SHRI DAVARA UNIVERSITY

NAYA RAIPUR (C.G.)

PROGRAMME- CURRICULUM

FOR

BACHELOR OF SCIENCE

(Physics, Chemistry, Mathematics) (PCM)

SEMESTER-III

AS PER NEW EDUCATION POLICY-2020

AND

NATIONAL EDUCATION POLICY-2025

FOUR YEAR UNDERGRADUATE PROGRAMME-2024-25

EFFECTIVE FROM THE SESSION-(2024-2025)

श्री Davara University

Established under Chhattisgarh Private Universities (Establishment and Operation) Act, 2005

FOUR YEAR UNDERGRADUATE PROGRAMME

BACHELOR OF SCIENCE (PCM)

COURSE STRUCTURE

SEMESTER III

S.NO	COURSE CODE	COURSE TITLE	TEACHING HOURS PER WEEK				EXAMINATION SCHEME				
DISCIPLINE SPECIFIC COURSE (DSC)			L	T	P	C	THEORY		PRACTICAL		TOTAL MARKS
							EX	IN	EX	IN	
1.	PHSC –03T	Heat and Thermodynamics	2	1	0	3	70	30	-	-	100
2.	CHSC-03T	Inorganic and physical chemistry – I	2	1	0	3	70	30	-	-	100
3.	MASC-03	Differential Equations	3	1	0	4	70	30	-	-	100
GENERAL ELECTIVE (GE)/DISCIPLINE SPECIFIC ELECTIVE(DSE)											
4.	BDSC-2T	Basic Nutrition	3	1	0	4	70	30	-	-	100
4.	MASE-03	Advanced Calculus	3	1	0	4	70	30	-	-	100
ABILITY ENHANCEMENT COURSE (AEC)											
5.	BHMAEC-101	Environmental Studies	2	0	0	2	35	15	-	-	50
VALUE ADDITION COURSE (VAC)											
6.	DUVAC-03	Disaster Management	1	1	0	2	35	15	-	-	50
PRACTICALS (LAB)											
7.	PHSC –03P	Heat and Thermodynamics	0	0	2	1	-	-	35	15	50
8.	CHSC-03P	Inorganic and Physical Chemistry – I	0	0	2	1	-	-	35	15	50
Total Contact hours Per Week:30		Total credit:				20	Total mark				600

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF PHYSICS

COURSE CURRICULUM

PART – A : Introduction				
Programme: Bachelor of Science (Certificate/Diploma/Degree/Honors)			**Semester - III**	**Session : 2024-28**
1	**Course Code**	**PHSC –03T**		
2	**Course Title**	**Heat and Thermodynamics**		
3	**Course Type**	**Discipline Specific Course (DSC)**		
4	**Pre-requisite (if, any)**	**As per programme**		
5	**Course Learning. Outcomes (CLO)**	**At the end of this course, the students will be able to:-** ➢ Demonstrate a deep Comprehension of the fundamental principles of thermodynamics. ➢ Apply the law of thermodynamics to analyze and slow problems related with energy transfer, heat engines, refrigeration system and other thermodynamic processes. ➢ Analyze basic of kinetics theory and transport phenomenon in gases.		
6	**Credit Value**	**3 Credits**	**1Credit = 15 Hours – learning & Observation**	
7	**Total Marks**	**Maximum Marks: 100**	**Minimum Passing marks: 40**	

PART – B: Content of the Course		
Total No. of teaching – learning Periods (01 Hr. per period) - 45 Periods (45 Hours)		
Unit	**Topics (course contents)**	**No. Of Period**
I	**Historical background:** A brief historical background of Thermodynamics and statistical Physics in the context of India and Indian culture, Contribution of S.N. Bose in statistical mechanics. **Law of Thermodynamics:** Thermodynamic Description of system, Zeroth Law of Thermodynamics & temperature. First law and internal energy, conversion of heat into work, various thermo dynamical Processes, Work done during Isothermal & adiabatic Processes, Second Law of Thermodynamics & Entropy, Third Law of Thermodynamics.	12
II	**Thermodynamic Potentials :** Internal Energy, Enthalpy, Helmholtz Free Energy & Gibbs function, Maxwell's relations & applications, Clausius- Clapeyron Equation, Thermodynamic energy equation-change in internal energy of an ideal and Vander Waals gas, Joule – Thompson effect, Cooling by adiabatic demagnetization.	11
III	**Kinetic Theory of Gases:** Maxwell an distribution of speeds in an ideal gas: distribution of speeds and velocities,	11

	Experimental verification, distinction between mean, rams and most probable speed values, Molecular Collision and Mean Free Path. **Transport Phenomena in gases:** Viscosity, Conduction and Diffusion, Law of equipartition of energy.	
IV	**Theory of Radiation:** Blackbody radiation, Spectral distribution, Concept of Energy Density, Stefan Boltzmann Law, Newton's law of cooling from Stefan Boltzmann's law. Wien's displacement law and Rayleigh-Jeans Law (Only qualitative). Planck's radiation Law, Deduction of Wien's distribution law and Rayleigh Jeans Law from Planck's law. Experimental verification of Planck's radiation law.	11
Key words	Zeroth and First Law of Thermodynamics, Second Law of Thermodynamics, Entropy, Thermodynamic Potentials, Maxwell's Thermodynamic Relations Kinetic Theory of Gases. Distribution of Velocities, Molecular Collisions, Real Gases, Laws of radiation	

PART-C: Learning Resources:-

Text Books, Reference Books and Others

Text Books Recommended-

Text Books:-

1. Heat and Thermodynamics: Singhal, Agrawal and SatyaPrakash, PragatiPrakashan 1984
2. Physics (Part-2): Editor, Prof. B.P.Chandra, M.P. Hindi Granth Academy
3. Unified Physics-II R.P.Goyal, ShivlalAgrawal& Sons
4. Unified Physics-II. NovbodhPrakashan

Reference Books:-

1. Thermodynamics, Kinetic theory & Statistical thermodynamics, F.W.Sears&G.L.Salinger. 1988,Narosa
2. Energy Science in Vedas: A Treatise on Vedic Thermodynamics and Free Energy (Exploring Lost Science and Technology in Vedas), Ramesh Kumar Mineria, Priya Veda Publications

Online Resources:-

1. Basies of thermodynamics
https://www.youtube.com/watch?v=9GMBpZZtjXM&list=PLD8E646BAB3366BC8
2. Thermodynamics https://www.youtube.com/watch?v=E9cOAMhFUz0
3. Second law of thermodynamics https://www.youtube.com/watch?v=F [GoSPY80
4. NPTEL Online Lectures: https://archive.nptel.ac.in/courses/115/105/115105129/
5. https://archive.nptel.ac.in/courses/115/106/115106090/

6. https://bsc.heverma.in/course/penopcyc
7. Vedic Science and Thermodynamics :https://www.puranavedas.com/vedic-physics

ART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 100 Marks
Continuous Internal Assessment (CIA): 30 Marks
d Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 10*1=10 Marks Q2 Short answer type-5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks

Signature of Members (BoS)

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF PHYSICS

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor of Science **(Certificate/Diploma/Degree/Honors**		**Semester-III**	**Session: 2024-28**
Course Code	**PHSC-03P**		
Course Title	**Heat & Thermodynamics**		
Course Type	**Laboratory course**		
Pre-requisite(if any)	**As per programme**		
Course Learning. Outcomes (CLO)	**After the completion of the course, Students are expected to understand working mechanism and laws of classical mechanics,The Students will be able to-** ➢ Assemble required parts/devices and arrange them to performexperiments. ➢ Record/ observe data as required by the experimental objectives. ➢ Analyze recorded data and formulate it to get desired results. ➢ Interpret results and check for attainment of proposed objectives related to laws of mechanics and its applications.		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	

PART-B: Content of the Course

Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)

Module	Topics (Course contents)	No. of Period
Lab/ field Training/ Experiment Content of Course	1.To determine the thermal conductivity of a non-conducting material by Lee's disc method. 2.To study the variation of thermo emf across two junctions of a thermocouple with Temperature. 3.To verify Newton's law of cooling. 4.To determine the temperature co-efficient of resistance by Platinum resistance Thermometer. 5.To determine the coefficient of thermal conductivity(k) of a rubber tube. 6.To study the heat efficiency of an electric kettle with varying voltage 7. To determine the ratio of specific heat at constant pressure and constant volume (y-Cp/Cv) of air Clement and Desorme's method. 8.To determine the coefficient of thermal conductivity of copper by Searle's Apparatus. 9. To study the variation of thermos-Emf of thermos couple with Difference of Temperature of its Two Junctions. 10.To determine Mechanical Equivalent of Heat, J, by Callender and Bame's Constant Flow method. 11. Measurement of Planck's constant using black body radiation. 12.To determine Stefan's Constant.	30
Keywords	Thermal conductivity, Thermocouple, Newton's law of cooling. Temperature coefficient of resistance, Heat efficiency, Specific heat ratio, Mechanical equivalent of heat, Plank Constant.	

Signature of Members (BoS)

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Advanced Practical Physics for students, B.L..Flint&H.T.Worsnop, 1971, Asia Publishing House.

2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

3. A Text Book of Practical Physics, InduPrakash and Ramakrishna, 11th Edition, 2011, KitabMahal, New Delhi.

4. A Laboratory Manual of Physics for Undergraduate Classes, D.P. Khandelwal, 1985, Vani Publication.

5. Unified Practical Physics B.Sc II: R P Goyal, ShivlalAgrawal&Sons Publications

Reference Books Recommended:-

1. Practical Physics by C.L..Arora
2. Practical Physics by S.L. Gupta and Vijay Kumar
3. Advanced Practical Physics for Students by B.L. Worsnop and H.T. Flint.

Online Resources:-

1. Thermal Physics and Statistical Mechanics: Laboratory Collectionhttps://egyankosh.ac.in/handle/123456789/67450
2. Virtual Lab :https://vlab.amrita.edu/index.php?sub=1&brch-194
3. https://vlab.amrita.edu/index.php?sub=1&brch=194&sim=802&cnt=1
4. https://vlab.amrita.edu/index.php?sub=1&brch=194&sim=801&cnt=4
5. https://srmap.edu.in/seas/physics-virtual-lah/
6. hups://sites.google.com/view/vlab-bumitmech/home/heat-transfer-lab https://www.pbslearningmedia.org/resource/lsps07-sci-phys-thermalenergy/thermal-energy-transfer/#.WdJiolrLI

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ART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):35	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks B: Sporting based on lab, work (written) 10*1=10Marks Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks
Signature of Members (BoS)	

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART-A:Introduction			
Programme: Bachelor of Science (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2028**
Course Code	**CHSC-03T**		
Course Title	**INORGANIC AND PHYSICAL CHEMISTRY – I**		
Course Type	**Discipline Specific course (DSC)**		
Pre-requisite(if any)	**As per programme**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to** ➢ Understand Fundamental chemical concepts of transition elementsand their applications . ➢ Master the principles of coordination chemistry. ➢ Grasp the core principles of thermodynamics and apply them to various phenomena. ➢ Explore the world of electrochemistry and its applications.		
Credit Value	**3 Credits**	**Credit =15 Hours-learning & Observation**	
Total Marks	**Max. Marks:=100**	**Min Passing Marks: 40**	

PART -B: Content of the Course

Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)

Unit	Topics (Course contents)	
I	**Chemistry of d & f-block elements** **A. d-block elements (f hrs.)** Chemistry of elements of first transition series: Characteristic properties of the elements of first transition series with reference to their: Electronics configuration, Atomic and ionic radii, Ionization potential, Variable oxidation states, Magnetic properties, Color, Complex formation tendency and catalytic activity. 1. Chemistry od elements of second and third transition series: Electronic configuration of 4d and 5d transition series. Comparative treatment with their 3d-analogous (Group Cr-Mo-W, Co-Rh-Ir) in respect of oxidation states and magnetic behavior. **B. F-block elements (6hrs.)** Chemistry of Lanthanide & Actinides: Electronic structure, oxidation states, ionic radii, magnetic, and spectral properties. Lanthanide contraction and its consequences, extraction and ion exchange method. General features **and** Chemistry of actinides, Transuranic elements, chemistry of separation of Mp, Pu and Am from Am from uranium, similarities between the later actinides and the later lanthanides.	12

II	**Oxidation and reduction (5 Hrs.)** Various definitions of oxidation and reduction, Balancing of redox reaction by ion-electron method, Latimer diagram of Chlorine and Oxygen, Frost diagram of Mitrogen and Oxygenm and Pourbaix diagrams of Iron. Predicting disproportionation and comproportionating phenomena. **Coordination Chemistry (6 Hrs)** A. Coordination compounds: Distinction among simple salts, double salts, and coordination compounds. Terminology and nomenclature of Coordination Compounds. Types of ligands based on denticity. Werner's Coordination theory and its experimental verification. Sidgwick's electronic interpretation Ean rule with examples. Electroneutrality principle, Valence Bond Theory of transition metal complexes. Determination of structures and magnetic properties of complexes based on VBT. Chelates: Classification and their application. **B)** Isomerism in coordination compounds: structural isomerism and Stereoisomerism (Geometrical and optical) in coordination compounds with four and six coordination umbers.	11
III	**Thermodynamics-I: (5 Hrs.)** **A.** Basic concept of thermodynamics: System, surrounding, types of system (closed, open & isolated). Intensive & extensive properties. Thermodynamics processes: isothermal, adiabatic, isobari, isochoric, isochoric, cyclic, reversible & irreversible. State fuction& path functions and their differentiation, concept of heat & work. Zeroth law of thermodynamics, First law of thermodynamics. Definition of internal energy & enthalpy. Concept of heat capacity, heat capacity at constant volume & at constant pressure, and ther relationship. Jouble- Thomson experiment, Joule-Thomson coefficient (no derivation) & inversion temprerature. Calculations of W, q, E & H for expansion of gases for isothermal & adiabatic conditions for reversible process. **B. Thermochamistry (2 hrs.)** Standards. states, Heat of reaction, enthalpy of formation, enthalpy of combustion, enthalpy of solution, enthalpy of neutralization, Hess's law of constant heat of summation & its applications. Variation of enthalpy change of reaction with temperature (Kirchoff's equation). **C. Thermodynamics II (4 hrs.)** Second law of thermodynamics: Limitiations of first law and need for the second Thermodynamic principle of working of a refrigereator (Carnot theorem). Concept of entropy: entropy change in a reversible and irreversible process; entropy change in isothermal reversible expansion of an ideal gas. Physical significance of entropy. Gibbs free energy, Gibbs- Helmoholtzeqation. **D. Thirs law of thermodynamics (1hr)** **E.** Stetement of third law, Nernst heat theorem, Absolute entropy of solids, liquids, and gases.	11
IV	**Electrochemistry-I** Electrolyte conductance: specific and equivalent conductance, measurement of	11

	equivalent conductance, effect of dilution on conductance, Kohlrausch law, application of Kohlrausch law in determination of dissociation constant of weak electrolyte, solubility of sparingly soluble electrolyte, absolute velocity of ions, ionic product of water, conductometric titrations. Single electrode potential, standard electode potential, electrochemical series and its applications. Concept of overvoltage. Theory of strong electrolyte: limitation of Ostwals's dilution law weak and strong electrolyte, Debye-Huckel-Onsager's (DHO) equation for strong electrolytes, relazation, and electrophoretic effect. Migration of ions: Transport nimber-definition and determination by Hittorf method and moving boundary method. electrochemical cells or Galvanic cells: reversible and irreversible cells, conventional Representation of electrochemical cells. EMF of a cell, effect of Temperature on EMF of cell, Nernst equation calculation of AG, AH and AS for cell reaction, polarization, Overpotential and hydrogen overvoltage.	
Keywords	***D & f-blocks elements, Coordination compounds, Werner;s theory, VBT, Isomerism, Thermodynamics, thermochemistry, Electrical/electrolytical conductance, Transport number.***	
Signature of Convener & Members (CBoS)		

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Gurtu, J. N., &Kapoor, R. (1987). Experimental Chemistry. S. Chand & Co
2. Bajpai, D. N., Pandey, O. P., &Giri, S. (2013). Practical Chemistry. S. Chand & Co.
3. 3. Ahluwalia, V. K., Dhingra, S., &Dhingram, S. (2005). College Practical Chemistry. Universities.
4. Kamboj, P. C. (2014). Advanced University Practical Chemistry (Part 1). Vishal Publishing Co. 5. Fultariya, C., &Harsora, J. (2017). Volumetric Analysis: Conceptt and Experiments.

Reference Books Recommended-

1. Mcpherson, P. A. (2015). Practical Volumetric Analysis. Royal Society Of Chemistry.
2. Shobha, R., &Banani, M. (2017). Essentials of Analytical Chemistry. Pearson.
3. Venkateswaran, V., Veeraswamy, R., &Kulandaivelu, A. R. (2004). Basic Principles Of Practical Chemistry (2nd Ed.). S. Chand Publications.
4. Sundaram, S., &Raghavan, K. (1996), Practical Chemistry. S. Viswanathan Co. Pvt. 5. Svehla, G. (2011). Vogel's Textbook of Inorganic Qualitative Analysis (7th Ed.). Pearson Education

Online Resources-

- E-resources/e-books and e-learning portals
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- www.egyankosh.ac.in
- www.litm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in

PART -D: Assessment and Evaluation

<table>
<tr><td colspan="3">Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks</td></tr>
<tr><td>Continuous Internal Assessment (CIA): 15
(By Course Teacher)</td><td>Internal Test/Quiz:10+10
Assignment/ Semenar-05
Total Marks-15</td><td>Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks</td></tr>
<tr><td>End Semester Exam (ESE):35</td><td colspan="2">Laboratory/Field Skill Performance: On spot Assessment
Section A : Performed the Task based on lab, work 20*1=20 Marks
B: Performed the Task based on lab, work (written) 10*1=10Marks
Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks</td></tr>
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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor in Science (Certificate/Diploma/Degree/Honors)		**Semester-III**	**Session: 2024-2028**
Course Code	**CHSC-03P**		
Course Title	**Lab. Course -01 INORGANIC AND PHYSICAL CHEMISTRY - I**		
Course Type	**Laboratory course**		
Pre-requisite(if any)	**As per PROGRAMME**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to**		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	
PART-B:	Content of the Course		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			

Module	Topics (Course contents)	No. of Period
Lab/ field Training/ Experiment Content of Course	**Transition Temperature :** (1) Transition temperature of a salt hydrate – determination of molecular weight . (2) Determination of the transition of the temperature of the given substance by thermometric / dialometric method (e.g. $SrBr_2$. $2H_2O$ or $MnCl_2.4H_2O$). **Thermochemistry** **A. Determination of solubility:** (1) To determine the enthalpy of neutralization of hydrochloric acid (strong acid) by sodium hydroxide (strong base) solution. (2) (a)To determine the enthalpy of neutralization of a weak acid (acetic acid) versus strong base (sodium hydroxide) and determine enthalpy of ionization of weak acid. (b) To determine the enthalpy of neutralization of a weak base (ammonium hydroxide) verses strong acid (hydrochloric acid) and determine enthalpy of ionization of weak base. (3) To determine the enthalpy of solution of solid calcium chloride and calculate the lattice energy . **Conductometry** (1) Conductometry – Determination of limiting molar conductance of a strong Electrolyte (KCl). (2) To determine the strength of the given acid (HCl) or	30

	CH_3COOH) conductometrically using standard alkali (NaOH) solution. (3) To determine the strength of strong acid and a weak acid in the given mixture conductometrically against a standard alkali mixture. (4) To determine the ionization constant of weak acid conductometrically. **Solubility Product** (1) To determine the solubility and solubility product of a sparingly soluble salt conductometrically. (2) Potentiometry – Determination of solubility product of a sparingly soluble substance.	
Keywords	**Solution , Acid , Alkali, Transition temperature Thermochemistry, Temperature , Enthalpy, Conducometric titration, Potentiometric titration, Solubility product.**	
Signature of Convener & Members (CBoS)		

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

5. Gurtu, J. N., &Kapoor, R. (1987). Experimental Chemistry. S. Chand & Co
6. Bajpai, D. N., Pandey, O. P., &Giri, S. (2013). Practical Chemistry. S. Chand & Co.
7. 3. Ahluwalia, V. K., Dhingra, S., &Dhingram, S. (2005). College Practical Chemistry. Universities.
8. Kamboj, P. C. (2014). Advanced University Practical Chemistry (Part 1). Vishal Publishing Co. 5. Fultariya, C., &Harsora, J. (2017). Volumetric Analysis: Conceptt and Experiments.

Reference Books Recommended-

5. Mcpherson, P. A. (2015). Practical Volumetric Analysis. Royal Society Of Chemistry.
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Online Resources-

- E-resources/e-books and e-learning portals
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- www.egyankosh.ac.in
- www.litm.ac.in
- www.eskillindia.org
- www.eshiksha.mp.gov.in
- www.vlab.co.in

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):35	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks B: Performed the Task based on lab, work (written) 10*1=10Marks Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks	
Signature of Convener & Members (CBoS)		

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENTOF MATHEMATICS

COURSECURRICULUM

PART-A:Introduction		
Programme:Bachelor of Science (Certificate/Diploma/DegreeHonors) PROGRAMME Code:	**Semester-III**	**Session:2024-2028**

Course Code	**MASC03**	
CourseTitle	**Differential Equations**	
Course Type	**Discipline Specific course (DSC)**	
Pre-requisite(ifany)	**Knowledge of basic Differential and Integral calculus and differential equation.**	
Course Learning. Outcomes(CLO)	**This Course will enable the students to:** ➢ Learn various techniques of getting exact solutions of certain solvable first order differential equations and linear differential equations of second order. ➢ Understand the genesis of ordinary as well as partial differential equations. ➢ Learn about solution of first order linear partial differential equations using Lagrange's method. ➢ Know how to solve second order linear partial differential equations with constant coefficients.	
CreditValue	**4Credits**	**1 Credit=** 15Hours-learning &Observation
TotalMarks	**Max.Marks:** 100	**MinPassing Marks:**40

PART-B:Content of the Course

TotalNo. OfTeaching-learningPeriods(01 Hr.perperiod)-60 Periods(60 Hours)

Unit	**Topics**	**No. of Periods**
I	**Contributions and Biography of Indian Mathematicians:** Aryabhatta, Varahmihir, Bhaskar-I, Shreedharacharya, Shreepati and Parmeshwar. **First Order and higher degree Differential Equations:** Differential equations of first order and first degree, Equations in which variables are separable, Homogeneous equations, Linear differential equations and equations reducible to linear form, Exact differential equations, Integrating factor, First order higher degree equations solvable for x, y and p, Clairaut's form and singular solutions, orthogonal trajectories.	**15**
II	**Linear and Ordinary simultaneous differential equations:** Linear differential equations with constant coefficients, Homogeneous linear ordinary differential equations. Linear differential equations of second order. Transformation of the equation by changing the dependent variable/the independent variable.Method of variation of parameters,Ordinary simultaneous differential equations.	**15**

III	**First order Partial differential equations :** Lagrange's solution, Some special types of equation which can be solved by methods other than general method, Charpit's general method of solution	**15**
IV	**Second and higher order Partial differential equations:** Classification of Linear partial differential equation of second order, Homogeneous and non-homogeneous equation with constant coefficients, Partial differential equation reducible to equation with constant coefficients. Monge's Method.	**15**

PART-C:LearningResources

TextBooks,ReferenceBooks andOthers

TextBooksRecommended-

1. Dr. M. D. Rajsinghania, Ordinary and partial Differential Equation, S. Chand and company Pvt.Ltd.
2. A.H. Siddiqi and P. Manchanda, A first course in Differential Equations with Macmillan India Ltd. Applications,

ReferenceBooksRecommended-

3. Erwin Kreyszig (2011). Advanced Engineering Mathematics (10th edition). J. Wiley & Sons

4. B. Rai& D. P. Choudhury (2006). Ordinary Differential Equations - An Introduction. Narosa Publishing House Pvt. Ltd. New Delhi.

5. Shepley L. Ross (2007). Differential Equations (3rd edition). Wiley.

6. George F. Simmons (2017). Differential Equations with Applications and Historical Notes (3r edition). CRC Press. Taylor & Francis.

7. Ian N. Sneddon (2006). Elements of Partial Differential Equations. Dover Publications.

E-resources: https://onlinecourses.nptel.ac.in
https://epgp.inflibnet.aci.in
https://swayam.gov.in
https://www.mooc.org

Part-D:AssessmentandEvaluation

Suggested Continuous EvaluationMethods:
MaximumMarks: 100Marks
ContinuousInternalAssessment(CIA): 30Marks
EndSemesterExam(ESE): 70Marks

ContinuousInternalAssessment(CIA):30 (ByCourseTeacher)	Internal Test/Quiz:20+20Assignment/ Seminar-10 TotalMarks-30	Better marks out of the two Total Quiz +obtained marks in Assignment shall be considered against30Marks

End SemesterExam	**Twosection :** A & B Section A:Q1.Objective10*1=10MarksQ2.Short answer type question -5*4=20 Section B:Descriptiveanswertype question,1 outof2fromeach unit -4*10=40Marks

Signature of Members (BoS)	

श्री Davara University

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF DIET AND NUTRITION

COURSE CURRICULUM

PART-A:Introduction			
Programme: Bachelor of Sciences (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2028**
Course Code	**BDSC-2T**		
Course Title	**BasicNutrition**		
Course Type	**General Elective (GE)**		
Pre-requisite(if any)	**As per PROGRAMME**		
Course Learning. Outcomes (CLO)	**At the end of this course, the students will be able to** ➢ Abilitytoembracemoral/ethical theoryofdietetics. ➢ Capableofdemonstratingcomprehensiveknowledgeofdietmodification. ➢ Capabilitytoapply analytic thoughtoftherapeuticdietfor disease condition. ➢ Abilitytoacquireknowledgeandskillsofimmunesystemdisfunctionandmetabolic syndrome. ➢ Capableofdemonstratingcomprehensiveknowledgeandunderstandingof DM,obesity, underweight, drug interaction and their dietary treatment.		
Credit Value	**3 Credits**	**Credit =15 Hours-learning & Observation**	
Total Marks	**Max. Marks:=100**	**Min Passing Marks: 40**	

PART -B: Content of the Course		
Total No. of Teaching-learning Periods (01 Hr. per period) -45 Periods (45 Hours)		
Unit	Topics (Course contents)	
I	**AncientTheoryofDietetics** HistoryofDietetics,Ancientcultures,Ancient diet. Role of dietician: The hospital & community. Basicconceptsofdiet therapy. TherapeuticDiet:Principleoftherapeuticdiet,nutritionforchangingneeds.	12
II	NutritionSupport:EnteralNutritionandParenteralNutrition. Modificationofdiet(Symptoms,Causes,Classification,DietaryTreatment): Diet in Febrile conditions and infections. Dietinsurgicalconditions. Diet for Burn. Dietfor Cancer.	11
III	Dietforgastro –intestinaldisorders:constipation, diarrhea ,pepticulcer. Diet for cardiovascular disease: Hypertension, Atherosclerosis. (Risk factor, Etiology, Nutritional management) Dietforrenal diseases-Nephritis,Nephroticsyndromeandrenalfailure,renal calculi.(Causes, Symptoms and Dietary management)	11

IV	NutritioninImmunesystemdysfunction,AIDS&Allergy. Nutritionsupportinmetabolicdisorders:MaplesyrupUrineDisease,PKU,GaucherDisease. Nutrition -Addictive behaviour in annorexia nervosa, bulimia & alcoholism. DietinDiabetesMellitus:Prevalence,types,Symptoms,Diagnosis,Treatment,Complications, Nutrition support during Diabetes. DietinObesityandUnderweight:Obesity,Aetiology,Theories,Assessment,Types,Dietary Treatment. Nutrientdruginteraction.	11
Keywords		
Signature of Convener & Members (CBoS)		

PART-C: Learning Resources

Text Books, Reference Books and Others

1. ManjulaShantaram,Biochemistry&NutritionforB.Sc.Nursing,JaypeeBrothersMedical Publishers (P) Ltd.
2. RumaSingh,FoodandNutritionforNurses,JaypeeBrothersMedicalPublishers(P)Ltd.
3. Y.K.Joshi,Basicsofclinicalnutrition,JaypeeBrothersMedicalPublishers(P)Ltd.

Text Books Recommended-

1. B.Srilaskshmi,Dietetics,NewAgeInternatinalPublishers.
2. T.Longvah,R.Ananthan,K.Bhaskaracharya,K.Venkalah,IndianFoodCompositionTables,NIN

Online Resources-

- e-books and e-learning portals
- http://www.swayam.ac.in
- http://www.ignou.ac.in
- http://www.egvankosh.ac.in
- http://www.itm.sc.in
- http://www.eskillindia.org
- http://www.eshiksha.mp.gov.in
- http://www.viah.co.in
- http://www.internshala.com

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 100 Marks
Continuous Internal Assessment (CIA): 30 Marks
End Semester Exam (ESE): 70 Marks

Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 10*1=10 Marks, Q2 Short answer type-5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks
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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENTOF MATHEMATICS

COURSECURRICULUM

PART-A :Introduction		
Programme: Bachelor of Science (Certificate/Diploma/Degree Honors)	**Semester-III**	**Session:2024-2028**

Course Code	**MASE-03**	
Course Title	**Advanced Calculus**	
Course Type	**Discipline Specific Elective (DSE)**	
Pre-requisite(if any)	**Basic idea of .elemetary differential and integral calculus**	
Course Learning. Outcomes(CLO)	**This Course will enable the students** ➢ Calculate the limit and examine the continuity and understand the concepts of limit, continuity and differentiability of functions of more than one variable with geometrical interpretation. ➢ To Understand the concepts of mean value theorems with their applications ➢ To understand the concept of maxima and minima for functions of two and three variables with their uses and techniques ➢ Understand conceptual variations while advancing from one variable to severalvariables in calculus. ➢ ➢ Understand the concept of integration of functions of two and three variables and their evaluation technique with emphasis on beta and gamma functions**.**	
Credit Value	**4Credits**	**1 Credit=** 15Hours-learning &Observation
Total Marks	**Max. Marks:** 100	**Min Passing Marks:**40

PART-B: Content of the Course

Total No. of Teaching-learning Periods(01 Hr. per period)-60 Periods(60 Hours)

Unit	**Topics**	No. of Period
I	Limit and continuity of function of two and three variables. Mean value theorems of function of two variables- First mean value theorem and taylor's theorem. Partial Differentiation and Euler's theorem on homogeneous functions, Change of variables.	**15**
II	Partial Derivation and differentiability of function of two variables. Schwartz's theorem, Young's theorem, Implicit function theorem. Fourier series, Fourier expansion of piece wise monotonic function.	**15**
III	Jacobians, Maxima, Minima and saddle points of function of two variables. Lagrange's multipliers method. Envelopes, Evolutes	**15**
IV	Beta and Gamma function. Double and triple integrals Dirichelet's integrals, Change of order of integration.	**15**

PART-C: Learning Resources

Text Books, Reference Books and Others

TextBooksRecommended-

1. 1. Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd.

2. Mathematical Analysis, S.C. malik and S. Arora, New age international, Delhi

Reference Books Recommended-

3. Howard Anton, I. Bivens & Stephan Davis (2016). Calculus (10th edition). Wiley India.

4.Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag.

5. Wieslaw Krawcewicz&Bindhyachal Rai (2003). Calculus with Maple Labs.

6. Principles of Mathematical analysis, W.Rudin, McGraw Hill Publication

7.Jerrold Marsden, Anthony J. Tromba & Alan Weinstein (2009). Basic

8. James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage.

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E-resources: https://onlinecourses.nptel.ac.in
https://epgp.inflibnet.aci.in
https://swayam.gov.in
https://www.mooc.org

Part-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks Continuous Internal Assessment(CIA): 30 Marks
End Semester Exam(ESE): 70 Marks

Continuous Internal.Assessment (CIA): 30(By Course Teacher)	Internal Test/Quiz:20 + 20 Assignment/ Seminar-10 TotalMarks-30	Better marks out of the two Total Quiz +obtained marks in Assignment shall be considered against30Marks
End Semester Exam	**Two section :** A & B Section A: Q1.Objective 10*1=10 Marks Q2.Short answer type question - 5*4 = 20 Section B:Descriptive answer type question,1 out of 2from each unit - 4*10=40 Marks	

Signature of Members (BoS)

PART-C: Learning Resources

Text Books, Reference Books and Others

TextBooksRecommended-

1. 1. Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd.

2. Mathematical Analysis, S.C. malik and S. Arora, New age international, Delhi

Reference Books Recommended-

3. Howard Anton, I. Bivens & Stephan Davis (2016). Calculus (10th edition). Wiley India.

4.Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag.

5. Wieslaw Krawcewicz&Bindhyachal Rai (2003). Calculus with Maple Labs.

6. Principles of Mathematical analysis, W.Rudin, McGraw Hill Publication

7.Jerrold Marsden, Anthony J. Tromba & Alan Weinstein (2009). Basic

8. James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage.

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E-resources: https://onlinecourses.nptel.ac.in
https://epgp.inflibnet.aci.in
https://swayam.gov.in
https://www.mooc.org

Part-D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks
Continuous Internal Assessment(CIA): 30 Marks
End Semester Exam(ESE): 70 Marks

Continuous Internal.Assessment (CIA): 30(By Course Teacher)	Internal Test/Quiz:20 + 20 Assignment/ Seminar-10 TotalMarks-30	Better marks out of the two Total Quiz +obtained marks in Assignment shall be considered against30Marks
End Semester Exam	**Two section :** A & B Section A: Q1.Objective 10*1=10 Marks Q2.Short answer type question - 5*4 = 20 Section B:Descriptive answer type question,1 out of 2from each unit - 4*10=40 Marks	

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF ENVIRONMENTAL SCIENCE

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor ofScience (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session: 2024-2028**
Course Code	**BHMAEC-101**		
Course Title	**Environmental Studies**		
Course Type	**Ability Enhancement Course (AEC)**		
Pre-requisite(if any)	**As per requirement**		
Course Learning. Outcomes (CLO)	➢ relate the basic concept of the environment ➢ explain environmental alterations ➢ develop skills in environmental measurement ➢ examine correction measures of the environment		
Credit Value	**02 Credits**	**01 Credit =15 Hours-learning & Observation**	
Total Marks	**Max. Marks:=50**	**Min Passing Marks: 20**	

PART -B: Content of the Course

Total No. of Teaching-learning Periods (01 Hr. per period) - 60 Periods (60 Hours)

UNIT	Topics (Course contents)	
I	**Basic Composition:** 1. Abiotic and Biotic components of the environment 2. Biodiversity Concept, types, and measures about its protection 3. Basic concept of Bio-Geo Chemical Cycle 4. Energy Flow in an ecosystem	**07**
II	**Alterations in Environment** 1. Concept and components of the pond ecosystem 2. Air pollution and measures for its control 3. Water pollution and measures for its control 4. Global warming, Climate change, and possible measures	**07**
III	**Measurements of Environmental Components** 1. Soil composition and methods of its analysis 2. Water analysis methods for DO, BOD, COD	**08**

	3. Water analysis methods for pH, TDS, Turbidity, Salinity, and Alkalinity 4. Information about environmental factors-PM-10, PM-2.5, NO2, 03	
IV	**Application Measures** 1.Useful microbes to control water pollution 2. Useful microbes to control soil pollution 3. Concept of Biodegradation 4. Concept of Phytoremediation	**08**
Keywords	Ecosystem, Pollution, Climate Change, Biodegradation	

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Ecology and Environment, 8th Edition, P.D.Sharma, Rastogi Publication, Meerut.
2. Environmental Biology, 2nd Edition, P,D.Sharma, Rastogi Publication, Meerut.
3. Environmental Biology and Toxicology, 2nd Edition, P.D.Sharma, Rastogi Publication, Meerut.
4. Environmental Studies, 1st Edition, S.V.S.Rana, Rastogi Publication, Meerut.
5. Environmental Biotechnology, 1" Edition, S. V. S. Rana, Rastogi Publication, Meerut.

Online Resources-

- https://onlinecourses.nptel.ac.in
- https://epqp.inflibnet.aci.in
- https://swayam.gov.in
- https://www.mooc.org

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two test/ Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 5*1=5 Q2 Short Answer Type 5*2=10 Section B : Descriptive answer type qts 1 out of 2 from each- 4*5=20 Marks	
Signature of Convener & Members (CBoS)		

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FOUR YEAR UNDERGRADUATE PROGRAMMEME

DISASTER MANAGEMENT

COURSE CURRICULUM

PART-A:Introduction			
Programme:Bachelor of Science (Certificate/Diploma/Degree Honors)		**Semester-III**	**Session:2024-2028**
Course Code	**DUVAC-03**		
Course Title	**Disaster Management**		
Course Type	**Value Addition Course (VAC)**		
Pre-requisite(if any)	**As per programme**		
Course Learning Outcomes (CLO)	he end of this course, student will be able to: A. Explain Emergencies and controls, with examples of industrial disasters and their consequences. B. Describe the elements of emergency planning and preparedness. C. Summarize the causes of natural disasters, mitigation of their effects, rescue, relief and rehabilitation. D. Explain the disaster management mechanism and capacity building concepts		
Credit Value	**2 Credits**	**Credit = 15 Hours – Learning &Observation**	
Total Marks	**Max. Marks:=50**	**Min PassingMarks:20**	

PART-B: Content of the Course

Total No .of Teaching-learning Periods (45 min per period)-30Periods(30 Hours)

Unit	Topics(Course Contents)	No. of Period
I	**Definition and types of disaster** Hazards and Disasters, Risk and Vulnerability in Disasters, Natural and Man-made disasters, earthquakes, floods drought, landside, land subsidence, cyclones, volcanoes, tsunami, avalanches, global climate extremes. Man-made disasters: Terrorism, gas and radiations leaks, toxic waste disposal, oil spills, forest fires.	**8**
II	**Study of Important disasters** Earthquakes and its types, magnitude and intensity, seismic zones of India, major fault systems of India plate, flood types and its management, drought types and its management, landside and its managements case studies of disasters in Sikkim (e.g.) Earthquakes, Landside). Social Economics and Environmental impact of disasters.	**7**
III	**Mitigation and Management techniques of Disaster** Basic principles of disasters management, Disaster Management cycle, Disaster management policy, National and State Bodies for Disaster Management, Early Warming Systems, Building design and construction in highly seismic zones, retrofitting of buildings.	**8**

IV	**Training, awareness PROGRAMME and project on disaster management** Training and drills for disaster preparedness, Awareness generation PROGRAMME, Usages of GIS and Remote sensing techniques in disaster management, Mini project on disaster risk assessment and preparedness for disasters with reference to disasters in Sikkim and its surrounding areas.	7
Keywords		
Signature of Convener & Members (CBoS)		

PART-C: Learning Resources

Text Books, Reference Books and Others

A. Disaster Management Guidelines, GOI-UND Disaster Risk programme (2009-2012) 2. Damon, P. Copola, (2006)

B. Introduction to International Disaster Management, Butterworth Heineman.

Reference Books

- Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
- Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi. 5. Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD.

Online Resources-

- https://onlinecourses.nptel.ac.in
- https://epgp.inflibnet.aci.in
- https://swayam.gov.in
- https://www.mooc.org

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 marks
Continuous Internal Assessment (CIA): 15 Marks.
End Semester Exam (ESE): 35 marks

Continuous Internal Assessment (CIA): (By Course Teacher)	**Internal test/Quiz-:10 & 10 Assignment /seminar-05 Total marks:-15**	**Better marks out of the two test/Quiz+ obtained marks in assignment shall be considered against 15 marks.**
End Semester Exam (ESE):	**Two section- A&B** Section A: Q1. Objective-05 marks: Q2. Short answer type-5x2=10 marks tion B: Descriptive answer type question, 1 out of 2 from each unit-4x5=20 marks al = 35 marks	

Name and Signature of Convener & Members of CBoS.

SHRI DAVARA UNIVERSITY

NAYA RAIPUR (C.G.)

PROGRAMME- CURRICULUM

FOR

BECHELOR OF SCIENCE

(Physics,Chemistry, Mathematics) (PCM)

SEMESTER-IV

AS PER NEW EDUCATION POLICY-2020

AND

NATIONAL EDUCATION POLICY-2025

FOUR YEAR UNDERGRADUATE PROGRAMME-2024-25

EFFECTIVE FROM THE SESSION-(2024-2028)

श्री Davara University

Established under Chhattisgarh Private Universities (Establishment and Operation) Act, 2005

FOUR YEAR UNDERGRADUATE PROGRAMME

BACHELOR OF SCIENCE (PCM)

COURSE STRUCTURE

SEMESTER IV

S.NO	COURSE CODE	COURSE TITLE	TEACHING HOURS PER WEEK				EXAMINATION SCHEME				
DISCIPLINE SPECIFIC COURSE (DSC)			L	T	P	C	THEORY		PRACTICAL		TOTAL MARKS
							EX	IN	EX	IN	
1.	PHSC –04T	Wave and Optics	2	1	0	3	70	30	-	-	100
2.	CHSC-04T	Organic and physical chemistry - I	2	1	0	3	70	30	-	-	100
3.	MASC-04	Abstract Algebra	3	1	0	4	70	30	-	-	100
GENERAL ELECTIVE (GE)/DISCIPLINE SPECIFIC ELECTIVE(DSE)											
4.	DUHISC-04	History of India from beginning to 2nd century BC	3	1	0	4	70	30	-	-	100
4.	MASE-04	Mechanics	3	1	0	4	70	30	-	-	100
ABILITY ENHANCEMENT COURSE (AEC)											
5.	AEC-04	Communicative English and Soft Skills	2	0	0	2	35	15	-	-	50
SKILL ENHANCEMENTCOURSE (SEC)											
6.	DUSECHS-T&P	Equine Studies & Horsemanship	1	1	0	2	35	15	-	-	50
PRACTICALS (LAB)											
7.	PHSC –04P	Wave and Optics	0	0	2	1	-	-	35	15	50
8.	CHSC-04P	Chemistry lab course - IV	0	0	2	1	-	-	35	15	50
Total Contact hours Per Week:30		Total credit:				20	Total mark				600

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF PHYSICS

COURSE CURRICULUM

PART – A : Introduction			
Programme : Bachelor of Science (Certificate/Diploma/Degree/Honors)		**Semester - IV**	**Session : 2024-2028**
1	**Course Code**	**PHSC –04T**	
2	**Course Title**	**Wave and Optics**	
3	**Course Type**	**Discipline Specific Course (DSC)**	
4	**Pre-requisite (if, any)**	**As per programme**	
5	**Course Learning. Outcomes (CLO)**	➢ Analyze the behavior of waves propagating through different mediums and predict how factors such as density, elasticity, and temperature affect wave propagation. ➢ Demonstrate an understanding of interference phenomena, including constructive and destructive interference, and apply this knowledge to solve problems involving wave superposition. ➢ Explain the concept of diffraction and its implications for wave propagation, including how waves bend around obstacles and spread out after passing through narrow openings.	
6	**Credit Value**	**3 Credits**	**1Credit = 15 Hours – learning & Observation**
7	**Total Marks**	**Maximum Marks: 100**	**Minimum Passing marks: 40**

PART – B: Content of the Course

Total No. of teaching – learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (course contents)	No. Of Period
I	**Contribution of C. V. Raman:-** Brief biography of C. V. Raman with his contribution in field of acoustics and optics. **Waves in Medium:-** Speed of transverse waves on uniform string, Speed of longitudinal waves in a fluid, Energy density and energy transmission in waves. Group velocity and phase velocity and relationship between them. **Reflection, refraction and diffraction of sound:-** Acoustic impedance of a medium, percentage, reflection & refraction at a boundary , diffraction of sound , Principle of a Sonar system.	11
II	**Interference:-** Principle of superposition, Division of wavefront and division of amplitude, Young's Double Slit experiment. Fresnel's Biprism, Phase change on reflection, Stokes treatment. Interference in Thin Films: parallel and wedge-shaped films. Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings, measurement of wavelength and refractive index. Michelson's Interferometer, Formation of fringes, Determination of wavelength, Wavelength difference.	12
III	**Diffraction:** Fresnel Diffraction; Half-period zones. Zone plate. Fresnel Diffraction pattern of a straight edge, a slit and a wire using half-period zone analysis. Fraunhofer diffraction; Single slit, Double slit. Multiple slits & Plane Diffraction Grating, Resolving power of Grating.	11

IV	**Polarization:-** Polarized light and its mathematical representation, Electromagnetic theory of double refraction, NicolPrism, Double image prism, Polaroid, Phase retardation plates, Circular and elliptical polarization. Polarization by double refraction and Huygens's theory, Rotation of plane of polarization, Biquartz polar meter.	11
Key words	Longitudinal and transverse waves, principle of superposition, Humdinger Fringes,Fresnel Diffraction, Fraunhofer diffraction, Polarization SignatureofConvener&Members	

PART-C: Learning Resources:-

Text Books, Reference Books and Others

Text Books Recommended-

Text Books:-

1. Berkely Physics Course: Vol.-III, 'Waves and Oscillations"

2. Principles of Optics, B.K. Mathur, 1995, Gopal Printing

3. Fundamentals of Optics, H.R. Gulati and D.R. Khanna, 1991, S. Chand Publication

4. Physical Optics, A.K. Ghatak

5. Unified Physics- II, R. P. Goyal, ShivlalAgrawal Publications

6. Unified Physics- II, Navbodh Publications.

Reference Books:-

1. Concepts of Physics by H.C. Verma
2. Fundamentals of Physics by R. Shankar
3. Optics by Ajoy

Online Resources:-

1. Wave an introductionhttps://youtu.be/SuQE7eUEriU
2. Interference https://youtu.be/hvpYKPYT-vc
3. Diffraction https://youtu.be/3RZZQVEVIEA
4. Polarization https://youtu.be/nELYaf N528
5. Waves and Oscillations- https://archive.nptel.ac.in/courses/115/106/115106119/
6. Optics- https://archive.nptel.ac.in/courses/115/107/115107131/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks Continuous Internal Assessment (CIA): 30 Marks End Semester Exam (ESE): 70 Marks		
Continuous Internal Assessment (CIA): 30 (By Course Teacher)	Internal Test/Quiz:20+20 Assignment/ Semenar-10 Total Marks-30	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):70	Two section A&B Section A :Q1 Objective 10*1=10 Marks Q2 Short answer type-5*4=20 Section B : Descriptive answer type qts 1 out of 2frm each- 4*10=40 Marks	
Signature of Members (BoS)		

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF PHYSICS

COURSE CURRICULUM

PART- A: Introduction			
Programme: Bachelor of Science (Certificate/Diploma/Degree/Honors)		**Semester-IV**	**Session: 2024-2028**
Course Code	**PHSC-04P**		
Course Title	**Wave & Optics**		
Course Type	**Laboratory course**		
Pre-requisite(if any)	**As per programme**		
Course Learning. Outcomes (CLO)	**After the completion of the course, Students are expected to understand working mechanism and laws of classical mechanics,The Students will be able to-** ➢ Assemble required parts/devices and arrange them to perform experiments. ➢ Record/ observe data as required by the experimental objectives. ➢ Analyze recorded data and formulate it to get desired results. ➢ Interpret results and check for attainment of proposed objectives related to laws of mechanics and its applications.		
Credits Value	**1 Credits**	**Credit =30 Hours Laboratory or Field learning/Training**	
Total Marks	**Max. Marks:50**	**Min Passing Marks: 20**	
PART-B:	**Content of the Course**		
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			

Module	**Topics (Course contents)**	**No. of Period**
Lab/ field Training/ Experiment Content of Course	1. To determine the Frequency of AC mains with the help of Sonometer. 2. Determination of angle of prism using spectrometer. 3 .To determine the Refractive Index of the Material of a given Prism using Spectrometer. 4To determine Dispersive Power of the Material of a given Prism using Spectrometer 5To determine the value of Cauchy Constants of a material of a prism. 6To determine the Resolving Power of a Prism. 7To determine wavelength of sodium light using Fresnel Biprism. 8To determine wavelength of sodium light using Newton's Rings Method. 9To determine the wavelength of Laser light using Single Slit Diffraction. 10To determine wavelength of Sodium light by laser diffraction. 11To determine wavelength of spectrum of Mercury light using plane diffraction Grating and Spectrometer. 12 To determine the Resolving Power of a Plane Diffraction Grating. 13 To determine the thickness of a thin paper by measuring the width of the interference Fringes produced by a wedge-shaped Film. 14Determination of resolving power telescope.	30
Keywords	Waves Motion-General, Velocity of Waves, Wave Optics, Interference, Interferometer, Diffraction, Polarization, Spectrometer.	

Signature of Members (BoS)

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended-

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House.

2. A Text Book of Practical Physics, J. Prakash& Ramakrishna, 11th Ed., 2011, KitabMahal

3. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers

4. A Laboratory Manual of Physics for undergraduate classes, D.P.Khandelwal, 1985, Vani Pub.

5. Practical Physics B.Sc II: RP Goyal, Shivlal Publications

Reference Books Recommended:-

1. Practical Physics by S.L. Gupta and V. Kumar

2. Advanced Practical Physics for Students by B.L. Worsnop and H.T. Flint

3. B.Sc. Practical Physics by C.L. Arora

4. Experimental Physics: Modern Methods by R.A. Dunlap

Online Resources:-

1. Link for e-Books for Physics: Physics Practical: https://egyankosh.ac.in/handle/123456789/82374: https://www.lightandmatter.com/lab 223 pdf;
2. Virtual Lab: https://vlab.amrita.edu/index.php?sub=18&brch=281
3. https://www.compadre.org/books/?ID=70&FID-63273
4. https://www.edutech.com/category/higher-education/engineering-labs/virtual-labs-1
5. https://phet.colorado.edu/en/simulations/wave-interference 6. https://egyankosh.ac.in/handle/123456789/82374

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 50 Marks
Continuous Internal Assessment (CIA): 15 Marks
End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): 15 (By Course Teacher)	Internal Test/Quiz:10+10 Assignment/ Semenar-05 Total Marks-15	Better marks out of the two Tot Quiz + obtained marks in Assignment shall be considered against 15 Marks

End Semester Exam (ESE):35	Laboratory/Field Skill Performance: On spot Assessment Section A : Performed the Task based on lab, work 20*1=20 Marks B: Sporting based on lab, work (written) 10*1=10Marks

	Section B : Viva-voce (based on principle/technology) - 5*1=05 Marks
Signature of Members (BoS)	

FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART – A : Introduction				
Programme : Bachelor of Science (Certificate/Diploma/Degree/Honors)			**Semester - IV**	**Session : 2024-2028**
1	**Course Code**	**CHSC – 04T**		
2	**Course Title**	**Organic And Physical Chemistry - I**		
3	**Course Type**	**Discipline Specific Course (DSC)**		
4	**Pre-requisite (if, any)**	**As per programme**		
5	**Course Learning. Outcomes (CLO)**	➢ Master the synthesis, properties, and reactivity of various functional groups and apply this knowledge to understand their significance in organic chemistry. ➢ Employ the principles of chemical/Ionic equilibriya, their influencing factors and applications . ➢ Interpret phase diagrams for one and two –component system, determine degrees of freedom and identify the triple point. ➢ Master the principles and applications of liquid – liquid mixtures using Raoult's law, Henry,s and Nernst Distribution law.		
6	**Credit Value**	**3 Credits**	**Credit = 15 Hours – learning & Observation**	
7	**Total Marks**	**Maximum Marks: 100**	**Minimum Passing marks: 40**	

PART – B: Content of the Course

Total No. of teaching – learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	**Topics (course contents)**	**No. Of Period**
I	**A. Halidesh (5 hrs.)** **(i) Alkyl Halides:** Preparation: from alkenes and alcohols. Reactions: Nucleophilic substitution reactions of alkyl halides (alcohol, ester, nitrile &isonitrile formation, Williamson's ether synthesis), mechanism and stereochemistry of nucleophilic substitution reactions (SN1 and SN2), factors affecting SN1 and SN2 reactions. **(ii) Aryl Halides:**Chlorobenzene: Preparation by aromatic halogenation and Sandmeyer reaction. Aromatic nucleophilic substitution involving Benzyne Mechanism: KNH_2/NH_3 (or $NaNH_2/NH_3$). Reactivity and Relative strength of C-Halogen bond in alkyl and aryl/ Vinyl halides. **B. Alcohols & Phenols (7 hrs.)** **(i) Alcohols** **(a)** Monohydric-nomenclature, methods of formation, Properties & chemical reactions distinction between primary, secondary & tertiary alcohols. **(b) Dihydric alcohols:** Nomenclature, methods of formation of ethylene glycol (from ethylene, epoxide, ethylene dibromide and ethylene diamine). Chemical reactions of vicinal glycols: with carbonyl compounds, dehydration, oxidative cleavage with Pb (OAc)4 and HIO4 and	11

	Pinacol-Pinacolone rearrangement (with mechanism). **(c) Trihydric alcohols:** Nomenclature and methods of formation (from Hydrolysis of fats and oils, propene and acrolein), chemical reactions of glycerol (with PCl5, HI, oxidation, and dehydration) and uses/applications. **(ii) Phenols** Nomenclature and methods of formation, physical properties, and acidic character. Resonance stabilization of phenoxide ion. Comparative acidic strength of alcohols and phenols. Electrophilic aromatic substitution, acetylation, and carboxylation. Mechanism of Fries rearrangement, Claisen rearrangement, and Reimer-Tiemann reaction.	
II	**ldehydes/Ketones and acid/Its derivatives** **A. Aldehydes and Ketones (6hrs)** Nomenclature and structure of the carbonyl group, synthesis of aldehydes and ketones. Acidity of alpha hydrogens and formaton of enolate, Concept of reactive methylene group, Keto-enoltautomerism in Acetoacetic ester. Oxidation of aldehydes by KMnO4, and Tollen's reagent, Reduction of aldehydes by $LiAlH_4$ and $NaBH_4$. Mechanism of nucleophilicadditons to carbonyl group with particular emphasis on aldol, Perkin, and Knoevenagel reactions. Wittig and Mannich reaction (without mechanism), Baeyer-Villager oxidation of Ketones (without mecheanism), Cannizaro reaction (with mechanism), MPV, Clemmensen, and Wolf-Kshner reaction. **B. Acid & its derivatives (5 hrs)** **(i) Carboxylic Acids** Nomenclature, structure, physical properties, acidity of carboxylic acids, effect of substituent on acid strength, method of preparation and chemical reaction. Hell-Volhard-Zeilinsky (HVZ) reaction, Reduction of carboxylic acids, Mechanism of Decarboxylation. Di carboxylic acids: - Methods of formation and chemical reactions, **(ii) Carboxylic Acid Derivatives** Structure, method of preparation & physical properties of acid chlorides, esters, amides (Urea) and acid anhydrides, Relative stability of acyl derivatives.	11
III	**Equilibrium** **A. Chemical equilibria (3hrs)** Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mas action, equilibrium constants and their quantitative dependence on temperature, pressure, and concentration, factors affecting equilibrium –Le Chatelier's principle. **B. Ionic Equilibria (5 hrs)** Ionization of acids and bases, Strong and weak electrolytes, degree of ionization ionization constant and ionic product of water. Ionization of weak acids and bases, pH scale, common ion effect and solubility product with illustrative examples), Salt hydrolysis-calculation of hydrolysis constant and degree of hydrolysis for salt of strong acid and weak base, Buffer solutions –Introduction, Henderson-Hasselbalch equations for acidic and basic buffer. **C. Phase Equilibrium (3 hrs)** **(A)** Hibbs phase (no derivation), phase, component and degree of freedom, Application of phase rule to one component system (water system and Sulphur systems), Reduced phase rule. Application of phase rule to two component systems: Pb-Ag system. Congruent-Ferric chloride system.	11

IV	**Photochemistry and Liquid-liquid mixtures** **(A) Photochemistry (8hrs)** Interaction of radiation with matter, difference between thermal and photochemical reactions, Laws governing absorption of light, laws of photochemistry, Jablonski diagram depicting various process quantum yield, determination of quantum yield of reactions, reasons various processes, quantum yield. Some examples of photochemical reactions (e.g. Photochemical decoposition of Hydrogen iodide, Photosynthesis of HBr from H_2 and Br_2 and photosynthesis of HCl from H_2 and Cl_2). Photosensitization and Quenching, Photosensitized reactions. **(B) Liquid-Liquid mixtures (3 hrs)** Ideal liquid mixtures, Raoult's law of ideal solutions, Henry's law and its applications, Nernst distributionlaw, limitations, and applications (association and dissociation – No derivation.)	11
Key words	***Halides (alkyl & aryl halides), Alcohols, Phenols, Aldehydes & Ketones, Carboxylic acids & their derivatives, Equilibrium (Chemical, Ioic, and Phase equilibria), Photochemistry, Liquid-Liquid mixtures.***	

PART- C: Learning Resources

Text Books , Reference Books and Others

Text Books Recommonded:

1. Bahl, A. (2010),AdvancedOrganic chemistry S.Chand publishing.
2. Singh, J. &Yadav, L. D. S. (2016), Advanced Organic chemistry. PragatiPrakashan Meerut.
3. Puri, L.B. Sharma, L. R. &Pathania, M. S. (2013), Principles of physical chemistry, Vishal Publishing. Co.
4. Kapoor, K.L. (2019), A. Textbook of Physical Chemistry. Thermodynamics and Chemical Equilibrium (SI Units) – Vol. 2. 6th Edition.

Reference Books Recommonded:

5. Boyd, R. N. &Morrison , R. T. (1983), Organic Chemistry (uden title), Allyn and Bacon.
6. Physical Chemistry.
7. Atkins, P. W. De Paula, J.& Keeler, J. (2023), Atkins Physical Chemistry, Oxford University Press.
8. MeQuarrie, D.A. & Simon, J. D. (2004), Molecular Thermodynamics Viva Books Pvt. Ltd:
9. New Delhi.

OnlineResources

10. e –Resources /e -books and e -learning portals.
11. https://ncert.nic.in/ncerts/I/lech202.pdf
12. https://unacademy.com/content/wp-content/uploads/sites/2/2022/10/30.-Aldehydes-Ketones-and-Carboxylic-acid.pdf
13. https://egyankosh.ac.in/bitstream/123456789/68232/3/Unit-3.pdf
14. https://magadhmahilacollege.org/wp-content/uploads/2020/photochemistry and jablonski diagram M.sc II Sem.pdf

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF CHEMISTRY

COURSE CURRICULUM

PART – A : Introduction			
Programme : Bachelor of Science (Certificate/Diploma/Degree/Honors)		**Semester - IV**	**Session : 2024-2028**
Course Code	**CHSC – 04P**		
Course Title	**CHEMISTRY LAB COURSE - IV**		
Course Type	**Discipline Specific Course (DSC)**		
Pre-requisite (if, any)	**As per programme**		
Course Learning. Outcomes (CLO)	➢ Understand the fundamentals of organic compounds analysis including preparation of sodium extract and detection of elements. ➢ Identify functional groups and prepare derivations. ➢ Determine the P^H of various samples like water /acid/base/soil etc. ➢ Apply the concepts of phase equilibria to determine critical solution temperature and study concepts of Nernst distribution law and determine equilibrium constant of various reactions.		
6 **Credit Value**	**1 Credits**	**Credit = 30 Hours Laboratory or Field Learning/ Training**	
7 **Total Marks**	**Maximum Marks: 50**	**Minimum Passing marks: 20**	
PART – B: Content of the Course			
Total No. of learning - Training / Performance Periods: - 30 Periods (30 Hours)			

Module	**Topics (course contents)**	**No. Of Period**
Lab./Field Training / Experiment Contents of Course	**Organic Analysis :** SystematicIdentification of organic compounds: (a) Test for aliphatic and aromatic nature of substances. (b) Test for saturation and unsaturation. (c) Detection of elements (N,S and halogens) in organic compounds. (d) Identification of functional groups : (i) Carboxylic acids (ii) Phenols (iii) Aldehydes (iv) Ketones (v) Esters (vi) Carbohydrates (vii) Amines (viii) Amides (ix) Halogen compounds. (e) Determination of melting and boiling points. (f) Preparation of solid derivatives. **P^H Determination** (1)Determination of P^H of soil, water. (2) To measure the $P^H$of various solution using P^H indicators and P^H meter. (3) To prepare and study the properties of buffer solutions. **Phase Equilibrium:** (1) To determine the critical solution temperature of two partially miscible liquids (phenol-water systems). (2) To study the effect of solute such as (i) sodium chloride (NaCl) , (ii) succinic acid(HOOC-	30

	CH_2- CH_2-COOH) on the critical solution temperature of two partially miscible liquids (e.g. phenol-water system). (3) To construct the phase digram of two compounds (e.g. diphenylamine-benzophonone system) by cooling method. **Nernst Distribution Law** (1) To determine the partition coefficient of Iodine between water and carbon tetrachloride / Kerosene. (2) To determine the partition coefficient of benzoic water and benzene. (3) To determine the equilibrium constant of the reactions, $KI+I_2=KI_3$ by distribution method.	
Keywords	**Organic analysis , Aromatic/Aliphatic compounds , Saturated /Unsaturated compounds, Element detection , Functional groups, Derivatives for Functional groups, P^H, Phase equilibria, Nernst Distribution Law.**	

PART- C: Learning Resources

Text Books , Reference Books and Others

Text Books Recommonded:

1. Sahu, D. P. &Bapai, K. N. (2022), Unified practical chemistry. NavbodhPrakashan.
2. Yadav, J. B. (2006), Advanced Practical Physical Chemistry. Krishna Prakashan Media.
3. Pandey, O. P. &Bapai, D. N. (2010), practical chemistry. S. Chand Publisher.

Reference Books Recommonded:

4. Moudgill, H.K. (2010), Textbook of physical chemistry. PHI Learning Pvt. Ltd.
5. Adamson, A. (2012), A. Textbook of physical chemistry. Elsevier.
6. Findlay. A. (1923), Practical Physical Chemistry.Langmaans, Green.
7. Learnard, J. Lygo, B. & Procter, G.(2013), Advanced Organic Chemistry.CRC Press.

OnlineResources

8. e –Resources /e -books and e -learning portals.
9. https://faculty.ksu.edu.sa/sites/default/files/vogel-practical organic chemistry 5th edition.pdf
10. https://tech.chemistrydoes.com/Books/Physical/Advanced-Physical-Chemistry-Experiments-by-J-N-Gurtu-&-Amit-Gurtu.pdf
11. https://byjus.com/chemistry/conductomtric-titration/
12. https://chem.libretexts.org/Courses/University of California Davis/Chem4BLab%3A General Chemistry for Majorrs II/I%3A Thermochemistry (Experiment)
13. https://www.vim.edu/chemistry/courses/manuals/chem1010/experiment 10.pdf
14. https://www.masterjieeclasses.com/wp-content/uploads/2019/02/11.Practical-Organic-Chemistry/

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF MATHEMATICS

COURSE CURRICULUM

PART-A:Introduction		
Programme**: Bachelor of Science (Certificate/Diploma/DegreeHonors)**	**Semester-IV**	**Session:2024-2028**

Course Code	**MASC-04**	
CourseTitle	**Abstract Algebra**	
Course Type	**Discipline Specific Course (DSC)**	
Pre-requisite(ifany)	**Knowledge of algebra, vector space and inner product space.**	
Course Learning. Outcomes(CLO)	**This Course will enable the students to:** ➢ Understand of Homomorphism, Isomorphism of Group ➢ Understand Cyclic and Permutation Groups. ➢ Understand vector spaces, subspaces, basis, dimension and their properties. ➢ Learn about properties of linear transformation and isomorphism theorems. ➢ Understand the concept of linear transformations.	
CreditValue	**4Credits**	**1 Credit=** 15Hours-learning &Observation
TotalMarks	**Max.Marks:** 100	**MinPassing Marks:**40

PART-B:Content of the Course

TotalNo. ofTeaching-learningPeriods(01 Hr.perperiod)-60 Periods(60 Hours)

Unit	Topics	
I	**Isomorphism Theorems, Cyclic and Permutation Groups:** Group homomorphism and isomorphism with properties; First, second and third isomorphism theorems for groups, Cyclic groups and properties, Classifications of subgroup of cyclic groups, Permutation group and properties, Even and odd permutations, Cayley's theorem.	**15**
II	**Ring, Field and Integral Domain, Ideals:** Definition and properties of a ring, example of rings, Subrings, Integral domain and fields, characteristic of ring and field. Ring Homomorphism, Ideals and Quotient Rings. Field of Quotients of an Integral Domain, Euclidean Rings, Polynomial Rings, Polynomials over the Rational Field. The Eisenstein Criterion, Polynomial Rings over Commutative Rings, Unique factorization domain. R unique factorization domain implies so is R [x1, x2..... xn].	**15**
III	**Vector Spaces:** Definition and examples of vector spaces. Subspaces. Sum and direct sum of subspaces, Linear span. Linear dependence, independence and their basic properties. Basis. Finite dimensional vector spaces. Existence theorem for bases. Invariance of the number of elements of a basis set. Dimension. Existence of complementary subspace of a subspace of a finite dimensional vector space. Dimension of sums of subspaces. Quotient space and its dimension.	**15**
IV	**Linear Transformation:** Linear transformations and their representation as matrices. The Algebra of linear transformations. The rank nullity theorem. Change of basis. Dual space. Bi-dual space and natural isomorphism. Adjoint of a linear transformation.	**15**

PART-C:LearningResources

TextBooks,ReferenceBooks andOthers

TextBooksRecommended-

1. Nathan Jacobson (2009). Basic Algebra I (2nd edition). Dover Publications.
2. Nathan Jacobson (2009). Basic Algebra II (2nd edition). Dover Publications.

ReferenceBooksRecommended-

3. I. M. Gel'fand (1989). Lectures on Linear Algebra. Dover Publications.
4. Kenneth Hofliman& Ray Kunze (2015). Linear Algebra (2nd edition). Prentice-Hall.
5. Serge Lang (2005). Introduction to Linear Algebra (2nd edition). Springer India.
6. Gilbert Strang (2014). Linear Algebra and its Applications (2 edition). Elsevier

E-resources: https://onlinecourses.nptel.ac.in
https://epqp.inflibnet.aci.in
https://swayam.gov.in
https://www.mooc.org

Part-D:Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: **100 Marks**
Continuous Internal Assessment(CIA): **30 Marks**
End Semester Exam(ESE): **70 Marks**

Continuous Internal Assessment(CIA):30 (By Course Teacher)	Internal Test/Quiz:20+20Assignment/ Seminar-10 TotalMarks-30	Better marks out of the two Total Quiz +obtained marks in Assignment shall be considered against30Marks
End Semester Exam	**Two section :** A & B Section A:Q1.Objective10*1=10MarksQ2.Short answer type question -5*4=20 Section B:Descriptiveanswertype question,1 outof2fromeach unit -4*10=40Marks	

Signature of Members(BoS)

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FOUR YEAR UNDERGRADUATE PROGRAM

DEPARTMENT OF HISTORY

COURSE CURRICULUM

PART-A:Introduction			
Programme: Bachelor of Science (Certificate/Diploma/Degree/Honors)		**Semester-IV**	**Session: 2024-2028**
Course Code	**DUHISC-02**		
Course Title	**History of India from beginning to 2nd century BC**		
Course Type	**General Elective (GE)**		
Prerequisite	**As per programme**		
Course Learning Outcomes (CLO)	**At the end of this course, the students will be able** • Understand about various sources of ancient Indian History. • Understand various chronological Period of ancient Indian history. • Become familiar with various aspects of political and cultural history of those periods		
Credit Value	**4 Credits**	**1 Credit-15 Hours - Learning & Observation**	
Total Marks	**Max. Marks:100**	**Min marks -40**	

PART -B: Content of the Course

Total No. of Teaching-Learning Periods (01 Hr. per period)-60 Periods (60 Hours) No. of Topics (Course contents)

Unit	**Topics(Course Content)**	**No. of Period**
I	1. Sources of ancient Indian history . 2. Literacy of sources Brahman, Jain, Buddha and accounts of foreign Travelers 3. Archaeological sources: stone ,tools ,inscriptions ,coins Architecture and sculptures	**15**
II	1. Vedic age 2. Mahajanapadas 3. Flourishing of Magadh Empire	**15**
III	1. Achievements of Chandragupta Maurya and Ashoka and decline of mauryan Empire 2. Indo greeks 3. Sunga	**15**
IV	1. Satvahan 2. Shaka kshatrap and partiyon 3. kharvela	**15**
Keywords	Vedic age ,Mahajanapadas ,Magadh ,Empire ,kharvela	

Name and Signature of Convener & Members of CBS

4.

5.

6.

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. उदयनारायण राय - **गुप्त राजवंश तथा उसका इतिहास** (नया संस्करण) 1988
2. श्री राम गोयल- भारत का राजनैतिक इतिहास भाग 2 एवं 3
3. श्री राम गोयल- **गुप्त साम्राज्य का इतिहास**
4. विशुद्धानंद पाठक- **उत्तर भारत का राजनीतिक इतिहास**
5. डी.सी. गांगुली - परमार राजवंश
6. अवध बिहारी लाल अवस्थी- राजपूत राजवंश
7. भगवती प्रसाद पांथरी- **गौखरी और पुष्यभूमि राजवंश**
8. डॉ. बैजनाथ शर्मा- हर्षवर्धन
9. डॉ. के.ए. नीलकंठ शास्त्री- **दक्षिण भारत** का इतिहास
10. Majumdar, Roy - An Advanced History of India Vol. I
11. Ashvini Agrawal- Rise and Fall of the imperial Gupta
12. R.C. Majumdar & A.D. Pusalkar (Ed.) The Classicale Age "The age of Imperial

Online Resources:

- http://inflibnet.ac.in/index.php
- https://www.swayamprabita.gov.in/index.php

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100 marks
Continuous Internal Assessment (CIA): 30 Marks.
End Semester Exam (ESE): 70 marks

Continuous Internal Assessment (CIA): (By Course Teacher)	**Internal test/Quiz-:20 & 20 Assignment /seminar-10 Total marks:-30**	**Better marks out of the two test/Quiz+ obtained marks in assignment shall be considered against 30 marks.**
End Semester Exam (ESE):	**Two section- A&B Section A: Q1. Objective-10 marks: Q2. Short answer type-5x4=20 marks Section B: Descriptive answer type question, 1 out of 2 from each unit- 4x10=40 marks**	

Name and Signature of Convener & Members of CBoS.

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FOUR YEAR UNDERGRADUATE PROGRAM

DEPARTMENTOF MATHEMATICS

COURSECURRICULUM

PART-A: Introduction		
Programme **:Bachelor of Sciences (Certificate/Diploma/Degree Honors)**	**Semester-IV**	**Session:2024-2028**

Course Code	**MASE-04**	
Course Title	**Mechanics**	
Course Type	**Discipline Specific Elective (DSE)**	
Pre-requisite(if any)	**Basic idea of Statics and Dynamics**	
Course Learning. Outcomes(CLO)	**This Course will enable the students to:** ➢ knowledge of basic mechanics such as simple harmonic motion, motion under other laws and forces. ➢ ➢ Learn about a nul point, a nul line, and a nul plane with respect to a system of forces acting on a rigid body together with the idea of central axis. ➢ Understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a rigid body. Determine the centre of gravity of some materialistic systems and discuss the equilibrium of a uniform cable hanging freely under its own weight. ➢ Deal with the kinematics and kinetics of the rectilinear and planar motions of a particle including the constrained oscillatory motions of particles. Learn that a particle moving under a central force describes a plane curve and know the Kepler's laws of the planetary motions, which were deduced by him long before the mathematical theory given by Newton. ➢ Understand the reduction of force system in three dimensions to a resultant force acting at a base point and a resultant couple, which is independent of the choice of base of reduction.	
Credit Value	**4Credits**	**1 Credit=** 15Hours-learning &Observation
Total Marks	**Max. Marks:** 100	**Min Passing Marks:**40

PART-B: Content of the Course

TotalNo. ofTeaching-learningPeriods(01 Hr.perperiod)-60 Periods(60 Hours)

Unit	**Topics**	
I	Analytical conditions of equilibrium of Coplanar Forces. Forces in three dimensions, Poinsot's central axis, Wrenches, Null lines and planes.	**15**
II	Virtual work, Stable and Unstable equilibrium, Catenary.	**15**
III	Velocities and accelerations along and transverse directions, and along tangential and normal directions, Simple harmonic motion, Motion under other law of forces. Elastic strings.	**15**
IV	Motion in resisting medium, Constrained motion, Motion on smooth and rough plane curves. Motion of particles of varying mass, Central orbit, Keplers laws of motion, Rocket motion, Motion of particle in three dimensions	**15**

PART-C:LearningResources

TextBooks, Reference Books and Others

Text Books Recommended-

1.R.S. Verma (1962). a text books of statics Pothishala Pvt. Ltd.
2. P.L. Shrivastava (1964). Elementary dynamics. Ram Narayan Lal, Beni Prasad Publishers Allahabad

Reference Books Recommended-

3.A.S. Ramsey (2009), Dynamics, Cambridge University Press
4. S.L. Loney (2006), An Elementary Treatise on the dynamics of a partical and of rigid bodies..
5. J.L. Synge an Griffith (1949). Principal of Mechanics, McGraw-Hill

E-resources: https://onlinecourses.nptel.ac.in
https://epqp.inflibnet.aci.in
https://swayam.gov.in
https://www.mooc.org

Part-D:AssessmentandEvaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: **100 Marks**
Continuous Internal Assessment(CIA): **30 Marks**
End Semester Exam(ESE): **70 Marks**

Continuous Internal Assessment(CIA):30 (By Course Teacher)	Internal Test/Quiz:20+20Assignment/ Seminar-10 TotalMarks-30	Better marks out of the two Total Quiz +obtained marks in Assignment shall be considered against30Marks

End SemesterExam	**Twosection :** A & B Section A:Q1.Objective10*1=10MarksQ2.Short answer type question -5*4=20 Section B:Descriptiveanswertype question,1 outof2fromeach unit -4*10=40Marks

Signature of Members(BoS)

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FOUR YEAR UNDERGRADUATE PROGRAMME

DEPARTMENT OF ENGLISH

COURSE CURRICULUM

PART-A: Introduction			
Programme: Bachelor of Science (Certificate/Diploma/Degree/Honors)		**Semester-IV**	**Session: 2024-2028**
Course Code	**AEC- 04**		
Course Title	**Communicative English and Soft Skills**		
Course Type	**Ability Enhancement Course (AEC)**		
Prerequisite	**As per programme**		
Course Learning Outcomes (CLO)	**At the end of this course, the students will be able** • Learn deviant use of English both in written and spoken forms. • Understand the importance of communication n English. • Apply the ability to improve competence in using English language. • Analyze the importance of reading skills, • Develop language for speaking with confidence		
Credit Value	**2 Credits**	**1 Credit-15 Hours - Learning & Observation**	
Total Marks	**Max. Marks: 50**	**Min marks -20**	

PART -B: Content of the Course		
Total No. of Teaching-Learning Periods (45 min. per period)-30 Periods		
Unit	**Topics(Course Content)**	**No. of Period**
I	**What is communication?** • Purpose of Communication. • Types of Communication (Verbal and Non- Verbal), • The motivating factors (lntrinsic and Extrinsic) • Barriers of Communication (Internal and External).	**07**
II	**Building Vocabulary** i. Use of Dictionary, ii. Building vocabulary through synonyms and antonyms, iii. Use of Phrasal Verbs, Idioms and Phrases iv. Unseen passage	**07**
III	**Conversation in English** (Performance Based) **A) Reading:** Very short stories (Gif of Magi, Cinderella, The Selfish Giant, Stories from Panchatantra), Newspaper reports / Fact-based articles, Diction and tone, Identifying topic sentences, Reading aloud: Reading an article/report.	**08**

	B) Spoken English for the Real world and Situational Dialogues (any four) • Call Center: Talking to service Providers, Professional Enquiries, Talking with peers/ seniors. • Bank: for opening an account (seeking information on loans/FDs/other schemes. • Office: (seeking information regarding job vacancy) • Market (asking for price of an object, discount etc), • Restaurant: (asking for the special dish, offerings in the menu and ordering for food) • At the Railway Station / Bus Station enquiry: (Arrival and departure of buses/ trains) • Hotel: Booking a room, asking tariff rate • Travel agency:-(Asking to book tickets fares, finding vacancies in hotels) C) **Greetings and Common Etiquettes:** Introducing oneself Invitation; Making Requests; Expressing Gratitude; Complimenting and Congratulating; Expressing Sympathy; Apologizing; Complaining and Expressing Regret	
IV	**Applied Riding Practice and Ethics** i. Introduction to trail riding or arena riding ii. Group riding etiquette and communication iii. Intro to jumping and dressage (optional for advanced learners) iv. Ethical treatment and welfare of horses v. Assessment through practical demonstrations and logbook maintenance **Presentation skills** (Performance Based): Effective oral presentation, Characteristics of good oral presentation. Use of quotations and anecdotes. Ways of Oral Presentation (Seminar, Viva -voce, Interview, Power Point etc.) Gestures/ Mannerism during oral presentation. Media methods used for effective oral presentation, Body Language, Attire.	**08**
Keywords	Communication, Vocabulary, Conversation, Reading, Presentation.	

Name and Signature of Convener & Members of CBS

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

- Fluency in English - Part II, Oxford University Press, 2006.
- Enrich Your English, OUP, SR Inthira and V. Saraswathi, CIEFL,1997
- Oxford A-Z of English Usage, ed. Jeremy Butterfield, OUP, 2007.
- Longman Dictionary of Common Errors, N.D. Turton and J.B. Heaton, Longman, 1998
- Contemporary Communicative English, S Chand
- Malhotra Prerna, Deb Dulal Halder,(2019) Communication Skills: Theory and Practice, Eighth Edition,
- BookAge Publications, New Delhi.

Online Resources:

- Applying Communication Theory for Professional Life: A Practical Introduction. Dainton andZelley, http://tsime.uz.ac.zw/claroline/backends/download.php/url-L0ludHJvX3RvX2NvbWl1bmliYXRpb2Sf
- https://web.sol.du.ac.in/my_modules/type/cbcs-4l=2ldata/root/B.Com/Semester%20ABILITY-ENHANCEMENT 20COMPU_ SORY%20COURSE-AECC/English%20Communication%20A-B-C/Unit%201-5.pdf
- https:/larchive.ore/details/personality-development-book/mode/1up

- https://www.coursera.org/articles/presentation-skills
- https://eniaminball.com/blogleood-body-lanzuage-best-visual-aid-falks/
- https://www.cbs.de/en/blog/15-effective-presentation-tips-to-improve-presentation-skills/
- https://blow.moderngeoy.com/importance-of-body-language-in-presentations-good-bad-examples

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 marks
Continuous Internal Assessment (CIA): 15 Marks.
End Semester Exam (ESE): 35 marks

Continuous Internal Assessment (CIA): (By Course Teacher)	**Internal test/Quiz-:10 & 10 Assignment /seminar-05 Total marks:-15**	**Better marks out of the two test/Quiz+ obtained marks in assignment shall be considered against 15 marks.**
End Semester Exam (ESE):	**Two section- A&B Section A: Q1. Objective-05 marks: Q2. Short answer type-5x2=10 marks ction B: Descriptive answer type question, 1 out of 2 from each unit-4x5=20 marks otal = 35 marks**	

Name and Signature of Convener & Members of CBoS.

श्री Davara University

Established under Chhattisgarh Private Universities (Establishment and Operation) Act, 2005

FOUR YEAR UNDERGRADUATE PROGRAMME

EQUINE STUDIES &HORSEMANSHIP

COURSE CURRICULUM

PART-A:Introduction			
Programme: Bachelor of Science (Certificate/Diploma/Degree/Honors)		**Semester-IV**	**Session: 2024-2028**
Course Code	**DUSECHS-T&P**		
Course Title	**Equine Studies &Horsemanship**		
Course Type	**Skill Enhancement Course (SEC)**		
Prerequisite	**As per programme**		
Course Learning Outcomes (CLO)	**At the end of this course, the students will be able** • To develop riding proficiency and demonstrate basic riding skills and control at various gaits. • To understand equine behavior and care by gaining knowledge of horse behavior and basic care practices. • To enhance physical fitness and coordination by improving fitness, balance, and coordination through riding practice. • To learn riding techniques and styles by exploring different riding techniques and disciplines for specialization. • To promote safety and risk management by applying safety protocols and risk management strategies in equestrian activities.		
Credit Value	**2 Credits**	**1 Credit-15 Hours - Learning & Observation**	
Total Marks	**Max. Marks: 50**	**Min marks -20**	

PART -B: Content of the Course		
Total No. of Teaching-Learning Periods (45 min. per period)-30 Periods		
Unit	**Topics(Course Content)**	**No. of Period**
I	**Introduction to Horse-Riding and Equine Basics** i. History and evolution of horse-riding in sport and culture ii. Introduction to equine anatomy and physiology iii. Types of horse breeds and their characteristics iv. Equipment and tack: saddle, bridle, stirrups, reins, riding attire v. Basic grooming and horse care	**07**
II	**Ground work and Safety Protocols** v. Approaching, haltering, and leading a horse vi. Stable management and horse behaviour basics vii. Feeding, hydration, and routine checks viii. Safety guidelines for riders and handlers ix. Risk management and emergency procedures	**07**

III	**Basic Riding Techniques** i. Mounting and dismounting techniques ii. Correct rider posture and balance iii. Use of reins, legs, and seat for communication iv. Walking, halting, and changing directions v. Basic trot and control exercises	**08**
IV	**Applied Riding Practice and Ethics** vi. Introduction to trail riding or arena riding vii. Group riding etiquette and communication viii. Intro to jumping and dressage (optional for advanced learners) ix. Ethical treatment and welfare of horses x. Assessment through practical demonstrations and logbook maintenance	**08**
Keywords		

Name and Signature of Convener & Members of CBS

PART-C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

Online Resources:

i. https://www.coursera.org/learn/equine
ii. https://www.coursera.org/learn/equine-welfare
iii. https://www.edx.org/learn/animal-behavior
iv. https://www.youtube.com/user/EquestrianCoach
v. https://www.riding-instructor.com/
vi. https://horseandrider.com/
vii. https://equestrian.ca/
viii. https://www.bhs.org.uk/
ix. https://www.udemy.com/courses/search/?q=horse%20riding
x. https://equineinstitute.org/

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

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