. **Meaning and Nature of Social Research:** The scientific methods , the Problem of the Study of Social Phenomena , Objectivity and Subjectivity Fact & value , Quantitative Methods – Survey , Research Design & its types , Techniques of Data Collection
7. **Qualitative Methods:** Statistics in Social Research, Measures of Central Tendency – Mean Median Mode, etc

Reference Books –

- 1 Advanced Sociology - Manahan & Manahan
- 2 Elements of Social Research – Baghel & Pandey
- 3 Development of Sociology – G.R. Mohan
- 4 Sociology Thinkers – RavindraNath Mukharji
- 5 Indian Society – R.V. Badi, N.V. Badi
- 6 Social change in modern India - M.N. Srinivas
- 7 Social Change – William F. Ogburn
- 8 The Concept of Sociology – Farley E Eubank

(6) Discipline: Information Technology

Subject Name

Subject Code

(i) Information Technology & Computer Application

01

Dr. C.V. Raman University Bilaspur(C.G.)

Subject:- Information Technology and Computer Application

Unit-I: Data, Information, definition of data structure, arrays, stack, queues, linked lists, heaps, hashing. **Tree:** tree and rooted tree, B trees and B+ trees, spanning trees. **Graph:** walks, paths, connected graphs, cycles and circuits.

Unit –II: OOP's concept, arrays, structure, union, string, pointers, data type, function, control statements, constructor, destructor, overloading, templates, Exception handling.

Unit-III: E-R diagrams, **Normalization-** 1NF, 2NF, 3NF, BCNF, 4NF, Data Definition Language(DDL), Data Manipulation Language(DML), Data Control Language(DCL), Database objects: views, indexes, sequences, data dictionary.

Unit-IV: OSI reference model, TCP/IP model, Transmission media: wired and wireless, switching, ISDN, ATM, switch, hub, router, repeater, gateway, cryptography. Routing algorithms, network security tools, congestion control. System Development Life Cycle(SDLC), waterfall model, prototypes, spiral model, bottom up and top down models, software reengineering.

Unit-V: Types of operating system, virtual memory, paging, fragmentation, mutual exclusion, critical region, CPU scheduling, deadlock, Unix: File system, process management, shell, kernel, architecture, commands, meta characters. Definitions, AI approach, Breadth first, depth first, A, A*, AO*, performance comparison of search techniques, expert systems, decision support system.

Reference Books:

1. Operating System Concept by A. Silberschatz, Peter B. Galvin and Garge Gange , Wiley Publication.
2. Software Engineering by Roger S. Pressman, McGraw Hill International Edition.
3. Data Communications and Networking by Behrouz A. Forouzan, Tata McGraw Hill , 2nd Edition.
4. Database System Concepts by A. Silberschatz, H. F. Korth and S. Sudarshan, McGraw Hill International Edition, fifth Edition.
5. The Complete Reference, C++ by Herbert Schildt, McGraw Hill International Edition.
6. Data Structure by Seymour Lpschutz, Tata McGraw Hill Edition.
7. Artificial Intelligence by Elaine Rich, Kevin Knight and S. B. Nair, McGraw Hill Pvt. Ltd., 3rd edition.

(7) Discipline: Law

Subject Name

Subject Code

(i) Law

01

Dr. C.V. Raman University Bilaspur(C.G.)

Subject:-Law

Unit –I

Legal theory & jurisprudence

Meaning and Definition of Law .The Nature and Function of Law , The Purpose of Law — The Classification of Law — Equity, Law and Justice — Theory of Sovereignty., Sources of Law .Schools of Jurisprudence — Natural, Analytical, Historical, and Sociological Schools of Jurisprudence. Rights and Duties, Theories of Punishment. Concepts of Possession and Ownership.

Unit –II

Constitutional Law of India

Preamble , fundamental Rights and Duties, Directive Principal of state Policy, judiciary ,Executive, Union State Legislative Relation ,Emergency Provisions, Amendment of Constitution, Writ Jurisdiction.

Unit –III

Public International Law & Human Rights

Nature of International law and its relationship with Municipal Law, Source of International Law, Recognition of States and Governments, United Nations, Settlement of International Disputes, Concept Development of Human Rights in International & Indian Context.

Unit –IV

Law of Crime-& Family Law

Nature and definition of offence, General Exceptions, Common Intention and Common object, Criminal Attempt, Conspiracy and Abetment, Offence against Women. Concepts of Family Law. Sources of Family Law in India. Marriage , Maintenance & Guardianship under Hindu & Muslim Law.

Unit –V

Methodology of Legal Research.

Meaning, needs and scope of Legal research , Socio legal research, Doctrinal and non-Doctrinal, Relevance of empirical research, Induction and Deduction. Formulation of the Research problem,

Reference Books

1. Jurisprudence :- Salmond , Universal Publishers 12thEdn. 1966.
2. Legal Theory and Jurisprudence :- V.D. Mahajan, Eastern Book Company Lucknow, 5th Edn.1977.
3. Indian Constitutional Law :- M.P. Jain, , Wadhwa & Co, Nagpur 2009.
4. Constitution of India :- V.N. Shukla , Eastern Book Company Lucknow 2010.
5. Indian Penal Code :- Ratan lal and Dhiraj Lal Wadhwa & Co. 2000
6. Family Law :- Paras Diwan , AllahabadLaw Agency Allahabad 2012
7. International Law and Human Rights :- H.O. Agarwal, Central Law Publications Allahabad 2010.
8. Legal education and research methodology :- Dr. Mona Purohit , Central Law Publications Allahabad 2010.



DR. C.V. RAMAN UNIVERSITY

Kargi Road Kota Distt. – Bilaspur (Chhattisgarh) India

Ph: +91-7753-253801, 09617779322 Fax : 07753-253728

Web : www.cvru.ac.in