HEMCHNAD YADAV VISHWAVIDYALAYA, DURG (C.G.)

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SCHEME OF EXAMINATION
&
SYLLABUS
of
B.Sc. B.Ed Annual Exam

UNDER

Session 2023-24

B.Sc. B.Ed I

1. Scheme of Examination
2. Environmental Studies
3. Foundation Course
4. Physics
5. Chemistry
6. Zoology
7. Botany
8. Mathematics
9. Philosophical Perspectives of Education

B.Sc. B.Ed.- I
SCHEME OF EXAMINATION

Subject	Paper	Max. Marks	Total Marks	Min. Marks
Environmental Studies		75	100	33
Field Work		25		
Foundation Course				
Hindi Language	I	75	75	26
English Language	I	75	75	26
Maths Group				
1. Physics	I	50		
	II	50	100	33
	Practical		50	20
2. Chemistry	I	33		
	II	33	100	33
	III	34		
	Practical		50	20
3. Mathematics	I	50		
	II	50	150	50
	III	50		
Bio Group				
4. Botany	I	50		
	II	50	100	33
	Practical		50	20
5. Zoology	I	50		
	II	50	100	33
	Practical		50	20
6. Chemistry	I	33		
	II	33	100	33
	III	34		
	Practical		50	20
B.Ed. Group				
7. Philosophical Perspective of Education		80 (External)		20 (Internal)
PRACTICUM				
Community Activities			**50 (Internal)**	**20**

USE OF CALCULATORS

The Students of Degree/P.G. Classes will be permitted to use of Calculators in the examination hall from annual 1986 examination on the following conditions as per decision of the standing committee of the Academic Council at its meeting held on 31-1-1986.

1. Student will bring their own Calculators.
2. Calculators will not be provided either by the University or examination centres.
3. Calculators with, memory and following variables be permitted +, –, x, ¸ square, reciprocal, exponentials log, square root, trigonometric functions, wize, sine, cosine, tangent etc. factorial summation, xy, yx and in the light of objective approval of merits and demerits of the viva only will be allowed.

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Part - I

SYLLABUS FOR ENVIRONMENTAL STUDIES AND HUMAN RIGHTS

MM. 75

इन्वायरमेंटल साईंसेस के पाठ्यक्रम को स्नातक स्तर भाग–एक की कक्षाओं में विश्वविद्यालय अनुदान आयोग के निर्देशानुसार अनिवार्य रूप से शिक्षा सत्र 2003–2004 (परीक्षा 2004) से प्रभावशील किया गया है। स्वशासी महाविद्यालयों द्वारा भी अनिवार्य रूप से अंगीकृत किया जाएगा।

भाग 1, 2 एवं 3 में से किसी भी वर्ष में पर्यावरण प्रश्न–पत्र उत्तीर्ण करना अनिवार्य है। तभी उपाधि प्रदाय योग्य होगी।

पाठ्यक्रम 100 अंकों का होगा, जिसमें से 75 अंक सैद्धांतिक प्रश्नों पर होंगे एवं 25 अंकक्षेत्रीय कार्य (Field Work) पर्यावरण पर होंगे।

सैद्धांतिक प्रश्नों पर अंक – 75 (सभी प्रश्न इकाई आधार पर रहेंगे जिसमें विकल्प रहेगा)

(अ) लघु प्रश्नोंत्तर – 25 अंक
(ब) निबंधात्मक – 50 अंक

Field Work-25 अंकों का मूल्यांकन आंतरिक मूल्यांकन पद्धति से कर विश्वविद्यालय को प्रेषित किया जावेगा। अभिलेखों कीप्रायोगिकउत्तर पुस्तिकाओं केसमान संबंधित महाविद्यालयों द्वारा सुरक्षित रखेंगे।

उपरोक्त पाठ्यक्रम से संबंधित परीक्षा का आयोजन वार्षिक परीक्षा केसाथ किया जाएगा।पर्यावरण विज्ञान विषय अनिवार्य विषय है, जिसमें अनुत्तीर्ण होने पर स्नातक स्तर भाग–एक के छात्र/छात्राओं को एक अन्य विषय के साथ पूरक की पात्रता होगी। पर्यावरण विज्ञान केसैद्धांतिक एवं फील्ड वर्क के संयुक्त रूप से 33ः (तैंतीस प्रतिशत) अंक उत्तीर्ण होने के लिए अनिवार्य होंगे।

स्नातक स्तर भाग–एक के समस्त नियमित/भूतपूर्व/अमहाविद्यालयीन छात्र/छात्राओं को अपना फील्ड वर्क सैद्धांतिक परीक्षा की समाप्ति के पश्चात् 10 (दस) दिनों के भीतर संबंधित महाविद्यालय/परीक्षा केन्द्र में जमा करेंगे एवं महाविद्यालय के प्राचार्य/केन्द्र अधिक्षक, परीक्षकों की नियुक्ति के लिए अधिकृत रहेंगे तथा फील्ड वर्क जमा होने के सात दिनों के भीतर प्राप्त अंक विश्वविद्यालय को भेजेंगे।

B.Sc. B.Ed. Part-I
FOUNDATION COURSE
(Environmental Studies)

UNIT-I THE MULTI DISCIPLINARY NATUREOF ENVIRONMENTAL STUDIES

Definition, Scope and Importance Natural Resources: (12 Lecture)

Renewable and Nonrenewable Resources

(a) Forest resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people and relevant forest Act.

(b) Water resources: Use and over-utilization of surface and ground water, floods drought, conflicts over water, dams benefits and problems and relevant Act.

(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.

(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.

(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

(f) Land resources: Land as a resource, land degradation, man induced landslides soil erosion and desertification.

UNIT-II ECOSYSTEM (12 Lecture)

(a) Concept, Structure and Function of and ecosystem

- Producers, consumers and decomposers.
- Energy flow in the ecosystem
- Ecological succession
- Food chains, food webs and ecological pyramids.
- Introduction, Types, Characteristics Features, Structure and Function of Forest, Grass, Desert and Aquatic Ecosystem.

(b) Biodiversity and its Conservation

- Introduction - Definition: genetic. species and eco system diversity
- Bio-geographical classification of India.
- Value of biodiversity: Consumptive use. Productive use, social ethics, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as mega-diversity nation.
- Hot spots of biodiversity.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wild life conflict.
- Endangered and endemic species of India.
- Conservation of biodiversity: In situ and Ex-situ conservation of biodiversity.

UNIT- III **(12Lecture)**

(a) Causes, effect and control measures of

- Air water, soil, marine, noise, nuclear pollution and Human population.
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Disaster Management: floods, earthquake, cyclone and landslides.

(b) Environmental Management

- From Unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people, its problems and concerns.
- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
- Waste land reclamation
- Environment protection Act: Issues involved in enforcement of environmental legislation.
- Role of Information Technology in Environment and Human Health.

UNIT- IV

General background and historical perspective- Historical development and concept of Human Rights, Meaning and definition of Human Rights, Kind and Classification of Human Rights.

Protection of Human Rights under the UNO Charter, protection of Human Rights under the Universal Declaration of Human Rights, 1948.

Convention on the Elimination of all forms of Discrimination against women. Convention on the Rights of the Child, 1989.

UNIT- V

Impact of Human Rights norms in India, Human Rights under the Constitution of India, Fundamental Rights under the Constitution of India, Directive Principles of State policy under the Constitution of India, Enforcement of Human Rights in India.

Protection of Human Rights under the Human Rights Act, 1993- National Human Rights Commission, State Human Rights Commission and Human Rights court in India.

Fundamental Duties under the Constitution of India.

Reference/ Books Recommended

1. SK Kapoor- Human rights under International Law and IndianLaw.
2. HO Agrawal- Internation Law and HumanRights
3. एस.के. कपूर —मानव अधिकार
4. जे.एन. पान्डेय — भारत का संविधान
5. एम.डी. चतुर्वेदी —भारत का संविधान
6. J.N.Pandey - Constitutional Law ofIndia
7. Agarwal K.C. 2001 Environmental Biology, Nidi pub. Ltd.Bikaner
8. Bharucha Erach, the Biodiversity of India, Mapin pub. Ltd. Ahmedabad 380013,India, Email:mapin@icenet.net(R)
9. Bruinner R.C. 1989, Hazardous Waste Incineration. McGraw HillInc.480p
10. Clark R.S. Marine pollution, Clanderson press Oxford(TB)
11. Cuningham, W.P.Cooper. T.H.Gorhani, E & Hepworth.M.T,200
12. Dr. A.K.- Environmental Chemistry. Wiley EasternLtd.
13. Down to Earth, Center for Science and Environment(R)
14. Gloick, H.P. 1993 Water in crisis. Pacific institute for studies in Deve. Environment& Security. Stockholm Eng. Institute. Oxford University, Press. m473p.
15. Hawkins R.E. Encyclopedia of Indian Natural History, Bombay Natural History Society, Mumbai(R)
16. Heywood, V.H. & Watson, T.T.1995 Global Biodiversity Assessment, Cambridge Univ. Press1140p
17. Jadhav H. & Bhosale, V.H. 1995 Environmental Protection and Law. Himalayapub. House, Delhi284p
18. Mckinney M.L.& School R.M.1996, environmental Science systems & solutions,web enhanced edition,639p
19. Mhadkar A.K. Matter Hazardous, Techno-Science publication (TB)
20. Miller T.G.Jr. Environment Science, Wadsworth publication co.(TB)
21. Odum E.P.1971, Fundamentals of Ecology, W.B. Saunders Co.USA,574p
22. Rao M.N. & Datta, A.K. 1987, Waste water treatment. Oxford & IBH pub.co.pvt.Ltd 345p
23. Sharma B.K. 2001, Environmental chemistry, Goel pub. House,Meerut
24. Survey of the Environment, The Hidu(M)
25. Townsend C. Harper J. And Michael Begon, Essentials of Ecology, Blackwell Science(TB)
26. Trivedi R.K. Handbook of Environment Laws, Rules, Guidlines, Compliancesand Standards, Vol land II, Environment Media(R)
27. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science publication (TB)
28. Wanger K.D.1998, Environmental Management. W.B. Saunders Co. Philadelphia,USA 499p

बी.ए./ बी.एस-सी./ बी.कॉम./ बी.एच.एस.सी. भाग -एक

(आधार पाठ्यक्रम)

प्रथम प्रश्नपत्र

हिंदी भाषा

कोड....

पूर्णांक 75

क्रेडिट 05

पाठ्यक्रमका उद्देश्य:-

1.हिंदी भाषाके प्रयोजनात्मक स्वरूप का सामान्य ज्ञान प्रदान करना।
2.कंप्यूटर में हिंदी भाषा के प्रयोग की आवश्यकता के अनुरूप कंप्यूटर की कार्य प्रणाली की आरंभिक जानकारी से अवगत होने के लिए प्रेरित करना।
3.हिंदी व्याकरण की बुनियादी ज्ञान संप्रेषण कौशल तथा भाषायी दक्षता से अवगत कराना।
4.साहित्य और समाज को समझने की दिशा में रुझान उत्पन्न करना।

पाठ्य विषय:-

इकाई 1. (क) पल्लवन, पत्राचार, अनुवाद (ख) एक टोकरी भर मिट्टी : माधवराव सप्रे बड़े भाई साहब : प्रेमचंद	अंक 15 18 कालखंड
इकाई 2. (क) संक्षेपण, हिंदी में संक्षिप्तिकरण, हिंदी-अपठित गद्यांश, पारिभाषिक शब्दावली, हिंदी में पदनाम, मुहावरे एवंलोकोक्तियाँ (ख) जागो फिर एक बार: सूर्यकांत त्रिपाठी 'निराला' जन्मदिन ('मिट्टी से कहूँगाधन्यवाद' संग्रह से):एकांत श्रीवास्तव	अंक 15 18 कालखंड
इकाई 3. (क) शब्द-शुद्धि, वाक्य-शुद्धि, शब्द-ज्ञान- पर्यायवाची शब्द, विलोम शब्द, अनेकार्थी-शब्द, समश्रुत शब्द, अनेक शब्दों के लिए एक शब्द (ख) भोलाराम का जीव : हरिशंकर परसाई जीप पर सवार इल्लियां: शरद जोशी	अंक 15 18 कालखंड
इकाई 4.(क) मानक भाषा का अर्थ, मानक हिंदी भाषाका अर्थ, स्वरूप,	अंक 15

23.02.2023 23/2/23 23/2/23 23/2/23 23.2.2023

विशेषताएँ, मानक, उपमानक, अमानक-भाषा (ख)शिकागो से स्वामी विवेकानंद का पत्र सत्य और अहिंसा : महात्मा गांधी	18 कालखंड
इकाई 5. (क) देवनागरी लिपि- नामकरण, स्वरूप, विशेषताएँ, कंप्यूटर का सामान्य परिचय, कंप्यूटर में हिंदी का अनुप्रयोग। (ख)कछुआ-धरम : चन्द्रधर शर्मा 'गुलेरी' छत्तीसगढ़ का वैभव: हीरालाल शुक्ल	अंक 15 18 कालखंड

मूल्यांकन योजना:-

प्रत्येक इकाई से एक-एक प्रश्न पूछे जाएंगे। एक प्रश्न के 15 अंक होंगे। प्रत्येक प्रश्न में आंतरिक विकल्प होगा। प्रत्येक प्रश्न के दो भाग 'क' और 'ख' होंगे एवं अंक क्रमश:08 एवं 07 होंगे। प्रश्नपत्र का पूर्णांक75 निर्धारित है।

प्रश्नपत्रकेपूर्णांककादसप्रतिशतअंकआंतरिकमूल्यांकनकेलिएनिर्धारितहै।

पाठ्यक्रम अधिगम परिणाम:-

इस पाठ्यक्रम को पूर्ण करने के पश्चात विद्यार्थी:-

1.हिंदी प्रयोजनात्मक तथा कार्यशील भाषा के प्रति सजग होंगे।

2.भाषा संबंधी संभावित अशुद्धियों एवं उनके परिष्कारसे परिचित होंगे तथा मानक भाषा का व्यवहार करने में सक्षम होंगे।

3.विद्यार्थियों के शब्द भंडार में वृद्धि होगी।

4.हिंदी साहित्य के पठन-पाठन के प्रति रुचि जागृत होगी एवं सामाजिक महत्व के विविध आयामों को समझने की दृष्टि विकसित होगी।

पाठ्यक्रम निर्माण का औचित्य:-

23/2/23

23.2.23

23/2/23

23.2.2023

BA/B.Sc./B.Com/B.Sc. Home.Sc. (Part-I)
Foundation Course Paper-II English Language

Max. Marks:75 Qualifying Marks:26
Total credits: 05

Paper-II	Mark's	Period's	Credit
Unit-I **Flamingo : A Textbook for college students** **Publication : Macmillan Publishers**	3x5=15	18	01
Unit -II • Writing Skill • Describing a place or a person. • Writing a Biographical Sketch • Narrating an event or experience	1x10=10	18	01
Unit -III Reading Comprehension • (a) Unseen Passage (Normal) • (b) Vocabulary (Text-based)	1x5=05 1xl0=10	18	01
Unit -III Reading Comprehension (a) Unseen Passage (Normal) (b) Vocabulary (Text-based)	1x5=5 1x5=5	09	0.5
Unit-V Grammar • Articles • Gerunds /Participles • Subject Verb Agreement • Use of Conjunctions • Tenses • Relatives • Possessives & self forms • Grammatical items given in Textbook 'Flaminso'	1x25=25	27	1.5
Total	75	90	05
Recommended Books- 1. Essential English Grammar, 2nd Edition by Raymond Murphy, Cambridge Publication 2. English Grammar in use 5th edition by Raymond Murphy, Cambridge Publication. 3. Advanced English Grammar by Martine Hewings Cambridge University Press.			

Dr. Suzhama Mishra

2/6/23

BA/B.Sc./B.Com/B.Sc. Home.Sc. (Part-I)
Foundation Course Paper-II English Language

Max. Marks:75
Total credits: 05

Qualifying Marks:26

Paper-II	Mark's	Period's	Credit
Unit-I **Flamingo : A Textbook for college students** **Publication : Macmillan Publishers**	3x5=15	18	01
Unit -II • Writing Skill • Describing a place or a person. • Writing a Biographical Sketch • Narrating an event or experience	1x10=10	18	01
Unit -III Reading Comprehension • (a) Unseen Passage (Normal) • (b) Vocabulary (Text-based)	1x5=05 1xl0=10	18	01
Unit -IV Letter Writing (a) Formal Letters (Business Letters/ Application/Press/ Official Letters) (b) Informal Letters (Relatives and friends)	1x5=5 1x5=5	09	0.5
Unit-V Grammar • Articles • Gerunds /Participles • Subject Verb Agreement • Use of Conjunctions • Tenses • Relatives • Possessives & self forms • Grammatical items given in Textbook 'Flaminso'	1x25=25	27	1.5
Total	75	90	05
Recommended Books- 1. Essential English Grammar, 2nd Edition by Raymond Murphy, Cambridge Publication 2. English Grammar in use 5th edition by Raymond Murphy, Cambridge Publication. 3. Advanced English Grammar by Martine Hewings Cambridge University Press.			

11/07/2023
(P.C. Choudhury)

Part A: Introduction				
Program: **Certificate Course**		Class: **B.Sc.**	Year: **First**	Session: **2022-2023**
1	Course Code	**PHY – 1T**		
2	Course Title	**MECHANICS**		
3	Course Type	**Theory**		
4	Pre-requisite (if any)	No		
5	Course Learning Outcomes (CLO)	**After completion of the course students will be able to:** • Get knowledge about the vectors and differential equations used in physics. • Get an idea of different types of motions and conservation laws. • Get an idea about rotational motion and various properties of matter like elasticity and viscosity. • Understand various types of oscillatory motion and GPS system. • Get an idea about Frame of reference and special theory of relativity. • Solve numerical problems based on entire syllabus.		
6	**Credit Value**	**Theory : 4**		
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course		
Total Periods: 60		
Unit	**Topic**	**Number of Periods**
I	**Vectors**: Vector algebra, Derivatives of a vector with respect to a parameter, Scalar and vector products of two, three and four vectors, Gradient, divergence and curl of vectors fields, Polar and Axial vectors. **Ordinary Differential Equations:** 1st order homogeneous differential equations, exact and non-exact differential equations, 2nd order homogeneous and nonhomogeneous differential equations with constant coefficients (Operator Method Only).	12
II	**Laws of Motion:** Review of Newton's Laws of motion. Dynamics of a system of particles, Concept of Centre of Mass, determination of center of mass for discrete and continuous systems having cylindrical and spherical symmetry. **Work and Energy:** Motion of rocket, Work-Energy theorem for conservative forces, Force as a gradient of Potential Energy, Conservation of momentum	12

	and energy, Elastic and in-elastic Collisions.	
III	**Rotational Dynamics:** Angular velocity, Angular momentum, Torque, Conservation of angular momentum, Moment of Inertia, Theorem of parallel and perpendicular axes (statements only), Calculation of Moment of Inertia of discrete and continuous objects (rod, disc, cylinder, solid sphere). **Elasticity:** Hooke's Law – Stress – strain diagram – Elastic moduli – Relation between elastic constants – Poisson's Ratio – Expression for Poisson's Ratio in terms of Elastic Constants – Work done in stretching and work done in twisting a wire – Twisting couple on a cylinder – Determination of Rigidity modules, Elementary idea of Surface tension and Viscosity, flow of fluids, coefficient of viscosity, Stoke's law, expression for terminal velocity, wetting.	12
IV	**Gravitation:** Newton's Law of Gravitation, Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant), Kepler's Laws (statements only), Satellite in circular orbit and applications, Geosynchronous orbits. **Oscillations:** Simple harmonic motion, Differential equation of SHM and its solutions, Kinetic and Potential Energy, Total Energy and their time averages, Compound pendulum, Differential equations of damped oscillations and forced oscillations (Conceptual only).	12
V	**Special Theory of Relativity:** Frame of reference, Galilean Transformations, Inertial and Non-inertial frames, Outcomes of Michelson Morley's Experiment, Postulates of Special Theory of Relativity, Length contraction, Time dilation, Relativistic transformation of velocity, Relativistic variation of mass, Mass-energy equivalence, Transformation of Energy and Momentum.	12

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Reference Books:

1. University Physics. FW Sears, MW Zemansky & HD Young 13/e, 1986.AddisonWesley
2. Mechanics Berkeley Physics course, v.1:Charles Kittel, et.al. 2007, Tata McGrawHill
3. Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley
4. Engineering Mechanics, Basudeb Bhattacharya, 2nd edn., 2015, Oxford University Press
5. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.

Link for e-Books for Physics:

1. *All e-books of physics* https://www.e-booksdirectory.com/listing.php?category=2
2. *Free physics text book in PDF* https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yy6xK1s0

Kma0VR0AWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE

3. *Cambridge University Books for Physics https://www.cambridgeindia.org/*
4. *Books for solving physics problems https://bookboon.com/en/physics-ebooks*

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50
Min Marks : 17
Continuous Comprehensive Evaluation (CCE): As per University Guideline
University Exam(UE): 50 Marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	As per University Guideline

DECLARATION

This is to certify that the syllabus is framed by the Central Board of studies (Physics) as per the guidelines (TOR) of The Department of Higher Education, Raipur, Chhattisgarh

01/ Dr.S.K.Gupta, Govt. E.R.R. P.G Science College, Bilaspur - Chairman

02/ Dr. Jagjeet Kaur Saluja, Govt. V Y T P.G. College, Durg - Member

03/ Dr.Meera Gupta, Govt. Dr. W.W.Patankar Girls P.G. College, Durg, - Member

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17/ Dr. Vikas Gulhare, Govt. G.N.A. P.G. College, Bhathapara - Member

Part A: Introduction				
Program: **Certificate Course**		Class: **B.Sc.**	Year: **First**	Session: **2022-2023**
1	Course Code	**PHY – 2T**		
2	Course Title	**ELECTRICITY AND MAGNETISM**		
3	Course Type	**Theory**		
4	Pre-requisite (if any)	No		
5	Course Learning Outcomes (CLO)	**After completion of the course students will be able to –** • Get knowledge about the vectors analysis and able to apply in electrostatic and Magnetostatics. • Get idea about electric fields, force and potential. • Get idea about Dielectric and Electric currents and also the application in AC circuits. • Get idea about Magnetic properties of material. • To get idea about Electromagnetic Induction and Maxwell's equation and Electromagnetic wave propagation. • Solve numerical problems based on entire syllabus.		
6	**Credit Value**	**Theory : 4**		
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course		
Total Periods: 60		
Unit	Topic	Number of Periods
I	**Vector Analysis**: Vector Integration, Line, surface and volume integrals of Vector fields, Gauss-divergence theorem and Stoke's theorem of vectors and its application in electrostatics and magnetostatics.	12
II	**Electrostatics:** Electrostatic Field, electric flux, Gauss's theorem of electrostatics, Applications of Gauss theorem- Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere, Calculation of electric field from potential, Capacitance of an isolated spherical conductor, Parallel plate, spherical and cylindrical condenser, Energy per unit volume in electrostatic field.	12

III	**Dielectric & Electric Currents:** Dielectric medium, Polarisation, Displacement vector, Gauss's theorem in dielectrics, Parallel plate capacitor completely filled with dielectric. Steady current, current density J, non – steady current an ontinuity equation, Kirchoff's law (statement only), Ideal constant – voltage and constant – current sources, Thevenin theorem, Norton theorem, Superposition theorem, Reciprocity theorem and maximum power transfer theorem, Rise and decay of current in LR, CR, LCR circuits.	12
IV	**Magnetism:** Magnetostatics: Biot-Savart's law and its applications- straight conductor, circular coil, solenoid carrying current, Divergence and curl of magnetic field, Magnetic vector potential, Ampere's circuital law, Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility, Brief introduction of dia, para and ferro-magnetic materials.	12
V	**Electromagnetic Induction:** Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils, Energy stored in magnetic field. **Maxwell`s equations and Electromagnetic wave propagation:** Equation of continuity of current, Displacement current, Maxwell's equations, Wave equation in free space.	12

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Reference Books:

1. Vector analysis – Schaum's Outline, M.R. Spiegel, S. Lipschutz, D. Spellman, 2nd Edn., 2009, McGraw- Hill Education.
2. Electricity and Magnetism, Edward M. Purcell, 1986, McGraw-Hill Education.
3. Electricity & Magnetism, J.H. Fewkes & J.Yarwood. Vol. I, 1991, Oxford Univ. Press
4. Electricity and Magnetism, D C Tayal, 1988, Himalaya Publishing House.
5. University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
6. D.J.Griffiths, Introduction to Electrodynamics, 3rd Edn, 1998, Benjamin Cummings.

Link for e-Books for Physics:

1. *All e-books of physics* https://www.e-booksdirectory.com/listing.php?category=2
2. *Free physics text book in PDF* https://www.motionmountain.net/?gclid=CjwKCAjwmq3kBRB_EiwAjkNDp5v8Yy6xK1s0Kma0VR0AWGlichRwFfCC0-vpZK1jrPoEOAnBq8fcqRoCILsQAvD_BwE
3. *Cambridge University Books for Physics* https://www.cambridgeindia.org/
4. *Books for solving physics problems* https://bookboon.com/en/physics-ebooks

Part D: **Assessment and Evaluation**		
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Min Marks: 17 Continuous Comprehensive Evaluation (CCE): As per University Guideline University Exam(UE): 50 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	As per University Guideline

DECLARATION

This is to certify that the syllabus is framed by the Central Board of studies (Physics) as per the guidelines (TOR) of The Department of Higher Education, Raipur, Chhattisgarh

01/ Dr.S.K.Gupta, Govt. E.R.R. P.G Science College, Bilaspur - Chairman

02/ Dr. Jagjeet Kaur Saluja, Govt. V Y T P.G. College, Durg - Member

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17/ Dr. Vikas Gulhare, Govt. G.N.A. P.G. College, Bhathapara - Member

Part A: Introduction				
Program: **Certificate Course**		Class: **B.Sc.**	Year: **First**	Session: **2022-2023**
1	Course Code	**PHY 1P**		
2	Course Title	**LAB 1: Mechanics, Electricity and Magnetism**		
3	Course Type	**Practical**		
4	Pre-requisite (if any)	NO		
5	Course Learning Outcomes (CLO)	**Expected Outcomes:** • To get knowledge about the use of various measuring instruments. • To get understanding about the simple harmonic motion, elasticity, surface tension and viscosity. • Students will be able to understand applications of basic principle of Electricity and Magnetism theory in real world.		
6	**Credit Value**	**Practical : 2**		
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course	
	Total Lectures: 30
Tentative Practical List	At least 14 experiments from the following: 1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope. 2. To study the random error in observations.

	3. To study the motion of the spring and calculate (a) Spring constant and, (b) g. 4. To determine the Moment of Inertia of a Flywheel. 5. To determine g and velocity for a freely falling body using Digital Timing Technique. 6. To determine Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method). 7. To determine the Young's Modulus of a Wire by Optical Lever Method. 8. To determine the Modulus of Rigidity of a Wire by Maxwell's needle. 9. To determine the elastic constants of a wire by Searle's method. 10. To determine the value of g using Bar Pendulum. 11.To determine the value of g using Kater's Pendulum. 12. To use a Multimeter for measuring (a) Resistances, (b) AC and DC Voltages, (c)DC Current, and (d) checking electrical fuses. 13. To compare capacitances using De'Sauty's bridge. 14. Measurement of field strength B and its variation in a Solenoid (DeterminedB/dx). 15. To study the Characteristics of a Series RC Circuit. 16.To study the ı series LCR circuit and determine its (a) Resonant Frequency, (b)Quality Factor. 17. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q. 18. To determine a Low Resistance by Carey Foster's Bridge. 19. To verify the Thevenin and Norton theorem. 20. To verify the Superposition, and Maximum Power Transfer Theorem.

Part C - Learning Resource
Text Books, Reference Books, Other Resources
Reference Books: 1. Advanced Practical Physics for students, B.L.Flint & H.T.Worsnop, 1971, Asia Publishing House. 2. Engineering Practical Physics, S.Panigrahi & B.Mallick,2015, Cengage Learning India Pvt. Ltd. 3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition, 2011, Kitab Mahal, New Delhi. **Link for e-Books for Physics:**

Physics Practical: https://www.uou.ac.in/sites//default/files/slm/BSCPH-104.pdf		
Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Continuous Comprehensive Evaluation (CCE): As per University Guideline University Exam(UE): 50 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	As per University Guideline

DECLARATION

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01/ Dr.S.K.Gupta, Govt. E.R.R. P.G Science College, Bilaspur -- Chairman

02/ Dr. Jagjeet Kaur Saluja, Govt. V Y T P.G. College, Durg -- Member

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17/ Dr. Vikas Gulhare, Govt. G.N.A. P.G. College, Bhathapara -- Member

Part A: Introduction				
Program: **Certificate Course**		Class: **B.Sc. I Year**	Year: **2022**	Session:**2022-23**
1.	Course Code	CHEM-1T		
2.	Course Title	Inorganic and Physical Chemistry		
3.	Course Type	Theory		
4.	Pre-requisite (if any)	To Study this course our students must have had the subject chemistry in class +2 or equivalent		
5.	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to learn the following aspects of Chemistry • To learn basic concept of atomic structure and the periodic properties of elements • To understand chemical bonding in ionic and covalent compounds • To study group trends for *s* and *p*-block elements in the periodic table • learn properties and bonding of compounds of the noble gases • Understand the metallurgical extraction of metals. • Basic concepts of Mathematics and Computer for Chemists. • Basics and mechanism of chemical kinetics and catalysis.		
6.	Credit Value	Theory: **4**		
7.	Total Marks	**Max. Marks: 50**	**Min. Passing Marks: 17**	

Part B: Content of the Course		
Total No. of Lecturers: **90**		
Unit	**Topics**	**No. of Lectures**
I	**Atomic structure :** Bohr's theory and its limitation, General idea of de-Broglie matter-waves, Heisenberg uncertainty principle, Schrödinger wave equation, significance of Ψ and Ψ^2, radial & angular wave functions and probability distribution curves, quantum numbers, Atomicorbital and shapes of *s*, *p*, *d* orbitals, Aufbau and Pauli exclusion principles, Hund's Multiplicity rule, electronic configuration of the elements. **Periodic properties:** Detailed discussion of the following periodic properties of the elements, with reference to *s*- and *p*- block. Trends in periodic table and applications in predicting and explaining the chemical behavior. a. Atomic and ionic radii, b. Ionization enthalpy, c. Electron gain enthalpy, d. Electronegativity, Pauling's, Mulliken's, Allred Rochow's scales. Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.	**15**
II	**Chemical bonding- I: Ionic bond:** Ionic Solids - Ionic structures, radius ratio & co-ordination number, limitation of radius ratio rule, lattice defects, semiconductors, lattice energy Born-Haber cycle, Solvation energy and solubility of ionic solids, polarizing power & polarizability of ions, Fajan's rule, Ionic character in covalent compounds: Bond moment and dipole	**15**

	moment, Percentage ionic character from dipole moment and electronegativity difference, Metallic bond-free electron and band theories.	
III	**Chemical bonding-II: Covalent bond**: Valence bond theory and its limitations, Concept of hybridization, equivalent and non-equivalent hybrid orbitals. Valence shell electron pair repulsion theory (VSEPR), shapes of the following simple molecules and ions containing lone pairs and bond pairs of electrons: H_2O, NH_3, PCl_3, H_3O^+, SF_4, ClF_3, ICl_2^-, XeF_2, XeF_4, XeF_6, $XeOF_2$, $XeOF_4$, Molecular orbital theory. Bond order and bond strength, Molecular orbital diagrams of diatomic and simple heteroatomic molecules N_2, O_2, F_2, CO, NO.	**15**
IV	**Chemistry of s- & p- block elements:** General concepts on group relationships and gradation properties, Comparative study, salient features of hydrides, solvation & complexation tendencies, General concepts on group relationships and gradation properties. Halides, hydrides, oxides and oxyacids of Boron, Aluminum, Nitrogen and Phosphorus. Boranes, borazines, fullerenes, graphene and silicates, interhalogens and pseudohalogens. Chemical properties of the noble gases. **Metallurgical extraction of Fe, Al and Cu :** Principle of extraction of metal, The occurrence, extraction & isolation of Fe, Al, and Cu	**15**
V	**Mathematical concepts for chemist**: Basic Mathematical Concepts: Logarithmic relations, curve sketching, linear graphs, Properties of straight line, slope and intercept, Functions, Differentiation of functions, maxima and minima; integrals; ordinary differential equations; vectors and matrices; determinants; Permutation and combination and probability theory, Significant figures and their applications. **Computer for chemists:** Introduction to computer, introduction to operating systems like DOS, Windows, Linux **Use of computer programs:** Running up standard programs & packages such as MS –Word, MS- Excel, Power Point. Execution of linear regression x-y plot, use of software for drawing structures and molecular formulae	**15**
VI	**Chemical kinetics :** Rate of reaction, Factors influencing rate of reaction, rate law, rate constant, Order and molecularity of reactions, rate determining step, Zero, First and Second order reactions, Rate and Rate Law, methods of determining order of reaction, Chain reactions. Temperature dependence of reaction rate, Arrhenius theory, Physical significance of Activation energy, collision theory, demerits of collision theory, non-mathematical concept of transition state theory. **Catalysis:** Homogeneous and Heterogeneous Catalysis, types of catalyst, characteristics of catalyst, Enzyme catalyzed reactions, Micellar catalyzed reactions, Industrial applications of catalysis.	**15**
Keywords: Atomic structure, Periodic properties, ionic bonding, covalent bonding, diagonal relationship, metallurgy, computer, memory, chemical kinetics, catalysis		

Part C : Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings :

1. Lee, J. D. Concise Inorganic Chemistry, Wiley, 5th Edition, 2008.
2. Douglas, B.; McDaniel, D. and Alexander J. Concepts & Models of Inorganic
3. Chemistry, Wiley, 3rd Edition, 2006
4. Atkins, P.W. & Paula, J. Physical Chemistry, 10th Ed., Oxford University Press, 2014.
5. Puri, B. R., Sharma, L. R. and Kalia, K. C., Principles of Inorganic Chemistry, Milestone Publishers/ Vishal Publishing Co.; 33rd Edition 2016
6. Madan, R. D. Modern Inorganic Chemistry, S Chand Publishing, 1987.

7. Rodger, G.E. Inorganic and Solid State Chemistry, Cengage Learning India Edition, 2002.
8. Pfennig, B. W. Principles of Inorganic Chemistry, Wiley, 2015.
9. Housecroft, C. E. and Sharpe, A. G. Inorganic Chemistry, Pearson, 4th Edition, 2012
10. Rajarammana, V.,Computers for beginners, PHI Learniong Private Publishers, New Delhi, 2021
11. Tebbutt, P., Basic mathematics for Chemists, IInd Edn. ELBS, 1999
12. Khera, H.C., Gurtu, J.N., Singh, J., Chemistry for B.Sc. Ist Year, Pragati Prakashan
13. Bariyar, A. & Goyal, S., B.Sc. Chemistry Combined (in Hindi), Krishna Educational Publishers Year 2019
14. Puri, B.R., Pathania, M.S., Sharama, L.R., Principles of Physical Chemistry, Vishal Publishing Company 2020
15. Gurtu, J.N., Gurtu, A., Advanced Physical Chemistry, Pragati Prakashan, Meerut, Edition IV, 2017
16. Atkins' Physical Chemistry, 10th Edition, Oxford University Press, 2014
17. Barrow, G.M., Physical Chemistry Tata McGraw-Hill, 2007
18. Ball, D.W., Physical Chemistry, Thomson Press, India, 2007
19. Castellan, G.W., Physical Chemistry, 4th Edition, Narosa, 2004
20. Mortimer, R.G., Physical Chemistry, 3rd Edition, Elsevier, Noida, UP, 2009
21. Levine, I.N., Physical Chemistry, 6th Edition, Tata McGraw-Hill, 2010
22. Metz, C.R., 2000 Solved Problems in Chemistry, Sahaun Series, 2006
23. Engel, T. and Reid, P., Physical Chemistry, 3rd Edition, Prentice Hall, 2012
24. Negi, A.S. & Anand, S.C., A Text Book of Physical Chemistry, 3rd Edition, New Age International Publication
25. Bajpai, D.N., Advanced Physical Chemistry, S. Chand, 2019
26. Bahal & Tuli, Essential of Physical Chemsitry, 2020

E- Learning Resources:

1. http://heecontent.upsdc.gov.in/Home.aspx
2. https://nptel.ac.in/courses/104/106/104106096/
3. http://heecontent.upsdc.gov.in/Home.aspx
4. https://nptel.ac.in/courses/104/106/104106096/
5. https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm
6. https://nptel.ac.in/courses/104/103/104103071/#

Fundamental Chemistry related topics on SWAYAM platform and E-pathshala

Part D: Assessment and Evaluation

Maximum Marks: 50

DECLARATION

This is to certify that the syllabus is framed by the Central Board of Studies (Chemistry) as per the guidelines (TOR) of the Department of Higher Education, Raipur Chhattisgarh.

1. Dr. Alka Shrivastav, Assistant Professor, Govt. E.V.P.G. College, Korba - Chairman
2. Smt. Priyanka Tiwari, Assistant Professor, Govt. J.P. Verma P.G. College, Bilaspur (C.G.) - Member

3. Mr. Vijay Kumar Lahare, - Member
Assistant Professor,
Govt. Lahiri P.G. College Chirimiri(C.G.)

4. Dr. Rajmani Patel, - Member
Assistant Professor,
Hemchand Yadav University, Durg (C.G.)

5. Dr. A.K. Singh, - Member
Professor,
Govt. V.Y.T. P.G. College Durg (C.G.)

6. Dr. P.K. Singh, - Member
Assistant Professor,
Govt. T.C.L. P.G. College Janjgir(C.G.)

7. Dr. P.K. Agnihotri, - Member
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9. Dr. Sandhya Patre, - Member
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Sant Shiromani Guru Ravidas Govt. College Sargaon,
Mungeli(C.G.)

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Govt. G.N.A. P.G. College Bhatapara, (C.G.)

11. Dr. Alka Shukla, - Member
Assistant Professor,
Mohan Lal Jain(Mohan Bhaiya) Govt. College Khursipar,
Bhilai(C.G.)

12. Dr. Arti Gupta, - Member
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13. Dr. Deepti Tikariha, - Member
Assistant Professor, APSGMNS Govt. P.G. College
Kawardha(C.G.)

14. Dr. Seema Negi, - Member
Assistant Professor, Govt. J.M.P. College, Takhatpur (C.G.)

15. Dr. Vikesh Kumar Jha, - Member
Assistant Professor, Govt. R.R.M. P.G. College Surajpur
(C.G.)

16. Dr. Ashish Tiwari, - Member
Assistant Professor,
Dr. Bhimrao Ambedkar Govt. College Pamgarh(C.G.)

17. Mr. Laxmi Chand Manwani, - Member
Assistant Professor,
Government Vivekand PG College Manendragarh(C.G.)

Part A: Introduction				
Program: **Certificate Course**		Class: **B.Sc. I Year**	Year: **2022**	Session:**2022-23**
1.	Course Code	CHEM-2T		
2.	Course Title	Organic and Physical Chemistry		
3.	Course Type	Theory		
4.	Pre-requisite (if any)	To Study this course our students must have had the subject chemistry in class +2 or equivalent		
5.	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to learn the following aspects of Chemistry • Understand the fundamentals of physical organic chemistry • Stereochemistry of carbon compounds • Chemistry of Alkenes and Alkynes • Chemistry of Alicyclic and aromatic Hydrocarbons • Understanding kinetic model of gases and its properties, Behavior of real gases, its derivation from ideal behavior, equation of state, isotherms and Law of corresponding states and molecular velocities. • Fundamental concepts of liquid state and colloids & surface chemistry. • Solids, Lattice parameters – its calculation, application of symmetry, solid characteristics of simple salts.		
6.	Credit Value	Theory: **4**		
7.	Total Marks	**Max. Marks: 50**		**Min. Passing Marks: 17**

Part B: Content of the Course		
Total No. of Lecturers: **90**		
Unit	**Topics**	**No. of Lectures**
I	**Basics of organic chemistry**: Influence of hybridization on bond properties (as applicable to ethane, ethene, and ethyne). Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbocations. Resonance or Mesomeric effect, application to (a) acidity of phenol, and (b) acidity of carboxylic acids. Hyper conjugation and its application to stability of carbocations, Free radicals and alkenes. Reactive intermediates: carbanions, carbenes, Nitrene, Basic concept of S_N1, S_N2, E1, E2, E1cb reactions and Neighboring group Participation (NGP). Electrophiles and Nucleophiles; Nucleophilicity and basicity.	**15**
II	**Introduction to stereochemistry:** Optical Isomerism: Optical Activity, Specific Rotation, Chirality/Asymmetry, Enantiomers, Molecules with two or more chiral-centres, Diastereoisomers, meso compounds, Relative and absolute configuration: Fischer, Newman and Sawhorse Projection formulae and their interconversions; Erythrose and threose, D/L, d/l system of nomenclature, Cahn-Ingold-Prelog system of nomenclature (C.I.P rules),	**15**

	R/S nomenclature. Geometrical isomerism: cis–trans, syn-anti and E/Z notations. Stereospecific and stereoselective synthesis. Asymmetric synthesis.	
III	**Acyclic hydrocarbons:** Alkenes - Preparation of alkenes. Properties: Addition of hydrogen - heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H_2O, (Oxymercuration-reduction and hydroboration -oxidation), HOX, H_2SO_4 with mechanism and addition of HBr in the presence of peroxide (anti - Markonikov's addition). Dienes - Types of dienes, reactions of conjugated dienes - 1,2 and 1,4 addition of HBr to 1,3 - butadiene and Diel's - Alder reaction. Alkynes: Preparation by dehydrohalogenation of dihalides, dehalogenation of tetrahalides, Properties; Acidity of acetylenic hydrogen (formation of Metal acetylides). Preparation of higher acetylenes, Metal ammonia reductions, Physical properties. Chemical reactivity - electrophilic addition of X_2, HX, H_2O (Tautomerism), Oxidation with $KMnO_4$, OsO_4, reduction and Polymerization, reaction of acetylene.	**15**
IV	**Alicyclic hydrocarbons (cycloalkanes):** Nomenclature, Preparation by Freunds method, Wislicenus method. Properties - reactivity of cyclopropane and cyclobutane by comparing with alkanes, Stability of cycloalkanes - Baeyer's strain theory, Sachse and Mohr predictions and Pitzer's strain theory. Conformational structures of cyclobutane, cyclopentane, cyclohexane. Confirmers: in substituted cyclohexane, decalins. **Aromatic hydrocarbons:** Aromaticity: Hückel's rule, aromatic character of arenes, cyclic carbocations/ carbanions and heterocyclic compounds with suitable examples. Electrophilic aromatic substitution: halogenation, nitration, sulphonation and Friedel-Craft's alkylation/acylation with their mechanism. Directive effects of the groups.	**15**
V	**Gaseous state chemistry:** Kinetic molecular model of a gas: postulates and derivation of the kinetic gas equation; collision frequency; collision diameter; mean free path; Maxwell distribution and its use in evaluating molecular velocities (average, root mean square and most probable) and average kinetic energy, law of equipartition of energy, degrees of freedom and molecular basis of heat capacities. Joule Thomson effect, Liquification of Gases. **Behavior of real gases:** Deviations from ideal gas behavior, compressibility factor (Z), and its variation with pressure and temperature for different gases. Causes of deviation from ideal behavior. Vander Waals equation of state, its derivation and application in explaining real gas behavior, calculation of Boyle temperature. Isotherms of real gases and their comparison with Vander Waals isotherms, continuity of states, critical state, relation between critical constants and Vander Waals constants, law of corresponding states.	**15**
VI	**Liquid state chemistry**: Intermolecular forces, magnitude of intermolecular force, structure of liquids, Properties of liquids, viscosity and surface tension. **Colloids and surface chemistry:** Classification, Optical, Kinetic and Electrical Properties of colloids, Coagulation, Hardy Schulze law, flocculation value, Protection, Gold number, Emulsion, micelles and types, Gel, Syneresis and thixotropy, Application of colloids. Physical adsorption, chemisorption, adsorption isotherms (Langmuir and Freundlich). Qualitative	**15**

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	discussion of BET. **Solid state chemistry:** Nature of the solid state, law of constancy of interfacial angles, law of rational indices, Miller indices, elementary ideas of symmetry, symmetry elements and symmetry operations, seven crystal systems and fourteen Bravais lattices; X-ray diffraction, Bragg's law, a simple account of rotating crystal method and powder pattern method. Crystal defects.	

Keywords: Electronic effect, Reactive intermediates, Stereochemistry, Alkenes, Alkynes, Cycloalkanes, Aromaticity, Gas, Liquid, Colloidal state and Solid

Part C: Learning Resource

Text Books, Reference Books, Other Resources

Suggested Readings :

1. Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd.(Pearson Education).
2. Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
3. Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education).
4. Eliel, E. L. &Wilen, S. H. Stereochemistry of Organic Compounds, Wiley: London, 1994.
5. Kalsi, P. S. Stereochemistry Conformation and Mechanism, New Age International, 2005.
6. McMurry, J.E. Fundamentals of Organic Chemistry, 7th Ed. Cengage Learning India Edition, 2013.
7. Bruice, P. Y. Organic Chemistry, 2nd Edition, Prentice-Hall, International Edition (1998).
8. Atkins' Physical Chemistry, 10th Edition, Oxford University Press, 2014
9. Barrow, G.M., Physical Chemistry Tata McGraw-Hill, 2007
10. Ball, D.W., Physical Chemistry, Thomson Press, India, 2007
11. Castellan, G.W., Physical Chemistry, 4th Edition, Narosa, 2004
12. Mortimer, R.G., Physical Chemistry, 3rd Edition, Elsevier, Noida, UP, 2009
13. Levine, I.N., Physical Chemistry, 6th Edition, Tata McGraw-Hill, 2010
14. Metz, C.R., 2000 Solved Problems in Chemistry, Sahaun Series, 2006
15. Negi, A.S. & Anand, S.C., A Text Book of Physical Chemistry, 3rd Edition, New Age International Publication
16. Bajpai, D.N., Advanced Physical Chemistry, S. Chand, 2019
17. Bahal & Tuli, Essential of Physical Chemistry, 2020

E- Learning Resources:

1. http://heecontent.upsdc.gov.in/Home.aspx
2. https://nptel.ac.in/courses/104/106/104106096/
3. http://heecontent.upsdc.gov.in/Home.aspx
4. https://nptel.ac.in/courses/104/106/104106096/
5. https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm
6. https://nptel.ac.in/courses/104/103/104103071/#

Fundamental Chemistry related topics on SWAYAM platform and E-pathshala

Part D: Assessment and Evaluation

Maximum Marks: 50

DECLARATION

This is to certify that the syllabus is framed by the Central Board of Studies (Chemistry) as per the

guidelines (TOR) of the Department of Higher Education, Raipur Chhattisgarh.

1. Dr. Alka Shrivastav, - Chairman
   Assistant Professor,
   Govt. E.V.P.G. College, Korba
2. Smt. Priyanka Tiwari, - Member
   Assistant Professor,
   Govt. J.P. Verma P.G. College, Bilaspur
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   Assistant Professor,
   Govt. Lahiri P.G. College Chirimiri(C.G.)
4. Dr.Rajmani Patel, - Member
   Assistant Professor,
   Hemchand Yadav University, Durg
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   Professor,
   Govt. V.Y.T. P.G. College Durg
6. Dr. P.K. Singh, - Member
   Assistant Professor,
   Govt. T.C.L. P.G. College Janjgir(C.G.)
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   Professor,
   Govt. Yuganandam Chhattisgarh College Raipur(C.G.)
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   Assistant Professor,
   Sant Shiromani Guru Ravidas Govt. College Sargaon,
   Mungeli(C.G.)
10. Mrs. Mousami Lahare, - Member
    Assistant Professor,
    Govt. G.N.A. P.G. College
11. Dr. Alka Shukla, - Member
    Assistant Professor,
    Mohan Lal Jain(Mohan Bhaiya) Govt. College Khursipar,
    Bhilai(C.G.)
12. Dr. Arti Gupta, - Member
    Professor, Govt. Dr. W.W.P. Girlas P.G. College Durg (C.G.)
13. Dr. Deepti Tikariha, - Member
    Assistant Professor, APSGMNS Govt. P.G. College
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14. Dr. Seema Negi, - Member
    Assistant Professor, Govt. J.M.P. College, Takhatpur (C.G.)
15. Dr. Vikesh Kumar Jha, - Member
    Assistant Professor, Govt. R.R.M. P.G. College Surajpur
    (C.G.)
16. Dr. Ashish Tiwari, - Member
    Assistant Professor,
    Dr. Bhimrao Ambedkar Govt. College Pamgarh(C.G.)
17. Mr. Laxmi Chand Manwani, - Member
    Assistant Professor,
    Government Vivekand PG College Manedragarh(C.G.)

Part A: Introduction				
Program: **Certificate Course**		Class: **B.Sc. I Year**	Year: **2022**	Session:**2022-23**
1.	Course Code	CHEM-1P		
2.	Course Title	Lab. 1		
3.	Course Type	Practical		
4.	Pre-requisite (if any)	To Study this course our students must have had the subject chemistry in class +2 or equivalent		
5.	Course Learning. Outcomes (CLO)	At the end of this course, the students will be able to learn the following aspects of Chemistry • To analyse the given mixture for anions (acid radicals) and cations (basic radicals). • Titrations • Qualitative Analysis • Surface tension measurements. • Viscosity measurement • Chemical Kinetics		
6.	Credit Value	Practical: **2**		
7.	Total Marks	**Max. Marks: 50**	**Min Passing Marks: 17**	

Part B: Content of the Course		
Total No. of Lecturers: **30**		
LABATORY COURSE		**No. of Lectures**
Tentative list of Practical	**A. Inorganic chemistry** Semi-micro qualitative analysis (using H_2S or other methods) of mixtures - not more than four ionic species (two anions and two cations, excluding interfering, insoluble salts) out of the following: **Cations :** NH_4^+, Pb^{2+}, Bi^{3+}, Cu^{2+}, Cd^{2+}, Fe^{3+}, Al^{3+}, Co^{2+}, Ni^{2+}, Mn^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Na^+ **Anions :** CO_3^{2-}, S^{2-}, SO_3^{2-}, NO_2^-, CH_3COO^-, Cl^-, Br^-, I^-, NO_3^-, SO_4^{2-} (Spot tests may be carried out wherever feasible) **B. Acid-Base Titrations** • Standardization of sodium hydroxide by oxalic acid solution. • Determination of strength of HCl solution using sodium hydroxide as intermediate. • Estimation of carbonate and hydroxide present together in mixture. • Estimation of carbonate and bicarbonate present together in a mixture. • Estimation of free alkali present in different soaps/detergents	**10**

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	C. Redox Titrations • Standardization of $KMnO_4$ by oxalic acid solution. • Estimation of Fe(II) using standardized $KMnO_4$ solution. • Estimation of oxalic acid and sodium oxalate in a given mixture. •Estimation of Fe(II) with $K_2Cr_2O_7$ using internal (diphenylamine, anthranilic acid) and external indicator.	
	Organic chemistry 1. Demonstration of laboratory Glassware's and Equipments. 2. Calibration of the thermometer. 80^o –82^o (Naphthalene), 113.5^o – 114^o (Acetanilide), 132.5^o -133^o (Urea), 100^o (Distilled Water).) 3. Purification of organic compounds by crystallization using different solvents. Phthalic acid from hot water (using fluted filter paper and stemless funnel). Acetanilide from boiling water. Naphthalene from ethanol. Benzoic acid from water. 4. Determination of the melting points of organic compounds. Naphthalene 80^o –82^o , Benzoic acid 121.5^o –122^o , Urea 132.5^o –133^o Succinic acid 184.5^o – 185^o , Cinnamic acid 132.5^o –133^o , Salicylic acid 157.5^o –158^o, Acetanilide 113.5^o –114^o , m-Dinitrobenzene 90^o , p-Dichlorobenzene 52^o , Aspirin 135^o . 5. Effect of impurities on the melting point – mixed melting point of two unknown organic compounds. Urea–Cinnamic acid mixture of various compositions (1:4, 1:1, 4:1). 6. Determination of boiling point of liquid compounds. (boiling point lower than and more than 100°C by distillation and capillary method). Ethanol 78^o, Cyclohexane 81.4^o, Toluene 110.6^o, Benzene 80^o. i. Distillation (Demonstration) Simple distillation of ethanol-water mixture using water condenser. Distillation of nitrobenzene and aniline using air condenser. ii. Sublimation Camphor, Naphthalene, Phthalic acid and Succinic acid. iii. Decolorisation and crystallization using charcoal. Decolorisation of brown sugar with animal charcoal using gravity filtrations crystallization and decolorisation of impure naphthalene (100 g of naphthalene mixed with 0.3 g of Congo red using 1 g of decolorizing carbon) from ethanol. 7. Qualitative Analysis Detection of elements (N, S and halogens) and functional groups (Phenolic, Carboxylic, Carbonyl, Esters, Carbohydrates, Amines, Amides, Nitro and Anilide) in simple organic compounds. 8. Preparation and characterization of biodiesel from vegetable oil. 9. Preparation of soap.	**10**
	Physical chemistry 1. Surface tension measurements. Determine the surface tension by (i) drop number (ii) drop weight method. • Surface tension composition curve for a binary liquid mixture. 2. Viscosity measurement using Ostwald's viscometer. Determination of viscosity of aqueous solutions of (i) sugar (ii) ethanol at room temperature. Study of the variation of viscosity of sucrose solution with the concentration of solute. Viscosity Composition curve for a binary liquid mixture.	**10**

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	3. Chemical Kinetics To determine the specific rate of hydrolysis of methyl/ethyl acetate catalysed by hydrogen ions at room temperature. To study the effect of acid strength on the hydrolysis of an ester. To compare the strengths of HCl & H_2SO_4 by studying the kinetics of hydrolysis of ethyl acetate. 4. Colloids To prepare colloidal solution of silver nanoparticles (reduction method) and other metal nanoparticles using capping agents.	

Keywords: Semi-micro qualitative analysis, Qualitative analysis, Titrations, Chemical Kinetics, Colloids, Viscosity, Surface tension, Decolorization and crystallization, Distillation, Sublimation, Soap, biodiesel.

Part C: Learning Resource

Text Books, Reference Books, Other Resources

Suggested Readings :

1. Mendham, J., A. I. Vogel's Quantitative Chemical Analysis 6th Ed., Pearson, 2009.
2. Ahluwalia, V. K., Dhingra, S. and Gulati, A. College practical Chemistry, University Press.
3. Mann, F.G. & Saunders, B.C. Practical Organic Chemistry, Pearson Education (2009).
4. Furniss, B.S.; Hannaford, A.J.; Smith, P.W.G.; Tatchell, A.R. Practical Organic Chemistry, 5th Ed., Pearson (2012)
5. Khosla, B. D.; Garg, V. C. & Gulati, A. Senior Practical Physical Chemistry, R. Chand & Co.: New Delhi (2011).
6. Garland, C. W.; Nibler, J. W. & Shoemaker, D. P. Experiments in Physical Chemistry 8th Ed.; McGraw-Hill: New York (2003).
7. Halpern, A. M. & McBane, G. C. Experimental Physical Chemistry 3rd Ed.; W.H. Freeman & Co.: New York (2003).

Sidhwani, I.T., Saini, G., Chowdhury, S., Garg, D., Malovika, Garg, N. Wealth from waste: 8.A green method to produce biodiesel from waste cooking oil and generation of useful products from waste further generated "A Social Awareness Project", Delhi University Journal of Undergraduate Research and Innovation.

9.Carpenter, William Lant; Leask, Henry (1895). A treatise on the manufacture of soap and candles, lubricants and glycerin. Free ebook at Google Books.

E- Learning Resources:

1. http://heecontent.upsdc.gov.in/Home.aspx
2. https://nptel.ac.in/courses/104/106/104106096/
3. http://heecontent.upsdc.gov.in/Home.aspx
4. https://nptel.ac.in/courses/104/106/104106096/
5. https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm
6. https://nptel.ac.in/courses/104/103/104103071/#

Fundamental Chemistry related topics on SWAYAM platform and E-pathshala

Part D: Assessment and Evaluation

Maximum Marks: 50

PRACTICAL EXAMINATION B. Sc. – I	05 Hrs. M.M. 50
Three experiments are to be performed	
1. Inorganic Mixture Analysis, four radicals two basic & two acid (excluding insoluble, Interfering & combination of acid radicals) **OR** Two Titrations (Acid Bases, Redox and Iodo/Iodiometry/Complexometric titration)	**12 marks**
2. Detection of functional group in the given organic compound and determine its MPt/BPt. **OR** Crystallization of any one compound as given in the prospectus along with the determination of mixed MPt. **OR** Decolorisation of brown sugar along with sublimation of camphor/ Naphthlene.	**8 marks** **14 marks**
3. Any one physical experiment that can be completed in two hours including calculations.	**10 marks**
4. Viva	**06 marks**
5. Sessionals	
In case of Ex-Students two marks will be added to each of the experiments	

DECLARATION

This is to certify that the syllabus is framed by the Central Board of Studies (Chemistry) as per the guidelines (TOR) of the Department of Higher Education, Raipur Chhattisgarh.

1. Dr. Alka Shrivastav, - Chairman
   Assistant Professor,
   Govt. E.V.P.G. College, Korba
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   Govt. Yuganandam Chhattisgarh College Raipur(C.G.)
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Assistant Professor,
Govt. G.N.A. P.G. College

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Assistant Professor,
Government Vivekand PG College Manedragarh(C.G.)

Part A: Introduction				
Program: Certificate Course		Class: B. A. / B.Sc. Part I	Year: 2022	Session:2022-2023
1	Course Code	Paper – MATH- 1T		
2	Course Title	Calculus		
3	Course Type	Theory		
4	Pre-requisite (if any)	No		
5	Course Learning Outcome (CLO)	**This Course will enable the students to:** • Calculate the limit and examine the continuity and understand the geometrical interpretation of differentiability. • Understand the consequences of various mean value theorems. • Draw curves in cartesian and polar coordinate systems. • Understand conceptual variations while advancing from one variable to severalvariables in calculus. • Inter-relationship amongst the line integral, double and triple integral formulations. • Realize importance of Green, Gauss and Stokes' theorems in other branches ofmathematics.		
6	Credit Value	4		
7	Total Marks	Maximum Marks : 50	Minimum Passing Marks : …..	

Part B: Content of the Course Total Periods: 60		
Unit	Topics	No. of Periods
I	**Sequences, Continuity and Differentiability:** Notion of convergence of sequences and series of real numbers, ε-δ definition of limit and continuity of a real valued function; Differentiability and its geometrical interpretation; Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem and their geometrical interpretations, Darboux's theorem.	12
II	**Expansion of Functions:** Successive differentiation and Leibnitz theorem, Maclaurin's and Taylor's theorems for expansion of a function, Taylor's theorem in finite form with Lagrange, Cauchy and Roche–Schlömilch forms of remainder.	12
III	**Curvature, Asymptotes and Curve Tracing:** Curvature; Asymptotes of general algebraic curves, parallel asymptotes, Asymptotes parallel to axes; symmetry, concavity and convexity, points of inflexion, Tangents at origin, Multiple points, Position and nature of double points; Tracing of	12

	cartesian, polar and parametric curves; Envelopes and Evolutes.	
IV	**Functions of Several Variables:** Limit, continuity and first order partial derivatives, Higher order partial derivatives, Change of variables, Euler's theorem for homogeneous functions, Taylor's theorem, Total differentiation and Jacobians.	12
V	**Double and Triple Integrals:** Double integration over rectangular and non-rectangular regions, Double integrals in polar co-ordinates, Triple integral over a parallelepiped and solid regions, Volume by triple integrals, Line integrals, Green's theorem, Area as a line integral, Surface integrals, Stokes' theorem, The Gauss divergence theorem.	12

Part C - Learning Resource

Text Books and Reference Books:

1. Howard Anton, I. Bivens & Stephan Davis. Calculus (10th edition). Wiley India. 2016
2. Gabriel Klambauer. Aspects of Calculus. Springer-Verlag. 1986
3. Wieslaw Krawcewicz & Bindhyachal Rai. Calculus with Maple Labs. Narosa. 2003
4. Gorakh Prasad Differential Calculus (19th edition). Pothishala Pvt. Ltd. 2016
5. George B. Thomas Jr., Joel Hass, Christopher Heil & Maurice D. Weir. Thomas' Calculus (14th edition). Pearson Education 2018
6. Jerrold Marsden, Anthony J. Tromba & Alan Weinstein. Basic Multivariable Calculus, Springer India Pvt. Limited.2009
7. James Stewart. Multivariable Calculus (7th edition). Brooks/Cole. Cengage 2012.
8. Monty J. Strauss, Gerald L. Bradley & Karl J. Smith. Calculus (3rd edition). Pearson Education. Dorling Kindersley (India) Pvt. Ltd. 2011

E- Resources :

1. Suggested Equivalent **online courses:** Web link NPTEL/ SWAYAM/ MOOCs
2. https://www.youtube.com/watch?v=tffrrtzUhmw&list=PL7oBzLzHZ1wXBSiJEgqz_iwVoLiY8qhbv
3. https://www.youtube.com/watch?v=XzaeYnZdK5o&list=PLtKWB-wrvn4nA2h8TFxzWL2zy8O9th_fy
4. https://www.youtube.com/watch?v=zxbHsPB8m-M&list=PLBCEh9iawVM75FaeqS-z7olBKTSLfAC4A

Part D: Assessment and Evaluation	
Suggested Continuous Evaluation Methods: Maximum Marks:	50 Marks

Declaration

This is to certify that the syllabus is framed by the Central Board of Studies (Mathematics) as per the guidelines (TOR) of the Department of Higher Education, Raipur Chhattisgarh.

1. Dr. Premlata Verma
   Asst. Prof.
   Govt. Bilasa Girls PG College, Bilaspur - Chairman
2. Prof. R.R. Sahu
   Asst. Prof.
   Govt. MMR PG College, Champa - Member
3. Mr. Yetendra Upadhyay
   Asst. Prof.
   Govt. N.K. College, Kota - Member
4. Ram Lakhan Pandey
   Asst. Prof.
   Dr. B.R. Ambedkar Govt. College, Baloda - Member
5. Dr. Arun Kumar Mishra
   Professor
   Govt. DT PG College, Utai - Member
6. Dr. Shabnam Khan
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   Govt. Digvijay PG College, Rajnandgaon - Member
7. Dr. Padmavati
   Professor
   Govt. VYT PG Auto. College, Durg - Member
8. Dr. Anjali Chandravanshi
   Asst. Prof.
   Govt. J.Y. Chhattisgarh College, Raipur - Member
9. Manisha Gupta
   Asst. Prof.
   GNA Govt. PG College, Bhatapara, Raipur - Member
10. Mrs. Sangeeta Pandey
    Asst. Prof.
    R.G. Govt. PG College, Ambikapur - Member
11. Dr. S.K. Bohre
    Asst. Prof.
    I.G. Govt. PG College, Vaishalinagar, Bhilai - Member
12. Dr. Samir Dashputre

Asst. Prof.
Govt. College, Arjunda, Balod

13. Dr. Chandrajeet Singh Rathore - Member
Asst. Prof.
Govt. Jajwalyadev Naveen Girls PG College, Janjgir

14. Dr. Shri Nath Gupta - Member
K. Govt. Arts & Science College, Raigarh

15. Dr. Raghu Nandan Patel - Member
Asst. Prof.
Govt. MLS College, Seepat

Part A: Introduction				
Program: Certificate Course		Class: B. A. / B.Sc. Part I	Year: 2022	Session:2022-2023
1	Course Code	Paper – MATH-2T		
2	Course Title	Algebra		
3	Course Type	Theory		
4	Pre-requisite (if any)	No		
5	Course Learning Outcome (CLO)	**This Course will enable the students to:** • Employ De Moivre's theorem in a number of applications to solve numerical problems. • Learn about the fundamental concepts of groups, subgroups, normal subgroups, isomorphism theorems, cyclic and permutation groups. • Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix, using rank. • Find eigen values and corresponding eigen vectors for a square matrix. • Understand real vector spaces, subspaces, basis, dimension and their properties.		
6	Credit Value	4		
7	Total Marks	Maximum Marks : 50	Minimum Passing Marks :	

Part B: Content of the Course Total Periods: 60		
Unit	Topics	No. of Periods
I	**Set Theory and Theory of Equations:** Sets, Relations, Equivalence relations, Equivalence classes; Finite, countable and uncountable sets; The division algorithm, Divisibility and the Euclidean algorithm, Modular arithmetic and basic properties of congruence's; Elementary theorems on the roots of polynomial equations, Imaginary roots, The fundamental theorem of algebra (statement only); The n^{th} roots of unity, De Moivre's theorem for integer and rational indices and its applications.	12
II	**Groups, Subgroups, Normal Subgroups and Isomorphism Theorems :** Definition and properties of a group, Abelian groups, Examples of groups including D_n (dihedral groups), Q_8	12

	(quarternian group), $GL(n, \mathbb{R})$ (general linear groups) and $SL(n, \mathbb{R})$ (special linear groups); Subgroups and examples, Cosets and their properties, Lagrange's theorem and its applications, Normal subgroups and their properties, Simple groups, Factors groups; Group homomorphisms and isomorphisms with properties; First, second and third isomorphism theorems for groups.	
III	**Cyclic and Permutation Groups:** Cyclic groups and properties, Classifications of subgroup of cyclic groups, Cauchy theorem for finite abelian groups; Centralizer, Normalizer, Center of a group, Product of two subgroups, Permutation group and properties, Even and odd permutations, Cayley's theorem.	12
IV	**Row Echelon Form of Matrices and Applications:** Systems of linear equations, Row reduction and echelon forms, The rank of a matrix and its applications in solving system of linear equations; Matrix operations, Symmetric, skew- symmetric, self-adjoint, orthogonal, Hermition, skew-Hermition and unitary matrices; Determinant of a square matrix, The inverse of a square matrix, Eigen vectors and eigen values, The characteristic equation and the Cayley□Hamilton theorem, Applications of matrices to computer graphics and search engines.	12
V	**Vector Spaces and Linear Transformations:** Definitions of field and vector space with examples, Subspaces, Linear span, Quotient space and direct sum, Linearly independent and dependent sets, Bases and dimension, Linear transformation and matrix of a linear transformation, Change of coordinates, Rank and nullity of linear transformation, Rank-nullity theorem.	12

Part C - Learning Resource

Text Books and Reference Books

1. Michael Artin *Algebra* (2nd edition). Pearson 2014.
2. John B. Fraleigh. *A First Course in Abstract Algebra* (7th edition). Pearson 2007.
3. Stephen H. Friedberg, Arnold J.Insel& Lawrence E. Spence. *Linear Algebra* (4thedition). Prentice-Hall of India Pvt. Ltd. 2003
4. Joseph A. Gallian. *Contemporary Abstract Algebra* (9th edition). Cengage. 2017
5. Kenneth Hoffman & Ray Kunze. *Linear Algebra* (2nd edition). Prentice-Hall. 2015

6. I. N. Herstein. *Topics in Algebra* (2nd edition). Wiley India. 2006
7. Nathan Jacobson. *Basic Algebra* I (2nd edition). Dover Publications. 2009
8. Ramji Lal. *Algebra 1: Groups, Rings, Fields and Arithmetic*. Springer. 2017
9. I.S. Luthar & I.B.S. Passi. *Algebra: Volume 1: Groups*. Narosa. 2013

E- Resources

1. Suggested Equivalent **online courses:** Web link NPTEL/ SWAYAM/ MOOCs
2. Linear Algebra
   https://www.youtube.com/watch?v=9h_Q-R6sXbM&list=PL7oBzLzHZ1wXQvQ938Wg1-soq09GywgOw
3. Group theory
   https://www.youtube.com/watch?v=pMzcLG6s3z0&list=PLEAYkSg4uSQ1Yhxu2U-BxtRjZElrfVVcO

Part D: Assessment and Evaluation	
Suggested Continuous Evaluation Methods: Maximum Marks:	50 Marks

Declaration

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Part A: Introduction				
Program: **Certificate Course**		Class: **B.A./ B.Sc. I Year**	Year: **2022**	Session: **2022-2023**
1	Course Code	**MATH-1P (I)**		
2	Course Title	I - Lab 01 - Calculus and Algebra		
3	Course Type	**Practical**		
4	Pre-requisite (if any)	No		
5	Course Learning Outcomes (CLO)	At the end of course, Students will be able to • Learn Free and Open Source Software (FOSS) tools for computer programming • Solve problems on Calculus and Algebra theories studied in Mathematics Paper 1and 2 by using FOSS softwares. • Acquire knowledge of applications of Calculus and Algebra through FOSS.		
6	**Credit Value**	**2**		
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course	
	Total Periods: 30
Tentative Practical List	Mathematics practical with Free and Open Source Software (FOSS) tools forcomputer programs, such as GeoGebra/Maxima/Scilab/ Octave /Python/R. **Course Objectives:** • To learn Free and Open Source Software (FOSS) tools for computerprogramming • Acquire knowledge of applications of algebra and calculus through FOSS **List of Practicals**: (At least 15 practicals) • Programs to illustrate left hand and right hand limits for discontinuous functions. • Program to illustrate continuity of a function • Program to illustrate differentiability of a function • Program to verify Rolle's theorem • Program to verify Lagrange's theorem • Programs to verify Cauchy's mean value theorem and finding Taylor's theorem for a given function. • Program to illustrate nth derivative without Leibnitz rule.

	• Program to construct series using Maclaurin's expansion for functions of two variables. • Program to finding the asymptotes of curves. • Program to finding radius of curvature of cycloid. • Program to finding partial derivative of a given function. • Program to calculating the area under two curves. • Obtaining partial derivatives of some standard functions. • Evaluation of the line integral with constant limits. • Evaluation of the line integral with variable limits. • Evaluation of the double integral with constant limits. • Evaluation of the double integral with variable limits. • Evaluation of the triple integral with constant limits. • Evaluation of the triple integral with variable limits. • Programs for area and volume. • Verifying whether given operator is binary or not • To find identity element of a group • To find inverse element of a group. • To construct Cayley's table • Verification of a subgroup of a given subset of a group • Finding all possible subgroups of a finite group. • Examples to verify Lagrange's theorem. • To find the left and right cosets and index of a subgroup • To find all the cyclic subgroups of a given group • Verification of normality of a given subgroup of a group • Illustrating homomorphism and isomorphism of groups • Examples on different types of rings.

	• Examples on integral domains and fields. • Examples on subrings, ideals and subrings which are not ideals. • Homomorphism and isomorphism of rings- illustrative examples. • Solving polynomial equations. • Finding G.C.D of polynomials. • Finding product of two matrices • To test linear independency of a given set of a vectors in a vector space.

Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
SUPPORT FROM THE GOVT FOR STUDENTS AND TEACHERS IN UNDERSTANDING AND LEARNING FOSS TOOLS: As a national level initiative towards learning FOSS tools, IIT Bombay for MHRD, government of India is giving free training to teachers interested in learning open source software's like scilab, maxima, octave, geogebra and others. (Website: http://spoken-tutorial.org;) (email: info@spokentutorial.org; contact@spoken-tutorial.org)		
Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Continuous Comprehensive Evaluation (CCE): Not Applicable University Exam(UE): 50 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable

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- Member

Part A: Introduction				
Program: **Certificate Course**		Class: **B.A./B.Sc. I Year**	Year: **2022**	Session: **2022-2023**
1	Course Code	**MATH-1P (II)**		
2	Course Title	II - Project 01 - History of Mathematician		
3	Course Type	**Project**		
4	Pre-requisite (if any)	NIL		
5	Course Learning Outcomes (CLO)	Studying history of mathematicians help students: • Develop a deeper understanding of the mathematics they hare already studied by seeing how it was developed over time and in various places. • Know the rich intellectual heritage of the country. • Develop an appreciation of mathematics and build positive attitude towards mathematics increasing student's motivation decreasing anxiety related the subject. • To acquire knowledge about development of mathematics in ancient , medieval and modern period of history.		
6	**Credit Value**	**2**		
7	**Total Marks**	**Max. Marks: 50**	**Min Passing Marks : 17**	

Part B: Content of the Course	
	Total Periods: 30
Project List	**Course Objectives:** An elective course designed to acquire special / advance knowledge, such as supplement study / support study to a project work and a candidate will study such a course on his own with an advisory support a teacher / faculty member. **Project** Contributions and biographies of Indian Mathematicians- Bodhayan, Apasthambh, Katyayan and Mahaveeracharya, Brahmagupta, and Bhaskaracharya in special context of Leelavati and contributions of mathematicians involved in context of the paper of calculus and algebra. (10 Mathematicians)

Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: 50 Continuous Comprehensive Evaluation (CCE): Not Applicable University Exam(UE): 50 Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test/Assignment/Presentation	Not Applicable

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B.Ed. SYLLABUS:

PART-A INTRODUCTION			
PROGRAM:B.ED. SYLLABUS	CLASS: (SEMESTER I)	YEAR: 2022	SESSION: 2022-24
SUBJECT:	PHILOSOPHICAL PERSPECTIVE OF EDUCATION		

1.	PROGRAM CODE	0801	
2.	COURSE CODE	BED. 101	
3.	COURSE TITLE	B.Ed. SEMESTER I	
4.	COURSE LEARNING OUTCOME	• To help students discover and appreciate their unique vocation in society. • To create a learning environment which integrates theory and practice • To nurture, in particular, the values of peace, justice, equality and fraternity. • To enable students to understand and cater to the needs of a diverse student population. • To encourage students to become catalysts of social transformation • To revitalise education through collaboration with different organisations and universities • To provide prospective teachers with a stimulating and catalytic environment that is both futuristic in outlook and holistic in perspective for the achievement of excellence. • To provide theoretical knowledge interwoven with a repertoire of pedagogical practices, hands-on teaching experience and the inclusion of technology as a teaching and learning tool.	
5.	CREDIT VALUE	4	
6.	TOTAL MARKS	MAXIMUM MARKS: 100	INTERNAL : 20
			EXTERNAL: 80

PART B- CONTENT OF COURSE		
UNIT	TOPICS	NUMBER OF LECTURES
UNIT-I AIMS OF EDUCATION	• Education Nature and Meaning its objectives/aims in relation to the time and place. • Educational aims in the Western context: with specific reference to Russell , Dewey. Their impact on education although and class room practices, interm of progressive trends in education. • Educational aims in the Indian context with specific reference to Indian thinkers such as Gandhi, Tagore. • Philosophy and Education: Significance of studying philosophy in understanding educational practices and problem.	8

UNIT II PHILOSOPHICAL SYSTEMS	" Major Philosophical systems - their salient features and their impact on education. • **Realism** with reference to Aristotle and Jainism. • **Naturalism** with reference to the view! Of Rousseau and Rabindra Nath Tagore. • **Idealism** with reference to Plato, Socretes and Advaita Philosophy. • **Pragmatism** with reference to Dewey" instrumentalism & Experimentalism" • **Humanism**: Historical, Scientific and Buddhists. • **Constructivism**: Teaching, Method & Role of teacher.	10
UNIT-III INDIAN THINKERS	Educational thinkers and their contribution in developing principles of education. M.K.Gandhi : Wardha Shikshan /Education and Life Education. Gijju Bhai: The world of the child. Swami Vivekananda: Man making education. J.Krishna Murthy; Child Centered Education. Dr. A P J Abdul Kalam: Technology Enhanced Education.	8
UNIT-IV WESTERN THINKERS	• John Heinrich Pestalozzi: • Friedrich Frobel: • John Locke (Classical Liberalism) • Paulo Friere (Democratic Education) • Bertrand Russell:	8
UNIT-V CONTEMPORARY THOUGHT	• Critical and comparative study of the period and socio-political perspective of the western and Indian Thinkers. • Contemporary philosophical perspectives of Education; Modernization, globalization in thought and education	6

PART C: LEARNING RESOURCES (BOOKS RECOMMENDED)		
AUTHOR	TITLE	PUBLISHER
AnandC.L.et.al.	: Teacher and Education in EmergingIndia,	NCERT, New Delhi.
Anant Padmnabhan	: Population Education in Classrooms,	NCERT,NewDelhi.
Bhatnagar,S.:	Adhunik Bhartiya Shiksha Aur Uski Samasyayen,.	LyallBookDepot,Meerut
ChakravortyM.	: GandhianDimension in Education.	Daya Publishing House New Delhi
KalamAbdul, A.P.J. (1998).	India 2020-A Vision for the New Millenium,	Penguin Bools India Ltd.
Ministryof HumanResourceDevelopment	:National Policy on Education,1896, NewDelhi.	Sterling Publication,NewDelhi.
MohantyJagannath:	Indian Education inEmergingSociety,	
ManiR.S	.:Educational ideas and ide als of Gandhiand Tagore,	NewBookSociety,NewDelhi.
Pathak and Tyagi :	ShikshakeSamnyaSiddhant,	VinodPustakMandir,Agra.
Pandey,Shyam Swaroop	:Shikshaki Darshanik evam Samajik Shastriya PurshtBcomi.	VinodPustakMandir,Agra
Sharma, K. Yogendra	The Doctrines of the Great Western Educators (From Plato to Bertrand Russell)	Kanishka Publication, New Delhi.
Dr.VikrantMishra ,	The Educational Thoughts of APJ Abdul Kalam	(http//www.educationindiajournal.org

SUGGESTED DIGITAL PLATFORM	
	N List National library & Information Service (subscribe) (Shodh Sindhu)
	NDL National Digital Library Central Govt. Ministry of Education (Devlop by Khadgpur.)

Practicum

Community Activities

Community Activities **104 B**	➢ Village Survey (**Community Activities**) Prepare a **survey** report of any village and submit in college ➢ Awareness Rally/Program Awareness program in any relevant social problem of your city/ state/ or country.