



**MANONMANIAM SUNDARANAR UNIVERSITY**  
**- TIRUNELVELI**  
**UG PROGRAMMES**



**OPEN AND DISTANCE LEARNING (ODL) PROGRAMMES**

**(FOR THOSE WHO JOINED THE PROGRAMMES FROM THE ACADEMIC YEAR 2023-2024 ONWARDS)**

**B.Sc. Physics**

<b>Semester</b>	<b>Course</b>	<b>Title of the Course</b>	<b>Course Code</b>
<b>IV</b>	Part I –Languages (Tamil)	தமிழும் அறிவியலும்	J1TL41
	Part II – Languages (English)	General English - IV	J2EN41
	Core VII	Optics and Laser Physics	JMPH41
	Core VIII	Physics Practical – IV	JMPHP4
	Elective IV	Allied Chemistry – II	JECH41
		Allied Chemistry Practical - II	JECHP2
	Skill Enhancement Course - V	Maintenance of Electronic Appliances	JSPH41
	NMC /Substitute Paper	Instrumentation Physics – II	JNPH41
	Value Education	Value Based Education (Common)	JVBE41

## தமிழும் அறிவியலும்

அலகு-1	தமிழரின் அறிவியல் சிந்தனைகள்
	<ul style="list-style-type: none"> <li>• அறிவியலும் மனித வாழ்வும்</li> <li>• ஐந்திணைப் பகுப்பும் சூழலியலும்</li> <li>• தொழில்நுட்ப மேலாண்மை</li> <li>• நீர் நில மேலாண்மை</li> </ul>
அலகு-2	பழந்தமிழ் இலக்கியங்களில் அறிவியல் சிந்தனைகள்
	<ol style="list-style-type: none"> <li>1. நிலவியல்</li> <li>2. உலோகவியல்</li> </ol>

	<ol style="list-style-type: none"> <li>3. வானவியல்</li> <li>4. உயிரியல்</li> <li>5. உளவியல்</li> </ol>
அலகு-3	இடைக்கால இலக்கியங்களில் அறிவியல் சிந்தனைகள்
	<ol style="list-style-type: none"> <li>1. காப்பியங்களில் அறிவியல்</li> <li>2. சிற்றிலக்கியங்களில் அறிவியல்</li> <li>3. உரைநூல்களில் அறிவியல்</li> </ol>
அலகு-4	இணையத் தமிழ்
	<ol style="list-style-type: none"> <li>1. இணையத் தமிழ் பயன்பாடு - அறிமுகம்</li> <li>2. இணையத்தமிழ்க் கல்விக்கழகம்</li> <li>3. இணைய நூலகம்</li> <li>4. செயற்கை நுண்ணறிவியல்</li> <li>5. தமிழ்நாட்டு அறிவியல் ஆளுமைகள்</li> </ol>
அலகு-5	கடிதம் எழுதுதலும் கட்டுரை எழுதுதலும்
	<ul style="list-style-type: none"> <li>• உறவு முறைக் கடிதப் பயிற்சி</li> <li>• அலுவலகக் கடிதப் பயிற்சி</li> <li>• விண்ணப்பப் படிவம் எழுதும் பயிற்சி</li> <li>• தன் விவரப் படிவம் எழுதும் பயிற்சி</li> <li>• கருத்து விளக்கக் கட்டுரைகள் எழுதும் பயிற்சி</li> <li>• பத்திரிகைகளுக்குக் கட்டுரை எழுதும் பயிற்சி</li> </ul>
Text books	

## Reference Books

1. தமிழர் வேளாண்மை மரபுகள் - இல).செ.கந்தசாமி
- 2. சங்க இலக்கியத்தில் வேளாண் சமுதாயம், பெ.மாதையன், நியூ செஞ்சரி புக் ஹவுஸ்
3. தமிழில் அறிவியல் இதழ்கள்சாமுவேல்- ரா.பார்வேந்தன் ஃபிஷ்கிறீன் பதிப்பகம், கோவை
4. அறிவியல் தமிழ் - பதிப்பாசிரியர் இராதா செல்லப்பன்,பாரதிதாசன் பல்கலைக்கழகம், திருச்சிராப்பள்ளி.
5. இணையத் தமிழ் வரலாறு, மு.பொன்னவைக்கோ, பாரதிதாசன் பல்கலைக்கழகம்
6. இணையத் தமிழ், சந்திரிகா சுப்பிரமணியம் - சந்திரோதயம் பதிப்பகம்

7. இணையமும் இனிய தமிழும் - துரை. மணியரசன், இசை பதிப்பகம்
8. கணினித் தமிழ், இல. சுந்தரம் - விகடன் பிரசுரம்
9. மாண்புமிகு மண், பாமயன், வம்சி பக்ஸ்
10. தமிழ் இலக்கியத்தில் அறிவியல் சிந்தனைகள் வானதி பதிப்பகம், சென்னை

**SECOND YEAR - SEMESTER IV**  
**PAPER II –GENERAL ENGLISH**

<b>UNIT</b>	<b>Details</b>
<b>I</b>	<b>GOAL SETTING (UNICEF)</b> <b>Life Story</b> 1.1 From Chinese Cinderella – Adeline Yen Mah 1.2 Why I Write - George Orwell <b>Short Essay</b> 1.3 On Personal Mastery – Robin Sharma 1.4 On the Love of Life – William Hazlitt
<b>II</b>	<b>INTEGRITY</b> <b>Short Story</b> 2.1 The Taxi Driver – K.S. Duggal 2.2 Kabuliwala - Rabindranath Tagore 2.3 A Retrieved Reformation – O Henry <b>Extract from a play</b> 2.4 The Quality of Mercy (Trial Scene from the Merchant of Venice - Shakespeare)
<b>III</b>	<b>COPING WITH EMOTIONS</b> <b>Poem</b> 3.1 Pride – Dahlia Ravikovitch 3.2 Phenomenal Woman – Maya Angelou <b>Reader's Theatre</b> 3.3 The Giant's Wife A Tall Tale of Ireland – William Carleton 3.4 The Princess and the God : A Tale of Ancient India
<b>IV</b>	<b>Language Competency Sentences</b> 4.1 Simple Sentences 4.2 Compound Sentences 4.3 Complex Sentences <b>Direct and Indirect Speech</b>
<b>V</b>	<b>Report Writing</b> 5.1 Narrative Report 5.2 Newspaper Report <b>Drafting Speeches</b> 5.3 Welcome Address 5.4 Vote of Thanks
<b>Text Books (Latest Editions)</b>	1.Oxford Practice Grammar , John Eastwood, Oxford University Press
	2.Cambridge Grammar of English , Ronald Carter and Michael McCarthy
	3.George Orwell Essays, Penguin Classics

## OPTICS and LASER PHYSICS

UNIT	Details
I	<p><b>LENS AND PRISMS:</b></p> <p><b>Lens:</b> Lenses and its types – Equivalent focal length of two thin lenses in contact and separated by a distance – power of a lens.</p> <p><b>Aberrations:</b> Spherical aberration, Methods of minimizing Spherical Aberration and chromatic aberrations.</p> <p><b>Prism:</b> Dispersion by a prism, Angular dispersion and Dispersive power, Achromatic combination of prisms- Deviation without dispersion and Dispersion without deviation.</p> <p><b>Eyepieces:</b> Eyepiece - Huygen's and Ramsden's eyepieces, construction and working – comparison</p>
II	<p><b>INTERFERENCE:</b></p> <p>Interference – Conditions – Theory of Interference - Fresnel's biprism – Experimental determination of the wavelength of light –Colours of thin films - Production of colours in thin films – Air wedge (Wedge-shaped film) – Newton's rings.</p> <p>Michelson's interferometer – Applications, (i) determination of the wavelength of a monochromatic source of light and (ii) determination of a thickness of a mica sheet.</p>
III	<p><b>DIFFRACTION:</b> Fresnel and Fraunhofer diffraction-Fresnel's explanation of Rectilinear propagation of light - zone plate – action of zone plate for an incident spherical wave front–differences between a zone plate and a convex lens–diffraction pattern due to a straight edge –plane transmission diffraction grating– experiment to determine wavelengths.</p>
IV	<p><b>POLARISATION:</b> Polarisation of light -double refraction – Nicol prism – Plane, circularly and elliptically polarized light –quarter wave plate–half wave plate – production and detection of circularly and elliptically polarized lights – Optical activity- Fresnel's explanation–Laurent half shade polarimeter– Experiment to determine specific rotator power.</p>
V	<p><b>LASERS:</b> general principles of lasers – properties of lasers action – spontaneous and stimulate emission–population inversion–optical pumping –He-Ne laser (principle and working) – CO<sub>2</sub> laser (principle and working)– Laser applications –holography and its applications.</p>
REFERENCE BOOKS	<ol style="list-style-type: none"> <li>1. Sathyaprakash,1990,Optics,VII edition,RatanPrakashanMandhir,New Delhi.</li> <li>2. AjoyGhatak,2009,Optics,4th Edition, PHI Pvt Ltd, New Delhi.</li> <li>3. JenkinsA.FrancisandWhite,2011,Fundamentals of Optics,4th edition, McGraw Hill Inc., New Delhi.</li> </ol>

## PHYSICS PRACTICAL - IV

UNIT	Details
<b>I</b>	<p><b>Minimum of Six Experiments from the list:</b></p> <ol style="list-style-type: none"> <li>1. Determination of refractive index of prism using spectrometer.</li> <li>2. Determination of refractive index of liquid using hollow prism and spectrometer</li> <li>3. Determination of dispersive power of a prism.</li> <li>4. Determination of radius of curvature of lens by forming Newton's rings.</li> <li>5. Determination of thickness of a wire using air wedge.</li> <li>6. Determination of Cauchy's Constants.</li> <li>7. Determination of resolving power of grating</li> <li>8. Determination of refractive index of a given liquid by forming liquid lens</li> <li>9. Determination of refractive index-by forming Newton's rings</li> <li>10. Spectrometer-grating-oblique incidence-dispersive power</li> <li>11. Tangent Galvanometer– Horizon talearth's magnetic in duction</li> <li>12. Spectrometer-grating-oblique incidence-Wave length of Mercury spectral lines</li> <li>13. Ballistic Galvanometer –Absolute capacity of a condenser</li> <li>14. Ballistic Galvanometer–Comparison of Capacitances(<math>C_1/C_2</math>)</li> <li>15. Determination of refractive index using Laser.</li> </ol> <p><i>Note: Use of digital balance, digital screw gauge, digital calipers are permitted</i></p>

## ALLIED CHEMISTRY - II

UNIT	Details
I	<b>Co-ordination Chemistry and Water Technology</b> Course Outline Co-ordination Chemistry: Definition of terms-IUPAC Nomenclature Werner's theory EAN rule Pauling's theory- Postulates Applications to $[\text{Ni}(\text{CO})_4]$ , $[\text{Ni}(\text{CN})_4]^{2-}$ , $[\text{Co}(\text{CN})_6]^{3-}$ Chelation Biological role of Haemoglobin in and Chlorophyll (elementary idea) Applications in qualitative and quantitative analysis. Water Technology :Hardness of water, determination of hardness of water using EDTA method, zeolite method-Purification techniques- BOD, COD.
II	<b>Carbo hydrates and Amino acids</b> Carbohydrates: Classification, preparation and properties of glucose, fructose and sucrose.Discussion of open chain ring structures of glucose and fructose. Glucose- fructose inter conversion. Properties of starch and cellulose. Aminoacids: Classification preparation and properties of alanine, preparation of dipeptides using Bergmann method. RNA and DNA (elementary idea only).
III	<b>Electrochemistry</b> Galvaniccells Standard hydrogen electrode calomel electrode –standard electrode potentials -electrochemical series. Strong and weak electrolytes ionic product of water pH, pKa, pKb. Conduct om etricitrations- p Hd etermination by colorimetric method - buffer solutions and its biological applications electroplating Nickel and chrome plating-Types of cells-fuel cells-corrosion and its prevention.
IV	<b>Kinetics and Catalysis</b> Order and molecularity. Integrated rate expression for I and II (2A Products) order reactions, Pseudo first order reaction, methods of determining order of a reaction Half-life period - Catalysis - homogeneous and heterogeneous, catalyst used in Contact and Haber's processes. Concept of energy of activation and Arrhenius equation.
V	<b>Photochemistry</b> Grothus Drapper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield Hydrogen -chloride reaction. Phosphorescence, fluorescence, chemiluminescence photosensitization and photosynthesis (definition with examples)
Reference book	1. P.L.Soni,Mohan Katyal, Text book of Inorganic chemistry; Sultan Chand and Company, New Delhi, twentieth edition, 2007. 2. R.Puri,L.R.Sharma, M.S.Pathania, Text book Physical Chemistry:Vishal Publishing Co., New Delhi, forty seventh edition, 2018. 3. B.K,Sharma Industrial Chemistry; GOEL publishing house, Meerut, sixteenth edition, 2014

## ALLIED CHEMISTRY PRACTICAL - II

Details
<b>Semi-Micro Qualitative Analysis</b> <ol style="list-style-type: none"><li>1. Analysis of simple acid radicals: Carbonate, sulphide, sulphate, chloride, bromide, iodide, nitrate</li><li>2. Analysis of interfering acid radicals: Fluoride, oxalate, borate, phosphate.</li><li>3. Elimination of interfering acid radicals and Identifying the group of basic radicals</li><li>4. Analysis of basic radicals (group wise): Lead, copper, cadmium, nickel, cobalt, barium, ammonium.</li></ol> <p>Analysis of a simple salt containing one cation and one anion</p>
<b>Reference Books:</b> <p>V.Venkateswaran, R.Veeraswamy and A.R.Kulandivelu, Basic Principles of Practical Chemistry, Sultan Chand &amp; Sons, NewDelhi, second edition, 1997.</p>

## MAINTANANCE OF ELECTRONICS APPLIANCES

UNIT	Details
I	<b>SOLDERING TECHNIQUES</b> Soldering tools- soldering iron- soldering station-dry solder joint, cold solder joints- Good and bad solders joints. Groove board, bread board and printed circuit board
II	<b>POWER SUPPLY AND MEASURING INSTRUMENTS</b> Transformer Zener Voltage regulators-Dual Power supply IC'S7805, 7905-switchmode power supply (SMP'S), principle of SMP'S-block diagram of SMP'S. Practical uses of Multimeter (analog and digital)– testing and measurements of resistor, capacitor and transistor
III	<b>MAINTENANCE OF ELECTRONIC SHOME APPLIANCES</b> LED/LCD TV-music player, CCTV Camera block diagram-its working - cathode ray oscilloscope–its principle and block diagram-Measurement of Frequency, AC and DC using CRO
IV	<b>MAINTENANCE OF COMPUTER SYSTEMS</b> Various parts of computer-its assembling-installing windows operating systems, software and antivirus computer hardware maintenance-formatting and maintenance-Basic Network installation-IP address setting and its maintenance. Modem-working principle.
V	<b>SOLAR POWER SYSTEMS AND INVERTERS</b> Solar Panels- Solar Inverter – their principle & operation, power rating-, Protection circuits used in inverters– Solar Battery- battery level, over load, over charging. Various faults and its rectification.
<b>REFERENCE BOOKS</b>	<ol style="list-style-type: none"> <li>1. BasicElectronics,6<sup>th</sup> edition by B Grob,Mc Graw Hill NY1</li> <li>2. Integrate delectronics- Millman and Halkias</li> <li>3. Electronic principles- Malvino6th edition</li> <li>4. Operational amplifier–Gyakwar</li> <li>5. Basic electronics B. Basavaraj, H.N.Shivasankar University press</li> </ol>

## INSTRUMENTATION PHYSICS – II

UNIT	Details
<b>I</b>	<b>BASIC ELECTRONIC &amp; DIGITAL INSTRUMENTS</b> Electronic multi meters–Q meters–Vector meters–RF voltage and power measurements - Comparison of analog and digital techniques – digital voltmeter – digital multi meters
<b>II</b>	<b>TRANSDUCERS</b> Active trans ducers: Piezo electricity petrans ducers and Photovoltaic type transducer Passive transducer-Photoelectric type resistivetrans ducers- Inductive transducer.
<b>III</b>	<b>MICRO SCOPE</b> Optical and Electron micro scope-Comparison between optical and electron microscope – Resolving power - Magnification power - Types of electron microscope - TEM – SEM - Comparison between TEM and SEM.
<b>IV</b>	<b>ADVANCES IN MEDICAL INSTRUMENTS</b> X-ray machine-Comparison of Fluor os copy and Radiography-Lasers in medicine - Cryogenic surgery MRI (basics and instrumentation).
<b>V</b>	<b>OSCILLO SCOPE</b> Oscillo scope-Basic principle-CRT features–Block diagram of oscilloscope - Simple cathode ray oscilloscope.
<b>REFERENCE BOOKS</b>	1. David A.Bell, Electronic Instrumentation, and measurements, Prentice Hall of India Pvt Ltd, 2003 2. B.C.Nakra and K.K.Choudhry, Instrumentation, Measurement and Analysis, 2nd Edition, TMH, 2004

## VALUE BASED EDUCATION

### (Common Syllabus)

UNIT	Details
I	<b>Introduction to Value based Education</b>  a. Value: meaning and Classification b. Value based Education: Meaning, Characteristics, Components and Contents c. Value Erosion and Inculcation: Value crises in social life, economic life, and political life - Value inculcation: need and importance - Role of Parents and Teachers in inculcating values.
II	<b>Harmony in Being and Living</b>  a. Harmony of the self (I) with the body: Nurturing of the body- Understanding myself as co-existence of the self and the body- Understanding needs of self and needs of the body- Understanding the activities in the self and activities in the body. b. Harmony in the Family, Society and Nature: Family as a basic unit of human interaction and values in relationships - Affection, care, guidance, reverence, Glory, gratitude, and love – Harmony in society: Justice preservation, Production Work, Exchange Storage Harmony in nature: four orders in nature- The holistic perception of harmony in existence.
III	<b>Social Issues, Social Justice and Human Rights</b>  Social issues – causes and magnitude - alcoholism, drug addiction, poverty, Unemployment Social Justice: Definition and need – factors responsible for social injustice: caste and gender – contributions of social reformers. Human Rights: Concept and Principles of human rights – human rights and Indian constitution – Rights of Women and children – violence against women
IV	<b>Values and Mass Media</b>  Mass media: Meaning, functions and characteristics – Effects and Influence on youth and children – Media Power – socio, cultural and political consequences of mass mediated culture - consumerist culture – Globalization – new media- prospects and challenges – Role of media in value building
V	<b>Ethics</b>  Ethics: Meaning and importance Social ethics: tolerance, equity, justice for all, sensitivity towards mankind, love for nature and creatures, nationalism-love for nation, pride for nation, Honour to the law, Indian culture and traditions – Civic Sense: Being a good civilian Professional Ethics: Dedication to work and duty – Commitment to the Profession.

<p><b>Reference</b></p>	<ol style="list-style-type: none"> <li>1. Allport, G.W., Vernon, P.E., and Lindzey, G. (1970) study of values, Buston: Houghton Mifflin.</li> <li>2. Centaral Board of Secondary Education (1997), Value Education: A Handbook for Teachers, Delhi: Central Board of Secondary Education.</li> <li>3. Delors, J. (1996), Learning: The Treasure within- Report of the International Commission on Education for the Twenty-First Century, Paris: UNESCO.</li> <li>4. Morris, Charles W. (1956). Varieties of Human Values. Chikago: University of Chicago Press.</li> <li>5. Shukla, R.P.(2005). Value Education and Human Rights. Sarup&amp; Sons, New Delhi</li> <li>6. Satchidananda. M.K. (1991), "Ethics, Education, Indian Unity And Culture" – Delhi, Ajantha Publications</li> <li>7. Saraswathi. T.S. (Ed) 1999. Culture", Socialisation And Human Development: Theory, Research And Application In India" – New Delhi Sage Publications.</li> <li>8. Venkataiah. N (Ed) 1998, "Value Education" New Delhi Ph. Publishing Corporation.</li> <li>9. Chakraborti, Mohit (1997) "Value Education: Changing Perspectives" New Delhi: Kanishka Publications.</li> <li>10. Adithya Shetty and K.Pushpanandan Rao (2000): as quoted in Jayarami Reddy, B., (2010): "Values of B.Ed. teacher trainees in relation to certain psycho-sociological variables in Andhra Pradesh", Unpublished Ph.D. Thesis, Department of Education, S.V.University, Tirupati,</li> <li>11. Amareswaran, N. (2009): "Moral values of intermediate students", Published Ph.D. Thesis, Department of Education, S.V. University, Tirupati.</li> <li>12. Chetty, K. M. (2004): "Perspective of value oriented education" paper presented at UGC National Seminar on value oriented education, organized by Dept. of education, S.V.University, Tirupati.</li> <li>13. Chhaganlal, Nandini Man Sukhbai (1992): "A study of the value, adjustment, attitude in the teaching profession and academic achievement of researchers' children as compared to non-teachers children". [Ph.D. Edu. Saurashtra University]</li> <li>14. Mahatma Gandhi at Wardha Conference (1937) : as quoted in Gawande, E. N., (1994): "Value oriented education vision for better living", Sarup and Sons Publishers 4740/23, Amsari Road, Darya Colony, New Delhi, p. 9.</li> <li>15. Mohan Reddy (2011): "An analytical study of attitude of intermediate students towards value oriented education in relation to certain psycho-sociological variables", Ph.D. theses, S.V.University, Tirupati.</li> <li>16. Rajasekhar Reddy (2002) quoted in Nagarjuna, T.I. (2009): "A study of attitudes of DIET students towards value oriented education in relation to intelligence, personality and other variables", Published Ph.D. Thesis, Department of Education, S.V. University, Tirupati.</li> <li>17. Rajagopal (1989) quoted in Yella Reddy, B. (2009): "A study of moral judgment of intermediate students in relation to certain factors", Published Ph.D. thesis, S.V.University, Tirupati.</li> <li>18. Awasthi D. Value based Education is the only solution to the problem of Crisis of Moral Values among the youth of India. Retrieved from: worldwide, 2014. journals.com/gra/file:php? 2014. 1411110022_81.pdf.</li> <li>19. Brubacher, J.S. Modern Philosophies of Education, McGraw Hill Book</li> </ol>
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	<p>Company, INC, New York, 1950, Pp.93-95.</p> <p>20. Chetty, K.M., Value Education: A Conceptual Analysis, 70th Session of Indian Philosophical Congress, Haridwar, 1995, Pp.3-4.</p> <p>21. Dr. Jangaiah, C. Values Classification, APH Publishing Corporation, New Delhi, 1998, .</p> <p>22. Prahallada, N.N, Value Education in India. Association of Indian Universities, New Delhi, 2000.</p> <p>23. Rohidekar, S.R. Inculcation of values-how? APH Publishing Corporation, New Delhi, 1998.</p> <p>24. Seshadri, C. Education in Values, APH Publishing Corporation, New Delhi, 1998, Pp.47- 48.</p>
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