

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)
NATIONALLY ACCREDITED (III CYCLE) WITH “A” GRADE BY NAAC
ISO 9001:2015 Certified
TIRUCHIRAPPALLI – 18

PG AND RESEARCH DEPARTMENT OF PHYSICS



B.Sc., PHYSICS SYLLABUS
(2022-2023 Onwards)

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS), TRICHY-18.
PG AND RESEARCH DEPARTMENT OF PHYSICS

VISION

To establish a substratum for excellence and creation of knowledge by igniting the essence of learning physics and exploring its area of research with novel ideas.

MISSION

Our mission is two – fold.

- To provide an outstanding and distinctive education to our undergraduate and postgraduate students.
- To expand our research enterprises via centers and institutes to achieve national and international prominence in strategic research areas.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEOs	Statements
PEO1	LEARNING ENVIRONMENT To facilitate value-based holistic and comprehensive learning by integrating innovative learning practices to match the highest quality standards and train the students to be effective leaders in their chosen fields.
PEO2	ACADEMIC EXCELLENCE To provide a conducive environment to unleash their hidden talents and to nurture the spirit of critical thinking and encourage them to achieve their goal.
PEO3	EMPLOYABILITY To equip students with the required skills in order to adapt to the changing global scenario and gain access to versatile career opportunities in multidisciplinary domains.
PEO4	PROFESSIONAL ETHICS AND SOCIAL RESPONSIBILITY To develop a sense of social responsibility by formulating ethics and equity to transform students into committed professionals with a strong attitude towards the development of the nation.
PEO5	GREEN SUSTAINABILITY To understand the impact of professional solutions in societal and environmental contexts and demonstrate the knowledge for an overall sustainable development.

PROGRAMME OUTCOMES FOR B.Sc PHYSICS PROGRAMME

PO NO.	Programme Outcome On completion of B.Sc Physics Programme, The students will be able to
PO 1	Domain Knowledge: Analyse, design and develop solutions by applying firm fundamental concepts of basic sciences and expertise in discipline.
PO 2	Problem solving: Ability to think rationally, analyse and solve problems adequately with practical knowledge to assess the environmental issues.
PO 3	Creative thinking and Team Work: Develop prudent decision-making skills and mobility to work in teams to solve multifaceted problems.
PO 4	Employability: Self-study acclimatize them to observe effective interactive practices for practical learning enabling them to be a successful science graduate.
PO 5	Life Long Learning: Assure consistent improvement in the performance and arouse interest to pursue higher studies in premium institutions.

PROGRAMME SPECIFIC OUTCOMES FOR B.Sc PHYSICS PROGRAMME

B.Sc PHYSICS CURRICULUM [2022-2023 Onwards]

PSO NO.	Programme Specific Outcomes Students of B.Sc Physics will be able to	POs Addressed
PSO1	Intensify the student academic capability, unique qualities and transferable skills which will give them opportunity to evolve as responsible citizens.	PO1, PO2, PO4
PSO2	Explain the fundamentals laws involved in physics.	PO1, PO5
PSO3	Understand the theory and consequence of the various physical occurrence.	PO1,PO2,PO3,PO5
PSO4	Carryout experiments to interpret the laws and concepts of Physics.	PO1,PO2,PO5
PSO5	Relate the theories learnt and the skills procured to solve enduring problems.	PO1,PO2,PO3,PO5

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS), TRICHY-18.

B.Sc., PHYSICS PROGRAMME STRUCTURE

(For the candidates admitted from the Academic year 2022-2023 and onwards)

Semester	Part	Course	Title	Course Code	Inst.Hrs./ Week	Credits	Exam			Total
							Hrs	Marks		
								Int	Ext	
I	I	Language Course - I (LC)	,f;fhy ,yf;fpak;	22ULT1	6	3	3	25	75	100
			Hindi Literature & Grammar – I	22ULH1						
			History of Popular Tales, Literature and Sanskrit Story	22ULS1						
			Basic French – I	22ULF1						
	II	English Language Course -I (ELC)	Functional English for Effective Communication – I	22UE1	6	3	3	25	75	100
	III	Core Course - I (CC)	Properties of Matter, Waves and Acoustics	22UPH1CC1	5	5	3	25	75	100
		Core Practical - I (CP)	Properties of Matter, Waves and Acoustics – Practical	22UPH1CC1P	3	3	3	40	60	100
		First Allied I	Calculus and Fourier series	22UPH1AC1	4	3	3	25	75	100
		First Allied II	Algebra,Analytical Geometry of 3D & Trigonometry	22UPH1AC2	4	3	3	25	75	100
	IV	Ability Enhancement Compulsory Course - I (AECC)	UGC Jeevan Kaushal – Universal Human Values	22UGVE	2	2	-	100	-	100
Total					30	22				700

Semester I	Internal Marks: 25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
22UPH1CC1	PROPERTIES OF MATTER, WAVES AND ACOUSTICS	CC-I	5	5

Course Objectives

- To build the conceptual understanding of materials with mathematical skills and reviews the prior knowledge of properties of matter.
- To study the basics of bending of beams and its applications.
- To study the concepts of viscosity and surface tension.
- To study concepts of waves and understand the acoustical phenomena.

Pre-requisites

- Knowledge about the concepts of elasticity and bending moment
- Fundamental knowledge of capillarity, viscosity of various liquids
- Develop the idea of formula, frequency of vibration and factors affecting the architectural acoustics

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the Course, the Student will be able to	Cognitive Level
CO 1	Understand the basic ideas of Physical properties of different states of matter and sound	K1, K2
CO 2	Analyze the characteristics of elasticity, Simple Harmonic motion, viscosity, surface tension and the requisites of good acoustics	K3
CO 3	Evaluate the ideas of elasticity, Harmonic oscillations and excess pressure of surface tension in fluids and analyze the capillarity nature in liquids	K4
CO 4	Apply the concepts of moduli of elasticity, surface tension, viscosity, waves and acoustics	K3, K5
CO 5	Develop the idea of bending of beams, composition of Harmonic oscillation, empirical relations between surface tension and temperature, stokes formula, frequency of vibration of strings and factors affecting the architectural acoustics	K4

Mapping of CO with PO and PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	3	3	3	2	1	3	2	3	2	1
CO 2	3	3	2	3	1	3	2	3	2	2
CO 3	3	3	2	1	1	3	3	2	2	1
CO 4	3	3	3	2	2	3	3	2	3	1
CO 5	3	3	3	2	1	3	3	2	2	1

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation

“-” indicates there is no correlation

Syllabus

UNIT- I

ELASTICITY AND BENDING OF BEAMS: (22 Hours)

Elasticity–Basic ideas-Work done in a strain- Relation between elastic constants and Poisson’s ratio- Twisting couple on a cylinder-Torsional pendulum (with and without weights)- Determination of rigidity modulus and moment of inertia -Bending of Beams-Bending moment- Depression for loaded end of a cantilever-Measurement of Young ‘s modulus- Non-uniform bending (pin and microscope method) - Uniform bending (mirror and telescope method)- Non-uniform and uniform bending of a beam-Koenig ‘s method.

UNIT -II

HARMONIC OSCILLATIONS: (13 Hours)

Periodic Motion- Simple Harmonic Motion and Harmonic Oscillator- Energy of a Harmonic Oscillator- Composition of Two Simple Harmonic Motions of Equal Periods in a Straight Line - Lissajous Figures - Damping Force- Damped Harmonic Oscillator-Examples of Damped Harmonic Oscillator-Power Dissipation-Quality Factor-Forced Harmonic Oscillator.

UNIT- III

SURFACE TENSION: (10 Hours)

Surface tension – Definition – Molecular forces – Measurement of angle of contact -Explanation of surface tension on kinetic theory –Excess pressure inside a curved liquid surface – Measurement of surface tension: capillary rise method - drop weight method - surface tension of solids and gases - empirical relations between surface tension and temperature.

UNIT - IV

VISCOSITY: (10 Hours)

Newtonian and non-Newtonian fluids - critical velocity and Reynolds Number - Viscosity – Streamlined and turbulent motion–Poiseuille’s formula and its correction–Terminal velocity-Stokes formula-Stoke’s method for coefficient of viscosity- Searle’s viscometer- Viscosity of gas- Meyer’s formula.

UNIT –V

WAVES AND ACOUSTICS: (20 Hours)

Wave Motion- Plane Progressive Harmonic Wave- Intensity of a Wave-Transverse Waves in Stretched Strings- Modes of Transverse Vibrations of Strings- Longitudinal Waves in Rods and Gases-Wave Velocity and Group Velocity-Intensity of sound-Decibel and Bel-Loudness of sound- Reverberation-Factors affecting the architectural acoustics and their remedy-Sound distribution in auditorium-Requisites for good acoustics- Noise and its measurement- Noise reduction sound insulation.

UNIT-VI

SELF STUDY FOR ENRICHMENT: (Not to be included for External Examination)

Elasticity of rubber-like materials-An Harmonic Oscillator-Surface tension of polymeric liquids - Viscosity of Nano fluids and highly viscous liquids-Water Waves: Ripple and Gravity Waves.

Text Books

1. Murugesan, R., (2012). *Properties of Matter and Acoustics*. (3rd edition) S.Chand & Co, New Delhi.
2. Newman, F.H., & Searle, V.H. L., (1961). *The General Properties of Matter*. (5th edition) E.Arnold, London.
3. Mathur, D.S., (2010). *Elements of Properties of Matter*. (1st edition) S. Chand & Company, New Delhi.
4. Khanna, D.R., & Bedi, R.S., (1969). *Textbook of Sound*. (7th edition) Atmaram and sons, New Delhi.
5. Subrahmanyam, N., & Brij Lal., (2015). *Textbook of Sound*. (2nd edition) Vikas Publishing House, Chennai.

Reference Books

1. Murugesan, R., & Kiruthiga Sivaprasath, (2012). *Properties of Matter and Acoustics*. (3rd edition) S.Chand & Co, New Delhi.
2. Gulati, H.R., (1982). *Fundamentals of General Properties of Matter*. (1st edition) S.Chand & Co, New Delhi.
3. Saighal, R.L., (1998). *Text Book of Sound*. (2nd edition), S. Chand & Company, New Delhi.
4. Brown, R.C., (2005). *Mechanics and Properties of Matter*. (1st edition) Longmans Green and company, London.
5. David Halliday, Robert Resnick., (2013). *Fundamentals of physics*. (11th edition) Wiley Plus, United Kingdom.

Web References

1. <https://www.insula.com.au/physics/1279/L7.html>
2. <https://www.insula.com.au/physics/1279/L7.html>
3. <https://www.youtube.com/watch?v=CQGlgu-8dmA>
4. <https://hyperphysics.phy-astr.gsu.edu/hbase/pbuoy.html>
5. [https://kanchiuniv.ac.in/coursematerials/Physics%20book_Final%20\(1\).pdf](https://kanchiuniv.ac.in/coursematerials/Physics%20book_Final%20(1).pdf)

Pedagogy

Chalk and Talk ,Assignment, Group discussion and quiz

Course Designer

Dr.S.Gowri

Semester I	Internal Marks: 40		External Marks: 60	
COURSE CODE	COURSE TITLE	CATEGORY	HRS/WEEK	CREDITS
22UPH1CC1P	PROPERTIES OF MATTER, WAVES AND ACOUSTICS – PRACTICAL	CP-I	3	3

Course Objective

- To help students enhance their experimental skills.
- To gain hands-on experience with a variety of techniques.
- To learn the basic principles and procedures of laboratory work.

Pre-requisites

- Basic knowledge on usage of scientific apparatus.

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement On the successful completion of the Course, the Student will be able to	Cognitive Level
CO 1	Select the equipment and get the necessary accessories.	K1
CO 2	Demonstrate the use of equipment for various measures.	K2
CO 3	Construct the experiment by arranging and assembling the equipment.	K3
CO 4	Solve the physical quantity using the relevant formula after gathering accurate data through observations. Keep a detailed record of all laboratory activities.	K3
CO 5	Apply experimental approaches to correlate with physics theory to develop practical understanding.	K3

Mapping of CO with PO and PSO

COs	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	1	1	1	2	1	3	2	1	2	1
CO 2	2	3	2	2	2	3	3	1	2	1
CO 3	1	1	2	3	1	3	2	1	3	1
CO 4	2	3	3	3	2	1	3	1	3	2
CO 5	3	2	3	3	3	1	3	2	3	2

“1” – Slight (Low) Correlation

“2” – Moderate (Medium) Correlation

“3” – Substantial (High) Correlation

“-” indicates there is no correlation

Syllabus

List of experiments – Any 8

1. Young's modulus – Uniform bending (Pin and Microscope).
2. Young's modulus – Cantilever depression (scale and telescope).
3. Static Torsion: Determination of the Rigidity Modulus [N] of a material.
4. Rigidity modulus – Dynamic method.
5. Comparison of the co-efficient of viscosities of two liquids using the Burette method.
6. Surface Tension and Interfacial Surface Tension – Drop weight method.
7. Coefficient of viscosity of liquid – Variable pressure head.
8. Surface Tension – Capillary rise method.
9. Viscosity of liquid – Stoke's method.
10. Sonometer –determination of frequency of tuning fork.
11. Long focus convex lens - f, R, refractive index-determination.
12. Air wedge – thickness of thin wire.

Text Book

1. C.C.Ouseph, U.J.Rao, V.Vijayendran, (2016), *Practical Physics and Electronics*. S.Viswanathan, Printers & Publishers Pvt Ltd, Chennai.

Reference Book

1. Prof.M.N.Namboodirippad, Prof.P.A.Daniel, (1982), *B.Sc., Practical Physics*. G.B.C. Publications, Cochin.

Web References

1. <https://vlab.amrita.edu/?sub=1&brch=280&sim=550&cnt=1>
2. <https://vlab.amrita.edu/index.php?sub=1&brch=280&sim=1518&cnt=4>
3. <http://amrita.olabs.edu.in/?sub=1&brch=5&sim=225&cnt=4>
4. <http://www.olabs.edu.in/?sub=1&brch=5&sim=224&cnt=2>

Pedagogy

Demonstration, practical sessions and viva voce

Course Designer

Ms.N.Manopradha

FIRST ALLIED COURSE-I (AC)
CALCULUS AND FOURIER SERIES

(For B.Sc Physics & Chemistry)

(2022-2023 and Onwards)

Semester I	Internal Marks: 25		External Marks:75	
COURSE CODE	COURSE TITLE	CATEGORY	Hrs / Week	CREDITS
22UPH1AC1/ 22UCH1AC1A	CALCULUS AND FOURIER SERIES	ALLIED	4	3

Course Objective

- Explore the students with mathematical methods formatted for their major concepts and train them in basic Integrations.
- Analyze mathematical statements and expressions.
- Evaluate the fundamental concepts of Differentiation and Integration.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Explain the concepts of Calculus and Fourier series	K1,K2
CO2	Classify the problem models in the respective area.	K3
CO3	Solve various types of problems in the corresponding stream.	K3
CO4	Identify the properties of solutions in the core area.	K3
CO5	Discover the applications of Calculus and Fourier series.	K4

Mapping of CO with PO and PSO

Cos	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	3	2	2	2	2	3	2	2	2	2
CO2	3	2	2	2	2	3	2	2	2	2
CO3	3	2	2	2	2	3	2	2	2	2
CO4	3	2	2	2	2	3	2	2	2	2
CO5	3	2	2	2	2	3	2	2	2	2

“1” – Slight (Low) Correlation – “2” – Moderate (Medium) Correlation –

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Syllabus

UNIT I

(15 HOURS)

Successive Differentiation:

The n^{th} derivative – Standard results – Method of splitting the fractional expressions into partial fractions - Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product (proof not needed) – A complete formal proof by induction (proof not needed) - Curvature- Circle, radius and center of curvature - Cartesian formula for the radius of curvature–Simple problems in all these.

UNIT II

(12 HOURS)

Evaluation of integrals:

Integration of Rational algebraic functions– Rule (a) – Rule (b) Integration of the form $\int \frac{lx+m}{ax^2+bx+c} dx$ – Rule (c)- Integration of Irrational functions : Integration of the form $\int \frac{px+q}{\sqrt{ax^2+bx+c}} dx$ – Integration of the form $\int \frac{dx}{(x+p)\sqrt{ax^2+bx+c}}$ - Integration of the form $\int \frac{dx}{a+b \cos x}$

UNIT III

(13 HOURS)

Reduction Formula:

Properties of definite integrals –Reduction formula (when n is a positive integer) for

$$1] \int e^{ax} x^n dx \quad 2] \int x^n \cos ax dx \quad 3] \int \sin^n x dx \quad 4] \int_0^{\frac{\pi}{2}} \sin^n x \cos^m x dx \text{ (without proof) and illustrations.}$$

UNIT IV

(10 HOURS)

Double and Triple Integrals:

Definition of the double integral-Evaluation of Double integral(Problems Only)- Change of order and evaluation of the double integral (Problems only).

UNIT V

(10 HOURS)

Fourier Series:

Definition of Fourier Series – Finding the Fourier Coefficients for a given periodic function with period 2π - Even and Odd functions –Half range Fourier series.

UNIT VI

Self-Study for Enrichment : (Not included for External examination)

Radius of curvature when the curve is in Polar co-ordinates - (i) $\int \frac{dx}{ax^2+bx+c}$ (ii)

$$\int \frac{dx}{\sqrt{ax^2+bx+c}} - (1) \int \cos^n x dx \quad (2) \int_0^{\frac{\pi}{2}} \cos^n x dx \text{ -Triple Integrals in simple cases(Problems Only)-}$$

Development in cosine series - Development in sine series.

Text Books

1. Narayanan, S & Manichavasagam Pillai, T.K. (2015). *Calculus Volume I*. S. Viswanathan Pvt Limited.
2. Narayanan, S & Manichavasagam Pillai, T.K. (2015). *Calculus Volume II*. S. Viswanathan Pvt Limited.
3. Narayanan, S & Manichavasagam Pillai, T.K. (2015). *Calculus Volume III*. S. Viswanathan Pvt Limited.

UNIT-I Chapter 3:Sections 1.1 to 1.6,2.1,2.2[1]

Chapter 10:Sections 2.1 to 2.3 [1]

UNIT-II Chapter 1:Sections 7.1,7.3,7.4,8(CASE II, CASE V), 9 [2]

UNIT-III Chapter 1:Sections 11,13.1 to 13.5 [2]

UNIT-IV Chapter 5:Sections 2.1,2.2,4 [2]

UNIT-V Chapter 6:Sections 1to 4[3]

Reference Books

1. Sankarappan, S. Arulmozhi,G. (2006). *Vector Calculus, Fourier series and Fourier Transforms*. Vijay Nicole Imprints Private Limited.
2. Vittal, P.R.(2014). *Allied Mathematics*. Margham Publications.
3. Singaravelu, A.(2003). *Differential Calculus and Trigonometry*. R Publication.

Web Links

1. <https://www.youtube.com/watch?v=tBtF3Lr-VLk&t=64s>
2. <https://www.youtube.com/watch?v=Z4oSGuAZrZM>
3. https://www.youtube.com/watch?v=w6llnAQX_f8
4. <https://www.youtube.com/watch?v=LMcj8o0ERNE>
5. <https://www.youtube.com/watch?v=GAwOGCyWy0>
6. <https://www.youtube.com/watch?v=9X3ggqhcFII>

Pedagogy

Power point presentations, Group Discussions, Seminar, Quiz, Assignment.

Course Designers

1. Dr. P. Saranya
2. Ms.L.Mahalakshmi
3. Ms.P.Geethanjali

FIRST ALLIED COURSE-II (AC)
ALGEBRA, ANALYTICAL GEOMETRY OF 3D & TRIGONOMETRY
 (For B.Sc Physics & Chemistry)

(2022-2023 and Onwards)

Semester I	Internal Marks: 25	External Marks:75		
COURSE CODE	COURSE TITLE	CATEGORY	Hrs / Week	CREDITS
22UPH1AC2/ 22UCH1AC2A	ALGEBRA, ANALYTICAL GEOMETRY OF 3D & TRIGONOMETRY	ALLIED	4	3

Course Objective

- Analyze the mathematical methods formatted for their major concepts.
- Evaluate the problems in Algebra and Trigonometry.
- Explain the basics of Three-Dimensional geometry.

Course Outcomes

Course Outcome and Cognitive Level Mapping

CO Number	CO Statement	Cognitive Level
	On the successful completion of the course, students will be able to	
CO1	Explain various notions in Algebra, Analytical Geometry of 3D & Trigonometry.	K1,K2
CO2	Identify the problem models.	K3
CO3	Apply the concepts of Algebra, Analytical Geometry of 3D & Trigonometry.	K3
CO4	Solve the given problems in the respective stream.	K3
CO5	Analyze the applications of the core area.	K4

Mapping of CO with PO and PSO

COs	PSO1	PSO2	PSO3	PSO4	PSO5	PO1	PO2	PO3	PO4	PO5
CO1	2	2	2	3	2	3	2	2	2	2
CO2	2	2	2	3	2	3	2	2	2	2
CO3	2	2	2	3	2	3	2	2	2	2
CO4	2	2	2	3	2	3	2	2	2	2
CO5	2	2	2	3	2	3	2	2	2	2

“1” – Slight (Low) Correlation – “2” – Moderate (Medium) Correlation –

“3” – Substantial (High) Correlation – “-” indicates there is no correlation.

Syllabus

UNIT I

(12 HOURS)

Series Expansion:

Application of Binomial Theorem to summation of series – Approximate values – Summation of series by Exponential series - Summation of series by Logarithmic series (Formulae only).

UNIT II

(12 HOURS)

Matrices:

Matrix-Special types of Matrices –Scalar multiplication of a matrix-Equality of matrices-Addition of matrices-Subtraction of matrices- Symmetric matrix-Skew symmetric matrix-Hermitian and Skew Hermitian matrix –Multiplication of matrix – Inverse matrix-Inner product-Solution of simultaneous equations-Rank of a matrix-Elementary transformation of a matrix-A system of m homogeneous linear equations in n unknowns-Linear dependence and independence of vectors-System of non-homogeneous linear equations - Eigen values and Eigenvectors.(Applications only)

UNIT III

(12 HOURS)

Three Dimensional Geometry:

The Sphere – Definition- The equation of a sphere when the center and radius are given-The equation of a sphere to find its center and radius- The length of the Tangent Plane from a point to the sphere – The Plane Section of a sphere – Equation of a circle on a sphere – Intersection of two spheres in a circle.

UNIT IV

(12 HOURS)

Expansion of Trigonometric functions:

Expansions of $\cos n\theta$ and $\sin n\theta$ - Expansion of $\tan(A + B + C + \dots)$ (omitting examples on formation of equations) –Powers of sines and cosines of θ in terms of functions of multiples of θ – Expansions of $\cos^n \theta$ when n is a positive integer – Expansions of $\sin^n \theta$ when n is a positive integer – Expansions of $\sin \theta$ and $\cos \theta$ in a series of ascending powers of θ - The expansions of $\sin \theta$ and $\cos \theta$ to find the limits of certain expressions.

UNIT V

(12 HOURS)

Hyperbolic functions:

Hyperbolic functions – Relation between hyperbolic functions – Relations between hyperbolic functions and circular functions - Inverse hyperbolic functions.

UNIT VI

Self-Study for Enrichment : (Not to be included for External examination)

Series which can be summed up by the Logarithmic series - Simple applications of Matrices- The equation of the tangent plane to the sphere at a point. (Only problems) - Expansion of $\tan \theta$ in terms of powers of θ - Separation of real and imaginary parts of $\tanh(x+iy)$.

Text Books

1. Manichavasagam Pillai, T.K. Natarajan,T.& Ganapathy, K.S.(2015). *Algebra, Volume I*. S. Viswanathan Pvt Limited.
2. Manichavasagam Pillai, T.K. (2015). *Algebra, Volume II*. S.Viswanathan Pvt Limited.
3. Manichavasagam Pillai, T.K. & Natarajan,T. (2016). *A Text book of Analytical Geometry Part-II 3D*. New Gamma Publishers.
4. Manichavasagam Pillai, T.K. & Narayanan,S.(2013). *Trigonometry*. S. Viswanathan Pvt Limited.

UNIT-I Chapter 3:Sections 10,14[1]

Chapter 4:Sections 3,7,9 [1]

UNIT-II Chapter 2:Sections 1 to 16 [2]

UNIT-III Chapter 4:Sections 1-5,6,6.1,7,8 [3]

UNIT-IV Chapter 3:Sections 1 to 4, 4.1,5,5.1[4]

UNIT-V Chapter 4:Sections 1,2,2.1 to 2.3[4]

Reference Books

1. Arumugam,s.Issac,A. (2017). *Analytical Geometry 3D and Vector calculus*. New Gamma Publishing house.
2. Pandey, H.D. Khan, M.Q. & Gupta, B.N.(2011). *A Text Book of Analytical Geometry and Vector Analysis*. Wisdom Press.
3. Singaravelu, A. (2003). *Differential Calculus and Trigonometry*. R Publication.

Web Links

1. <https://www.youtube.com/watch?v=JayFh5EJHcU>
2. <https://www.youtube.com/watch?v=h5urBuE4Xhg>
3. <https://www.youtube.com/watch?v=59z6eBynJuw>
4. <https://www.youtube.com/watch?v=9DyPvJb2N9g>
5. <https://www.youtube.com/watch?v=HOk2XLeFPDk>
6. <https://www.youtube.com/watch?v=G1C1Z5aTZSQ>

Pedagogy

Power point presentations, Group Discussions, Seminar, Quiz, Assignment.

Course Designers

1. Dr. P. Saranya
2. Ms.L.Mahalakshmi
3. Ms.P.Geethanjali

Semester I	Internal Marks: 25		External Marks: 75	
COURSE CODE	COURSE TITLE	CATEGORY	Hours/Week	CREDITS
22UGVE	UNIVERSAL HUMAN VALUES	Part IV	2	2

COURSE OBJECTIVES

1. To enable the learners to learn the values of love and compassion.
2. To foster the values of righteousness and service among the learners.
3. To enhance the morale of the learners by inculcating the values renunciation and peace.
4. To inspire the learners to practice the basic human values so as to make them become responsible citizens of the Nation.

COURSE OUTCOMES AND COGNITIVE LEVEL MAPPING

CO Number	CO Statement On the successful completion of this course, the students will able to	Cognitive Level
CO1	Define the values of Love and Compassion	K1
CO2	Understand the value of Truth and Non - Violence	K2
CO3	Explain the value of Righteousness and Service	K3
CO4	Practice the values of Renunciation (sacrifice) & Peace	K4
CO5	Prioritize Human Values in their day today life	K5

Syllabus

Unit I: (6 Hours)

Love and Compassion

- **Introduction:** what is love? Forms of love for self, parents family friend, spouse community, nation, humanity and other beings both for living and non-living.
- Love and Compassion and Inter-relatedness
- Love, compassion, empathy, sympathy and nonviolence
- Individuals who are remembered in history for practicing compassion and love.
- Narratives and anecdotes from history, literature including local folklore

Unit II: (7 Hours)

Truth and Non - Violence

- **Introduction:** what is truth? Universal truth, truth as value, truth as fact (veracity. sincerity, honesty among others)
- Individuals who are remembered in history for practicing this value
- Narratives and anecdotes from history, literature including local folklore
- **Introduction:** what is non violence? Its need. Love, compassion, empathy sympathy for others as pre-requisites for non violence
- Ahimsa as non -violence and non- killing.
- Individuals and organisations that are known for their commitment to non - violence
- Narratives and anecdotes about non - violence from history and literature including local folklore

Unit III: (6 Hours)

Righteousness and Service

- **Introduction:** What are Righteousness and service?
- Righteousness and dharma, Righteousness and Propriety
- Forms of service for self, parents, family, friend, spouse, community, nation, humanity and other beings- living and non-living persons in distress for disaster.
- Individuals who are remembered in history for practicing Righteousness and Service
- Narratives and anecdotes dealing with instances of Righteousness and Service from history, literature, including local folklore

Unit IV: (6 Hours)

Renunciation (sacrifice) & Peace

- Introduction: what is renunciation? Renunciation and sacrifice. Self restraint and ways of overcoming greed. Renunciation with action as true renunciation. What is peace? It's need, relation with harmony and balance.
- Individuals who are recommended in history for practicing Renunciation and sacrifice. Individuals and organisations that are known for their commitment to peace.
- Narratives and anecdotes from history and literature including local folklore about individuals who are remembered for their renunciation and sacrifice. Narratives and anecdotes about peace from history and literature including local folklore practicing peace

Unit V: (5 Hours) Practicing human values

- What will learners learn/gain if they practice human values? What will learners lose if they Don't Practice human values?
- Sharing learner's individual and/ or group experience(s)
- Simulated situations
- Case studies

Pedagogy: Chalk & Talk, Seminar, PPT Presentation, Group Discussion, Blended Method, and Case Study.

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