G.T.N. ARTS COLLEGE(Autonomous)
Dindigul
(Affiliated to Madurai Kamaraj University)
(Accredited with 'B' Grade by NAAC)

DEPARTMENT OF PHYSICS

B.Sc PHYSICS SYLLABUS

(With effect from the academic year 2017 – 2018)

PRINCIPAL

Dr. N.Krishnamoorthy, M.Com., M.B.A., M.Sc., M.Phil., M.Ed., PGDCA., PGDFM., Ph.D.,

STAFF

1. Mr. S. Saravanan, M.Sc., M.Phil., B.Ed., PGDCA.,	**- Associate Professor and Head**
2. Mr. R. Jayaraman, M.Sc., M.Phil.,	**- Assistant Professor**
3. Tmt. K. Ramavenkateswari, M.Sc., M.Phil.,	**- Assistant Professor**
4. Tmt. K. Jayabala, M.Sc., M.Phil.,	**- Assistant Professor**
5. Dr. T. Rajeshkumar, M.Sc., M.Phil., Ph.D.,	**- Assistant Professor**
6. Dr.D. Lalitha M.Sc., M.Phil., B.Ed.,Ph.D	**- Assistant Professor**

G.T.N. ARTS COLLEGE, (Autonomous) DINDIGUL
SYLLABUS FOR B.Sc., (Physics) UNDER CBCS
(With effect from the academic year 2017 – 2018)

1. Objectives:

The Syllabus for B.Sc., Physics degree under semester system has been designed on the basis of Choice Based Credit System (CBCS) , which would focus on job oriented programmes and value added education. It will effect from June 2017 onwards.

2. Eligibility:

A pass in +2 examination conducted by the Board of Higher Secondary Education, Government of Tamilnadu with Physics & Mathematics OR any other examination accepted by the Governing Body, as equivalents thereto are eligible to join this course.

3. Duration of the Course:

The students who are joining the B.Sc., (Physics) degree shall undergo a study period of three academic years – Six semesters.

4. Subjects of study and Scheme of Examination :

The subjects offered in major Physics for six semesters and the scheme of examination are given .

5. Question Paper Pattern :

The Internal and External marks is 25 : 75

External:

The pattern of Question Paper will be as follows:

Time: 3 Hours **Max Marks: 75**

Section – A [10 x 1 = 10 marks]

Question No: 1 to 10

1. Two questions from each Unit
2. Four choices in each question
3. No 'none of these 'choice

Section – B [5 x 7 = 35 marks]

Question No: 11 to 15

1. Answer all questions choosing either (a) or (b)
2. Answers not exceeding two pages
3. One question from each Unit

Section – C [3 x 10 = 30 marks]

Question No: 16 to 20

1. Answers not exceeding four pages
2. Answer any three out of five questions
3. One question from each Unit

Note: There must be at least one problem in Section B and Section C

Internal:

The pattern for internal valuation may be

1. Two tests – 15 marks each: average 15 marks
2. Group Discussion / Seminar / Quiz – 5 marks
3. Two Assignments – 5 marks each: average 5 marks
4. Third test may be allowed for absentees of anyone of the two tests
5. For Quiz, two quizzes should be conducted

Blue Print of the Question Paper (External)

Maximum Marks: 75

Sections	Types of questions	No. of questions	No. of questions to be answered	Marks for each question	Total Marks
A	Multiple Choice : Two questions from each Unit	10	10	1	10
B	Not exceeding two pages (either or type) : One question from each Unit*	5	5	7	35
C	Not exceeding four pages (any three out of five) : one question from each Unit	5	3	10	30

- There must be at least one problem in Section – B and Section – C

6. There will be TWO Allied subjects to fulfill the course during three years.

Subject	Maximum Marks	Year of Study
Mathematics	600	I and II
Chemistry	600	II and III

The syllabus for the Allied subjects can be got from the Allied Departments of Mathematics and Chemistry

7. **Practicals:**

Record Note Book : 10 marks
Internal : 30 marks
External examination : 60 marks
Total : 100 marks

8. Eligibility for the Degree:

(i) A candidate will be eligible for the B.Sc., (Physics) degree by completing three years (six semesters) and passing all the prescribed examinations.

(ii) A candidate shall be declared as passed the course, if he / she scored a minimum of 40 % marks in each paper of all the subjects.

Courses studied by B.Sc., Physics students:

(Physics students study Mathematics and Chemistry as Allied-I and Allied-II respectively)

B.Sc., Physics – Semester – I

Part	Study Component	Course Code	Credit	Hours	Internal Marks	External Marks	Total Marks
I	Tamil / Other Languages	17UTAL11	3	6	25	75	100
II	English	17UENL11	3	6	25	75	100
III	Core Course – I Mechanics and Relativity	17UPHC11	4	4	25	75	100
	Core Practicals – I Major Physics Practicals- I	17UPHC2P		2			
	Allied Course - I Allied Mathematics - 1	17UMAA11	5	6	25	75	100
IV	Skill Based Course – I Properties of Matter	17UPHS11	2	2	25	75	100
	Skill Based Course–II Programming in C – I	17UPHS12	2	2	25	75	100
	NME		2	2	25	75	100
V	Physical Education	17UPEV2P					
	Total		21	30			

B.Sc., Physics – Semester – II

Part	Study Component	Course Code	Credit	Hours	Internal Marks	External Marks	Total Marks
I	Tamil/Other Languages	17UTAL21	3	6	25	75	100
II	English	17UENL21	3	6	25	75	100
III	Core Course - II Electricity	17UPHC21	4	4	25	75	100
	Core Practicals– I Major Physics Practicals -I	17UPHC2P	3	2	40	60	100
	Allied Course - I Allied Mathematics - 2	17UMAA21	2	3	25	75	100
	Allied Course - II Allied Mathematics - 3	17UMAA22	2	3	25	75	100
IV	Skill Based Course -III Thermal Physics	17UPHS21	2	2	25	75	100
	Skill Based Course -IV Programming in C – II	17UPHS22	2	2	25	75	100
	NME		2	2	25	75	100
V	Physical Education	17UPEV2P	1		25	75	100
	Total		24	30			

B.Sc., Physics – Semester – III

Part	Study Component	Course Code	Credit	Hours	Internal Marks	External Marks	Total Marks
I	Tamil/Other Languages	17UTAL31	3	6	25	75	100
II	English	17UENL31	3	6	25	75	100
III	Core Course - III Electromagnetism	17UPHC31	4	4	25	75	100
	Core Practicals– II Major Physics Practicals -II	17UPHC4P		2			
	Allied Course I Allied Mathematics - 4	17UMAA31	5	6	25	75	100
	Allied Course II Organic , Inorganic & Physical Chemistry	17UCHA11	4	4	25	75	100
	Allied Practicals I Volumetric Analysis	17UCHA2P		2			
	Total		19	30			

B.Sc., Physics – Semester – IV

Part	Study Component	Course Code	Credit	Hours	Internal Marks	External Marks	Total Marks
I	Tamil/Other Languages	17UTAL41	3	6	25	75	100
II	English	17UENL41	3	6	25	75	100
III	Core Course - IV Optics and Spectroscopy	17UPHC41	4	4	25	75	100
	Core Practicals– II Major Physics Practicals -II	17UPHC4P	3	2	40	60	100
	Allied Course I Allied Mathematics - 5	17UMAA41	2	3	25	75	100
	Allied Course I Allied Mathematics - 6	17UMAA42	2	3	25	75	100
	Allied Course I I Organic & Physical Chemistry	17UCHA21	4	4	25	75	100
	Allied Practicals –I Volumetric Analysis	17UCHA2P	1	2	40	60	100
V	Extension Activities		1				100
	Total		23	30			

B.Sc., Physics – Semester – V

Part	Study Component	Course Code	Credit	Hours	Internal Marks	External Marks	Total Marks
III	Core Course - V Atomic Physics & Quantum Mechanics	17UPHC51	4	4	25	75	100
	Core Course - VI Nuclear Physics	17UPHC52	4	4	25	75	100
	Core Course - VII Analog Electronics	17UPHC53	4	4	25	75	100
	Ancillary Course I I Organic Inorganic & Physical Chemistry	17UCHA31	4	4	25	75	100
	Core Practicals –III Major Physics Practicals - III	17UPHC6P		3			
	Core Practicals –IV Major Physics Practicals - IV	17UPHC6Q		3			
	Core Practicals –V Major Physics Practicals - V	17UPHC6R		2			
	Allied Practicals –II Inorganic Semi Micro Analysis	17UCHA4P		2			
	Elective Course Bio Medical Instrumentation (OR) Astro Physics	17UPHE51 (OR) 17UPHE52	2	2	25	75	100
IV	Environmental Studies	17UESV51	2	2	25	75	100
	Total		20	30			

B.Sc., Physics – Semester – VI

Part	Study Component	Course Code	Credit	Hours	Internal Marks	External Marks	Total Marks
III	Core Course - VIII Classical & Statistical Mechanics	17UPHC61	4	4	25	75	100
	Core Course - IX Materials Science	17UPHC62	4	4	25	75	100
	Core Course- X Digital Electronics	17UPHC63	4	4	25	75	100
	Core Practicals –III Major Physics Practicals -III	17UPHC6P	4	3	40	60	100
	Core Practicals –IV Major Physics Practicals -IV	17UPHC6Q	4	3	40	60	100
	Core Practicals –V Major Physics Practicals -V	17UPHC6R	4	2	40	60	100
	Allied Course I I Chemistry - 4	17UCHA41	4	4	25	75	100
	Allied Practicals –II Chemistry Practicals –II	17UCHA4P	1	2	40	60	100
	Elective Course Optoelectronics (OR) Laser Physics	17UPHE61 (OR) 17UPHE62	2	2	25	75	100
IV	Value Education	17UVEV61	2	2	25	75	100
	Total		33	30			

Summary of credits and marks

Part	Study Component	Total Credits	Total Marks
I	Tamil/Other Languages	12	400
II	English	12	400
III	Core Courses , Elective Courses & Allied Courses	98	2900
IV	Skill Based Courses, NME, EVS & Value Education	16	1600
V	Physical Education & Extension Activities	2	200
Grand Total		140	5500

G.T.N. ARTS COLLEGE(Autonomous), DINDIGUL
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Semester - 1

Course Title: ,f;fhy ,yf;fpaKk; Gidf; fijAk;; Semester : 1
Course Code : 17UTAL11 Part : I Contact Hours /Week : 6 Credit : 3

Nehf;fk;

,f;fhyf; ftpij> rpWfij> Gjpd tiffis mwpKfk; nra;jy;> ,f;fhy ,yf;fpaq;fspd; topg; GydhFk; fUj;Jf;fisg; ngwr; nra;jy;>gad;ghl;Lj; jkpo; ,yf;fzj;ij mwpar; nra;jy;.

gad;

ftpij> rpWfij gilf;Fk; Mw;wy; ngWjy;> r%f czHT+l;Lk; gilg;Gfis mwpe;J fw;wy;.

$W : 1 kuGf;ftpijfs; 30 kzpfs;

ghujpahH fz;zd; vd; Nrtfd; - ghujpjhrd; njhopyhsH tpz;zg;gk; - ftpkzp ciuf;f Ntz;Lk; - gl;Lf;Nfhl;il fy;ahz Re;juk; kdpjdhf tho;e;jpl Ntz;Lk; - fz;zjhrd; xU ghidapd; fij - Kbaurd; ahH ftpQd;.

$W : 2 GJf;ftpijfs; 20 kzpfs;

e.gpr;r%Hj;jp Mj;J}ud; %l;il – eh.fhkuhrd; fhfpjg;G+f;fs; – K.Nkj;jh vd;Dila tpLKiw ehs; – mg;Jy; uFkhd; Mwhj mwpT – ituKj;J Ie;J nghpJ MW rpwpJ – kPuh neQ;Nr! epy;! epy;! – ghyh thdk; trg;gLk; – ney;iy n[ae;jh njhg;Gs; nfhb – ckh kNf];thp Rak; – i`f;$ ftpijfs;.

$W : 3 rpWfijfs; 15 kzpfs;

GJikg;gpj;jd; rhg tpNkhrdk; – F.g.uh[Nfhghyd; cz;ikf;fij –F.mofphprhkp uh[h te;jpUf;fpwhH – fy;fp fbjKk; fz;zPUk; – n[afhe;jd; Af re;jp – mz;zh nrt;thio – fp.uh[ehuhazd fjT.

$W : 4 ,yf;fzk; 15 kzpfs;

KjnyOj;Jf;fs; – rhHngOj;Jf;fs; – nkhop Kjy; vOj;Jf;fs; – nkhop ,Wjp vOj;Jf;fs; – ty;nyOj;J kpFk;– ty;nyOj;J kpfh ,lq;fs;.

$W : 5 ,yf;fpa tuyhWk; gad;ghl;Lj;jkpOk; 10 kzpfs;

20 Mk; Ew;whz;;;;;;;;;by; kuGf;ftpijapd;; tsHr;rp – GJf;ftpijapd; Njhw;wKk; tsHr;rpAk; – rpWfijapd; Njhw;wKk; tsHr;rpAk; – kuGg;gpio ePf;Fjy; – gpwnkhopr; nrhw;fis ePf;Fjy; – XnuOj;J xU nkhopfs; – xyp NtWghLfSk; nghUs; NtWghLfSk;

ghlE}y;

1. R[hjh.rh(njh.M).>(2017)>",*f;fhy ,yf;fpaKk; GidfijAk*;",epA+ nrQ;Rhp Gf ;`T];.> gpiuNtl; ypkpl;nll;>nrd;id.

ghh;it E}y;fs;

1. rptj;jk;gp.fh.>(1978)>"*jkpopy; rpWfijapd; Njhw;wKk; tsHr;rpAk*";>jkpo;g;Gj;jfhyak;> nrd;id.
2. Rg;Gnul;bahu;.e.>(1982)> "*fz;zd; ghl;Lj;jpwd;> rHNthja ,yf;fpag; gz;iz*">kJiu
3. jz;lghzp NjrpfH>r.>(2008)>"*ed;D}y; tpUj;jpAiu*">rhujh gjpg;gfk;>nrd;id.

Course Title: English for Enrichment - I | Semester : 1

Course Code : 17UENL11 | Part : II | Contact Hours /Week : 6 | Credit : 3

Objectives

To teach language through Literature and to enable students to learn and imbibe good values of life gained from Literature

Unit-I – Poetry **23 Hours**

1. D.H.Lawrence -Snake
2. Wole Soyinka -Telephone Conversation
3. John Milton -On His Blindness
4. Shelley - Ozymandias

Unit-II – Prose **13 Hours**

1. Abraham Lincoln - Letter to his son's Headmaster
2. Stephen Leacock -With the Photographer
3. W.R. Inge -Spoon Feeding
4. Martin Luther king - I have a Dream

Unit-III - Short Stories **14 Hours**

1. Rev. G.W.Cox - Orpheus and Eurydice
2. Flora Annie Steele -Valiant Vicky
3. Guy De Maupassant -The Wedding Gift
4. R. K. Narayan - Engine Trouble

Unit-IV-Grammar **22Hours**

1. Noun, Pronoun, Verb, Adjective
2. Adverb, Preposition, Conjunction, Interjection
3. Transitive & Intransitive Verb
4. Articles

Unit-V-Composition **18 Hours**

1. Letter Writing
2. Precis Writing
3. Reading Comprehension
4. Advertisement

Text Book

1. Sudha, A.D and R. Kavitha (Eds.),(2018),"*English for Enrichment I*", New Century Book House, Chennai.

Reference Books

1. Radhakrishna Pillai, G.,(1990),*"Emerald English Grammar and Composition",* Emerald Publication,Chennai.
2. Green David, (2015),"*Comtemporary English Grammer Structures and Compositions*",Maemillen India limited,Chennai.
3. Nesfield.J.C. (2004),"*English Grammer,Composition and usage"*,Maemillen IndiaLimited,Chennai.

Course Title: Mechanics and Relativity Semester : 1
Course Code : 17UPHC11 Part : III Contact Hours /Week : 4 Credit: 4

Objectives

To enable the learners to understand Newton's laws of motion, Types of collisions and loss of Kinetic energy, Basic concepts of Moment of Inertia and to derive expressions for moment of inertia of various objects, About satellites and their different functions, expressions for orbital and escape velocities, General theory of relativity, Basic concepts of variation of time, length and mass with velocity, Experimental set up of Michelson interferometer and discussion about the result.

Unit: I **14 Hours**

Newton's laws of motion - Linear Momentum - Law of Conservation of Linear Momentum – Impulse of a force - Collision - Elastic and Inelastic collisions – Fundamental principles of impact - Newton's law of impact. Coefficient of restitution – Oblique Impact of a smooth sphere on a fixed smooth plane - Direct impact of two smooth spheres - Loss of Kinetic energy due to direct impact of two smooth spheres - Oblique impact of two smooth spheres-Loss of kinetic energy due to oblique impact of two smooth spheres.

Unit: II **12 Hours**

Moment of Inertia – Physical significance of M.I – Perpendicular axes theorem, Parallel axes theorem- Moment of inertia of circular disc (a) About an axis passing through its center and perpendicular to its Plane (b) About a diameter (c) About a tangent in its Plane - Moment of inertia of a solid sphere (a) About a diameter (b) About a Tangent - torque and Angular momentum - Relation between torque and Angular momentum - Kinetic energy of rotation - Expression for the acceleration of a body rolling down on an inclined plane.

Unit: III **12 Hours**

Escape velocity - Satellites - Orbital velocity - Stationary satellite - Rocket – Principle - theory of Rocket - Velocity of rocket at any instant - Rocket propulsion systems - specific impulse - multistage rocket - Shape of the rocket.

Unit: IV **8 Hours**

Frames of reference - Inertial frames of reference - Galilean transformation - Michelson Morley Experiment - Significance of negative result- Newtonian relativity.

Unit: V **14 Hours**

Postulates of special theory of relativity - Lorentz transformation - Lorentz Fitzgerald contraction - Time dilation - Relativistic addition of velocities - Simultaneity –Variation of mass with velocity- Einstein's mass energy relation - Relation between total energy, rest mass energy and momentum.

Text Book

1. Murugesan .R,(2006), "*Mechanics & Relativity*",Santha Publications.

Reference Books

1. Mathur.D.S.,(2010),"*Mechanics*",Sultan & Chand Publications.
2. Mathur. D.S.,(2010),"*Mechanics ,Elements of Properties of Matter*",Sultan Chand & Company.
3. Halliday.D.,Resnick.R.andWalker.J.,(2001),"*Fundamentals of Physics*",6th Edition,Wiley, NewYork.

Course Title: Properties of Matter Semester : 1

Course Code : 17UPHS11 Part : III Contact Hours /Week : 2 Credit : 2

Objectives

To enable the learners to understand the basic concepts of elasticity , Types of bending to determine Young's modulus of elasticity, Kepler's laws of planetary motion, Universal law of Gravitation, Variation of acceleration due to gravity and about earthquake ,Surface Tension, Excess of pressure inside spherical objects and Capillary rise, Viscosity, Bernoulli's theorem and measurement of coefficient of viscosity.

Unit: I **6 Hours**

Elasticity - Stress, strain - Poisson's ratio - Hooke's law - Young's modulus - Bending of a beam - Bending moment - Uniform and Non uniform Bending - Theory

Unit: II **6 Hours**

Kepler's laws of planetary motion - Newton's law of Gravitation – Mass & density of the earth - Potential at a point inside and outside a spherical shell

Unit: III **6 Hours**

Variation of 'g' with altitude, depth and latitude- Earthquake - seismograph - modern application of seismology

Unit: IV **6 Hours**

Definition of Surface Tension - Angle of Contact - Excess of Pressure in Synclastic and anticlastic surface - Capillary rise

Unit: V **6 Hours**

Viscosity - Coefficient of Viscosity - Streamlined and turbulent motion - Critical velocity - Capillary flow - Bernoulli's theorem - Venturimeter - Pitot's tube

Text Book

1. Murugesan.R.,(2004),"*Properties of Matter*",Sultan Chand & Company.

Reference Books

1. Brijlal and Subramanian,(2006), "*Properties of matter*",Sultan Chand & Company .
2. D.S.Mathur.D.S.,(2004),"*Elements of Properties of matter*",Sultan Chand & Company.
3. Mathur.D.S,(2010),"*Mechanics,Elements of Properties of Matter*",Sultan Chand & Company.

Course Title: Programming in C - I | Semester : 1
Course Code : 17UPHS12 | Part : III | Contact Hours /Week : 2 | Credit : 2

Objectives

To enable the learners to understand the basics of C language, Variables and constants, Operations, Types of If statement, ELSE – IF ladder, FOR, CONTINUE and GO TO statements, Simple programs like determination of roots of quadratic equation, Types of functions, Register types and related simple programs, Programs like sorting numbers in ascending and descending orders, arranging names in alphabetical order.

Unit: I **4 Hours**

Introduction to C - character set - Identifiers and key words - Data types - Variables and Constants - Various types of operators - Arithmetic - Expressions - Input and Output Operations

Unit: II **8 Hours**

Simple IF statement - Simple IF, ELSE statement - Block IF statement - Block IF, ELSE statement - The ELSE IF Ladder statement - Looping Operation using WHILE statement - FOR statement - BREAK statement - CONTINUE statement - SWITCH statement - GO TO statement - EXIT function

Unit: III **4 Hours**

Simple programs to find the volume of a sphere - to find factorial of a number - to find Fibonacci series - to evaluate Sin x - to find the roots of a quadratic equation $a x^2 + b x + c = 0$

Unit: IV **8 Hours**

Defining a function - accessing a function - category of a function - passing arguments to a function - recursion - library functions - storage class modifiers - Auto, Global, Static register types - simple programs

Unit: V **6 Hours**

Using functions to sort in the ascending and descending order of magnitude of a given set of numbers - using function to sum integer values between 1 - N recursion technique - to find binomial coefficient - to check whether a given number is odd or even - to sort names in alphabetical order .

Text Book

1. Byron Gottfried,(2004),"*Theory and problems of Programming with C*",Second edition,Tata McGraw Hill.

Reference Books

1. Balagurusamy.E,(2004),"*Programming in C*",Third Edition,Tata Mcgraw Hill.
2. Ramasamy.S. and Radhaganesan.P,(2006),"*Programming in C*",Scitech Publications (India) Private Limited,Chennai and Hyderabad.
3. Pandiyaraja.P.,(2005),"*Programming in C*",Viswanathan.S,Printers & publishers Private Limited,Chennai.

Course Title: Allied Mathematics - I			Semester : 1
Course Code : 17UMAA11	Part : III	Contact Hours /Week : 6	Credit : 5

Objectives

The aim of this course is to understand the fundamental concepts of Algebra and Analytical Geometry of three dimensions. Also to introduce the Fundamentals of Trigonometry and Calculus.

Unit I **15Hours**

Algebra Introduction – Formation of Equations - Relation between the roots and the Coefficients.

Unit II **15 Hours**

Differential calculus Curvature – Formula for radius of curvature – Evolutes - Centre and Circle of curvature.

Unit III **20 Hours**

Integral Calculus Evaluation of Definite Integrals - Reduction Formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\sec^n x$, $\cot^n x$, $\operatorname{cosec}^n x$ and $\sin^m x \cos^n x$ and simple problems.

Unit IV **15 Hours**

Trigonometry Expression for $\sin n\theta$, $\cos n\theta$,& $\tan n\theta$,- Expansion of $\sin\theta$,, $\cos\theta$,& $\tan\theta$,in powers of Hyperbolic Functions – Logarithm of complex numbers.

Unit V **25 Hours**

Analytical Geometry of Three Dimensions Direction cosines - direction ratios of a line-angle between two straight line –Equation of a plane - Equation of Straight line - Angle between a plane and a line – Co-planar lines – Shortest distance.

Text Book

1. Dr. Arumugam. S.,June,(2002), "*Ancillary Mathematics paper-I*",New Gamma Publications, Palayamkottai.

Reference Books

1. Manickavasagam Pilai.T.K & Narayanan.S.,(2015),"*Calculus Volumes I &II*", Publishers:S.Viswanathan.
2. ManickavasagamPillai.T.K & Narayanan.T,(2002),"*Analytical Geometry of Three Dimensions and Vector Calculus*",Viswanathan Publishing Company.
3. Manickavasagam pillai.T.K. &Narayanan,(2011),"*Algebra Volume I and Trigonometry*", S.Viswanathan Publications.

Course Title: English For Better Life -I Semester : 1

Course Code : 17UENN11 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

To enable the students to converse freely in English and deliver public speech effectively and facilitate the students to be placed in suitable jobs.

Unit I **6 Hours**

Self Introduction -Questioning and Answering

Unit II **6 Hours**

Speak for a minute –Extemporen-Turn Coat - Debate

Unit III **6 Hours**

Dialogue in Formal Situations - Narrating Stories

Unit IV **6 Hours**

Conversation in Informal Situations - Narrating experiences

Unit V **6 Hours**

Group Discussion - Argument

Text Book

1. Anushya.K.,"*English for Better Life I (For Private Circulation)*".

Reference Books

1. Mohan, Krishna and Singh.N.P,(2015),"*Speaking English Effectively"*,Laxmi Publications,Chennai.
2. Jones,Leo,(1992),"*Activities for Intermediate Students Book",*Cambridge University Press,London.
3. Pillai,Radhakrishnan.G and Rajeevan.K.,(2002),"*Spoken English for You",*Emerald Publishers,Chennai.

Course Title: Socio-Religious Reform Movements in Modern India Semester: 1
Course Code: 17UHIN11 Part: IV Contact Hours /Week: 2 Credit: 2

Objectives

To provide historical background of the reform movements, missionaries and depressed class movements in modern India and to enable students to understand and the role played by different social groups and leaders in modern India and the different facets of the Women Liberation movement.

Unit I **6 Hours**

Socio and Cultural awakening in India – Brahmo Samaj- Arya Samaj – Prarthana Samaj – Ramakrishna Misson – Thesophical Society.

Unit II **6 Hours**

Christian Missionaries and their activities – Muslim Reform Movements –Aligarh Movement – Ahamadian Movement.

Unit III **6 Hours**

The Depressed Class Movement – Dr.B.R.Ambedkar – E.V.Ramasamy and Self Respect Movement- Narayana Guru and Ezhava Movement VeerasalingamBandhalu – Jyotirao Phule.

Unit IV **6 Hours**

Emancipation of Indian Women- Rise of Women's Organisations – Women Liberation Movements - Dr. Muthulakshmi Reddi – Abolition of Devadasi System.

Unit V **6 Hours**

Social injustice against Women : Dowry System –Female infanticide – Child Marriage – Widows Remarriage – Sexual Harassment.

Text Books

1. Kenneth,Jones.W,(1990),"*Socio-Religious Reform Movements in British India*",Cambridge University Press.
2. Farquhar.J.N.(1998),"*Modern Religious Movements in India*",Munshiram Manoharlal Publishers Private Limited.

Reference Books

1. Pruthi.R.K.,(2014),"*Social & Religious Reform Movements in Modern India*",Commonwealth Publishers.
2. Rajaraman.P.,(2013),"*Glimpses of Social Movements in Peninsular India*",Poompozhil Publishers.
3. Bakshi S.R.,(2002),"*SocialReformers in India*",Deep and Deep Publications.

Course Title: Business Accounting Semester : 1
Course Code : 17UCON11 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

To familiarize the non-commerce students about the basics of accounting concepts, principles and conventions and to make the students to know about the preparation of Journal, Ledger, Trial Balance and Balance Sheet

Unit I **6 Hours**

Introduction – Book Keeping – Accountancy – Differences – Double Entry System – Merits and Limitations – Differences between Single Entry and Double Entry System – Classification of Accounts – Rules – Users of Accounting information.

Unit II **6 Hours**

Books of Prime Entry – Accounting Equation – Journal – Advantages – Ruling (Simple Problems) .

Unit III **6 Hours**

Subsidiary Books – Objectives – Advantages – Purchases Book – Sales Book – Returns Books – Cash Book – (Simple Problems) Difference between Trade Discount and Cash Discount.

Unit IV **6 Hours**

Books of Final Entry – Ledgers – Advantages – Ruling – (Simple Problems) – Trial Balance – Advantages – Difference between Trial Balance and Balance Sheet – Preparation of Trial Balance from given Ledger Balances.

Unit V **6 Hours**

Final Accounts of Sole Trading Concerns – Adjustments : Outstanding Expenses – Prepaid Expenses – Closing Stock – Depreciation – Bad debts – (Simple Problems) – Cost of Goods Sold.

Note:

40% Theory and 60% Problems

Text Book

1. Inbalakshmi.M.,(2015),*"Business Accounting"*,Kalyani Publishers,Ludhiana.

Reference Books

1. Reddy.T.S.& Murthy.A.,(2016),*"Financial Accounting"*,Margham Publications,Chennai.
2. Tulsian.P.C.,(2015),"*Financial Accounting"*,Pearson Education,Edition.7,New Delhi.
3. Jain. S.P.&Narang.K.L.,(2016),*"Advanced Accountancy"*,Kalyani Publishers,Ludhiana.

Course Title: Fundamentals of Mathematics -I Semester : 1
Course Code : 17UMAN11 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

The aim of this course is to introduce the basic concepts in mathematics which are relevant for students of humanities and arts.

Unit I **6 Hours**

Theory of Matrices –types of matrices –operations on them - Addition, Multiplication of two matrices.

Unit II **6 Hours**

Theory of indices, properties-simple problems –theory of Surds-properties- simplification – simple problems.

Unit III **6 Hours**

Differential calculus –differentiating addition subtraction of two functions –product rule - (Simple problems)

Unit IV **6 Hours**

Logarithms - Logarithms functions – changing the base -simplification– common logarithms.

Unit V **6 Hours**

Set Language- Theory of sets – Venn diagrams – Demorgan 's laws-cardinality –power set-simple problems.

Text Book

1.Manoharan .M.,Dr.Elango.C and Eswaran K.L.,(2007),"*Business mathematics*",Paramount publications,Bodi.

Reference Books

1.Vittal.R.R .,(2014),"*Business Mathematics*",Maragam Publications,Chennai.
2.Balakrishnan.R.,(2010),"*Quantitative Aptitude*",Pavai Publications.
3.Ranganathan.C.,(2003)*,"Business Mathematics*",Himalayan publication.

Course Title: Industrial Chemistry Semester : 1
Course Code : 17UCHN11 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

To understand various industrial process involved in the Milk and Milk Products, Agricultural, Polymer, Petrochemicals Industry and know the concepts of Nuclear power plants

Unit I **6 Hours**

Milk and Milk Products Industry : Composition of Milk. Physical properties of milk.Effect of heat on milk. Milk products- manufacturing process of cream, Butter, Ice cream, Milk Powder.

Unit II **6 Hours**

Agricultural Industry – Nutrients for plants – Major and minor nutrients – Role of NPK – Urea – Super Phosphate – Mixed fertilizers

Unit III **6 Hours**

Polymer Industry – Rubber - Natural and Synthetic rubber –difference and examples (Structure not necessary) – Vulcanization of rubber – Plastic - difference between Thermo and Thermosetting plastics.

Unit IV **6 Hours**

Petrochemical industry: Crude oil –Fractional distillation of crude oil, Gasoline –octane numbr, Diesel - cetane number – Natural gas – LPG - CNG

Unit V **6 Hours**

Nuclear Power Plants – Nuclear Power plants in India – Nuclear fuels – Concepts of Nuclear fission and energy production – Nuclear waste disposal and hazards.

Text Book

1. Sharma.B.K.,(2016),"*Industrial Chemistry (Including Chemical Engineering*)",Goel Publishing House,Meerut.

Reference Books

1. Bagavathi Sundari.K.,(2007),"*Applied Chemistry*",S.Chand,New Delhi.
2. Jaya Shree Ghosh.,(2008),"*Fundamental concepts of applied chemistry*",S.Chand,New Delhi.
3. Jain and Jain.,(2005),"*Engineering chemistry*",Dhanpat Rai Publications Private Limited,New Delhi.

Course Title: Human Biology			Semester : 1
Course Code : 17UZON11	Part : IV	Contact Hours /Week : 2	Credit : 2

Objectives

To provide information regarding nutrition, their deficiency diseases, chromosomal abnormalities, human genome, physiology of vital organs, basic concepts in embryology and applied biology.

Unit I Health and Hygiene: **6 Hours**

Composition of food, Digestion and absorption of food, Balanced diet, Vitamin deficiencies, Calorific value of food, Malnutrition and Obesity, protein deficiency.

Unit II Genetics: **6 Hours**

Sex determination in Man -Chromosomal abnormalities (Down, Turner's, Klinefelter's syndromes) – Human Blood groups, Eugenics, Euthenics (brief account), Human genome project Objectives and application.

Unit III Physiology **6 Hours**

Respiration – Structure of lungs, Inspiration and expiration; Blood: Blood Composition; Structure and function of heart, Electrocardiogram (ECG), Blood pressure, Blood urea; Structure of kidney, Nephron and Formation of urine.

Unit IV Embryology: **6 Hours**

Structure of Human sperm and ovum - Menstrual cycle – Menopause – Pregnancy — Parturition– Twins.

Unit V Applied Biology: **6 Hours**

Infertility, Sperm bank, IVF and types, Artificial insemination, Test tube baby, Birth control and Contraception.

Text Books

1. Arumugam.N., (2008),"*Developmental Biology*",Saras Publications, Kottar –629002.
2. Arumugam.N., Maria Kuttikan,(2013),"*Animal Physiology*",Saras Publications, Kottar – 629002.

Reference Books

1. Ambika Shanmugam,(2006),"*Biochemistry*",10,III Cross Street,West C. I. T.Nagar,Chennai – 600 035.
2. Balinsky.B.I.,(2002),"*An Introduction to Embryology*",W.B. Saunders Co.Philadelphia.
3. Gupta.P.K.,(1999),"*Genetics*",Rastogi Pub.,Meerut,ISBN81–7133–413–X.

Course Title: Introduction to Physical Education - I			Semester : 1
Course Code : 17UPEN11	Part : IV	Contact Hours /Week : 2	Credit : 2

Objectives

To educate the History and Rules and regulations of Handball, Football, Volleyball, and Kabaddi.

Unit I **6 Hours**

History and Development of Games – Organization of Games

Unit II **6 Hours**

Handball – Measurements – Ground Marking – Major Rules of the Game

Unit III **6 Hours**

Football – Measurements – Ground Marking – Major Rules of the Game

Unit IV **6 Hours**

Volleyball – Measurements – Ground Marking – Major Rules of the Game

Unit V **6 Hours**

Kabaddi – Measurements – Ground Marking – Major Rules of the Game

Text Book

1. National Council of YMCA,(2011),"*Rules book of Games and Sports*",KK Jacob National Council of YMCA, New Delhi.

Reference Books

1. American Sport Education Program,(2011),"*Coaching Volleyball Technical & Tactical Skills (Technical and Tactical Skills Series*)".
2. http://www.kabaddiikf.com/history.htm. Retrieved (2008),-04-20, "*Origin, History and Development of Kabaddi*".
3. U.S. Soccer Federation, (2011), "*Official Rule Book of Soccer*".

Semester- 2

Course Title: ,ilf;fhy ,yf;fpaKk; GjpdKk; Semester : 2

Course Code : 17UTAL21 PPart : I Contact Hours /Week : 6 Credit : 3

Nehf;fk;

jkpopy; cs;s gf;jp ,yf;fpa tifikfisAk; rpw;wpyf;fpa tifikfisAk; mwpKfk; nra;jy;> Gjpd ,yf;fpaq;fis khzth;fs; mwpe;Jnfhs;sr; nra;jy;> nrhy; ,yf;fzj;ij czh;j;Jjy;

gad;;

.gf;jp rpw;wpyf;fpaq;fshy; fhzyhFk; ftpj;Jtj;ijAk;>r%fNkk;ghl;Lf; fUj;Jf;fisAk; mwpe;Jnfhs;sr; nra;jy;> .Gjpd,yf;fpaj;ijmwpe;Jnfhs;Sjy;> gilg;ghw;wy; jpwidtsh;j;jy;

$W 1 :gf;jp ,yf;fpaq;fs; 30 kzpfs;

jpUQhdrk;ge;jh; Njthuk; ekr;rpthaj; jpUg;gjpfk; (1 – 5 ghly;fs;) – jpUehTf;furh; Njthuk; jpUtpilkUJhh; gjpfk; (Njh;e;njLf;fg;gl;l 5 ghly;fs;) – Re;juh; Njthuk; jpUr;Nrhw;Wj;Jiw gjpfk; (1 - 5 ghly;fs;) – khzpf;fthrfh; jpUr;rhoy; (1- 5 ghly;fs;) – jpUkq;ifMo;thh; nghpajpUnkhop (1 – 5 ghly;fs;) – Mz;lhs; ehr;rpahh; jpUnkhop jpUkzf;fdT (1 - 5 ghly;fs;) – jpU%yh; jpUke;jpuk; (Njh;e;njLf;fg;gl;l 5 ghly;fs; jhAkhdth; guhguf;fz;zp (1 - 5 ghly;fs;) – rptthf;fpahh; rptthf;fpahh; ghly;fs; (Njh;e;njLf;fg;gl;l 5 ghly;fs;).

$W - 2 :rpw;wpyf;fpaq;fs; 15 kzpfs;

jkpo;tpLJhJ gh.vz;. 35 - 44 tiu cs;s 10 ghly;fs; – fypq;fj;Jg;guzp fhLghbaJ (1 - 5 ghly;fs;) – jpUf;Fw;whyf; FwtQ;rp ehl;L tsk; $Wjy; (1- 5 ghly;fs;) – Kf;flw; gs;S gs;spah; Vry; (gh.vz;. 162 -166 5 ghly;fs;) – kJiukPdhl;rpak;ik gps;isj; jkpo; tUifg; gUtk; (gh.vz;. 61>63 2 ghly;fs;).

$W : 3 - Gjpdk; 15 kzpfs;

R+h;afhe;jd; - G+h;tPfG+kp

$W : 4 - ,yf;fzk; 15 kzpfs;

ehd;Ftifr; nrhw;fs; - Ntw;Wikfs; - njhifepiyj; njhlh; -njhfh epiyj; njhlh; - tpdhtpil tiffs;

$W : 5 - ,yf;fpatuyhWk; gad;ghl;Lj; jkpOk; 15 kzpfs;

gf;jp ,yf;fpa tuyhW – rpw;wpyf;fpatuyhW – Gjpdj;jpd; Njhw;wKk; tsh;r;rpAk; – fbjk; tiujy;

ghl E}y;

1.rhe;jpdp .fp (njh.M).> 2017> ,ilf;fhy ,yf;fpaKk; GjpdKk; > epA+ nrQ;Rhp Gf; `T]; (gp) ypl;.> nrd;id.

ghh;it Ehy;fs;

1. fjph;KUF> 2007 Kf;$lw;gs;S> rhujhgjpg;gfk;> nrd;id.
2. R+hpafhe;jd;> 2013 G+h;tPfG+kp> epA+nrQ;RhpGf; `T];> nrd;id.
3. f.jz;lghzpNjrpfh;> 2008 ed;Dhy; tpUj;jpAiu> rhujhgjpg;gfk;> nrd;id

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Course Title: English for Enrichment - II Semester : 2

Course Code : 17UENL21 Part : II Contact Hours /Week : 6 Credit : 3

Objectives

To teach language through Literature and to enable students to learn and imbibe good values of life gained from Literature

Unit I Poetry **20 Hours**

1. Rupert Brooke - The Great Lover
2. Robert Frost - Stopping by Woods on a Snowy Evening
3. Emily Dickinson - Because I Couldn't Stop For Death
4. Alice Walker - Gift

Unit II Prose **25 Hours**

1. Mark Twain - Monday Morning
2. Jawaharlal Nehru - Our Universities
3. G.B.Shaw - How I Become A Public Speaker
4. Khushwant Singh - The Portrait of the Lady

Unit III One Act Play **15 Hours**

1. RabindranathTagore - Chitra
2. Saki - The Death Trap
3. Wole Soyinka - The Strong Breed
4. Ronald Gow - Sheriff's Kitchen

Unit IV Grammar **15 Hours**

1. Tense
2. Voice
3. Degrees of Comparison
4. Question Tag

Unit V Composition **15 Hours**

1. Expansion of Proverb
2. Dialogue Writing
3. Note Making
4. Writing Soft and Hard News

Text Book

1. Remya, I.P. and Lakshmi Priya.N(Eds.), (2018),"*English for Enrichment II"*,Chennai,New Century Book House.

Reference Books

1. Murphy, Raymon,(1985), *"English Grammar in Use",* Cambridge: Cambridge University Press.
2. Green David, (2015),"*Comtemporary English Grammer Structures and Compositions*",Maemillen India Limited,Chennai.
3. Nesfield.J.C. (2004),"*English Grammer,Composition and usage*",Maemillen India Limited,Chennai.

Course Title: Electricity Semester : 2
Course Code : 17UPHC21 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To enable the learners to understand Gauss law and its application, Electric field and potential, Principle of capacitor and various types of capacitors, Kirchoff's laws, Whetstone's bridge, Potentiometer and its applications, Biot-Savart law, Ballistic Galvanometer and its applications ,Thermo electric effect of electric current, Seebeck and Peltier and Thomson effects .

Unit I **14 Hours**

Coulomb's law - Gauss law - Its proof - Applications of Gauss law - Electric field due to a charged sphere (a) at a point outside (b) at a point inside (c) at a point on the surface of the sphere - Electric field due to a plane sheet of charged conductor - Coulomb's theorem - Mechanical force on the surface of the charged conductor - Electric field - Flux of electric field - Relation between electric field and potential - Potential due to a charged spherical conductor at a point (a) outside (b) on the surface and (c) inside

Unit II **11Hours**

Capacitance - Principle of Capacitor - Expressions for the capacitance - Spherical capacitor - Cylindrical capacitor - Parallel plate capacitor with and without partly filled dielectric - Energy of capacitor - Loss of energy , when two charged conductors share the charges - Types of capacitors, fixed capacitor, variable capacitor, Electrolytic capacitor and sliding capacitor.

Unit III **10 Hours**

Kirchoff 's laws - Application to Kirchoff's laws to Wheatstone's network - Sensitiveness of bridge - Carey Foster's bridge - Determination of the resistance of given wire with the necessary theory - Principle of potentiometer - Determination of internal resistance of the cell using potentiometer - Calibration of ammeter and voltmeter - Low & high range

Unit IV **13 Hours**

Biot-Savart's law - Its application - Long straight wire of infinite length - Ampere's theorem - Magnetic field at the center of circular coil carrying current - Magnetic field along the axis of a coil carrying current - Solenoid - Ballistic galvanometer - Theory - Damping correction - comparison between deadbeat and aperiodic galvanometer - Determination of absolute capacity of a conductor using B.G (Theory) and experiment - Comparison of capacitance using B.G.(Theory) and experiment

Unit V **12 Hours**

Seeback effect - Thermo e.m.f - Neutral temperature - Temperature of inversion - Law of intermediate metals - Law of intermediate temperature - Measurement of e.m.f of a thermocouple with a potentiometer - Peltier effect - Peltier coefficient - Thomson effect - Thomson coefficient - Thermoelectric power.

Text Book

1. Sehgal, Chopra & Sehgal,(1998), "*Electricity and magnetism"* Sultan Chand & Sons.

Reference Books

1. Murugesan.R.,(2004), "*Electricity*",Sultan Chand & Company.
2. Dr. Tewari.K.K.,(2002), "*Electricity and Magnetism*", Sultan Chand & Company.
3. Brijlal & Subramaniyam,(2007), "*Electricity and Magnetism*" 20th revised edition Sultan Chand & Company.

Course Title: Thermal Physics | Semester : 2
Course Code : 17UPHS21 | Part : III | Contact Hours /Week : 2 | Credit : 2

Objectives

To enable the learners to understand Kinetic theory of gases and Transport phenomena like conduction viscosity and diffusion, Principle of Joule-Thomson effect, Porous plug experiment and properties of Helium-I and Helium- II, Black body radiation, Prevost's theory and Distribution of energy in black body, Stefan's law, Solar constant and measurement of temperature of the Sun, and Thermodynamics, First , Second and Zeroth laws, Entropy and change in entropy

Unit I **6 Hours**

Postulates of Kinetic theory - Mean free path -Transport phenomena - Conduction, viscosity and diffusion

Unit II **8 Hours**

Joule - Thomson effect - Porous plug experiment - Liquefaction of oxygen, hydrogen and helium - Properties of Helium I and Helium II.

Unit III **4Hours**

Black body Radiation - Prevost's theory - Emissive and absorptive power - Distribution of energy in black body - Wien's displacement law.

Unit IV **5 Hours**

Stefan's law of radiation - Derivation - Newton's law from Stefan's law - solar constant - Temperature of Sun - Angstrom's Pyrheliometer - Solar Spectrum

Unit V **7 Hours**

Thermodynamics - Zeroth law - First law, Second Law and Third Law of thermodynamics - Entropy - Change of entropy in reversible and irreversible process - Heat death - Change of entropy in converting ice into steam.

Text Book

1.Murugesan.R.,(2011),"*Thermal Physics*",Shantha Publications, Madurai. .

Reference Books

1. Mathur. D.S.,(2002), "*Heat and Thermodynamics*",Sultan Chand & Company.
2. Murugesan.R.,(2004), "*Heat and Thermodynamics*",Sultan Chand & Company.
3. Brijlal and Subramanian and Hemne.P.S.,(2004),"*Heat,Thermodynamics and Statistical Physics*",Chand & Company.

Course Title: Programming in C - II Semester : 2
Course Code : 17UPHS22 Part : III Contact Hours /Week : 2 Credit : 2

Objectives

To enable the learners to understand Definition of arrays, one dimensional and two dimensional arrays and related programs, Program to find multiplication of two matrices, addition and subtraction of two matrices and sorting given numbers in ascending order ,Programs to find arithmetic, geometric and harmonic mean of given set of numbers, Structure and Unions, programs related to structure and union Program to prepare salary bill and concept of pointers

Unit: I **8 Hours**

Defining an array - Processing an array - One dimensional array - Two dimensional arrays - Multidimensional arrays - Passing arrays to functions - Programs using arrays and strings

Unit: II **4Hours**

To multiply two matrices of the order (l x m) and (m x n) - To add and subtract two matrices - To arrange the given set of numbers in ascending order - To arrange the given set of numbers in descending order .

Unit: III **5 Hours**

To find the arithmetic mean, geometric mean and harmonic mean of a given set of numbers

Unit: IV **7 Hours**

Defining a structure - Processing a structure - Arrays of structures - Arrays within structures - Unions - Bit field - Programs using structures - To print current date and time using functions .

Unit: V **6 Hours**

To prepare the salary bill for employees of a company - Pointers - Fundamentals - Pointer declaration - Pointers and simple variables

Text Book

1. Balagurusamy.E.,(2004),"*Programming in C*",Third Edition – Tata Mcgraw Hill.

Reference Books

1. Byron Gottfried, (2006),"*Theory and problems of Programming with* C"Second Edition – Tata McGraw Hill.
2. Ramasamy.SandRadhaganesan.P.,(2006),"*Programming in C*",Scitech Publication (India) Private Limited, Chennai and Hyderabad.
3. Pandiyaraja.P,(2005),"*Programming in C"*,ViswanathanPrinters & publishers Private Limited, Chennai.

Course Title: Allied Mathematics - II Semester : 2
Course Code : 17UMAA21 Part : III Contact Hours /Week : 3 Credit : 2

Objectives

This course is intended to offer the students to get mathematical skills to study higher physics and chemistry. The topic covers deals with vector differentiation, Integration, line integral, solution of simultaneous equation, eigen value and eigen vectors.

Unit I **10 Hours**

Vector-velocity-Acceleration, Vector differentiation- Gradient- Divergence-curl and their properties.

Unit II **8 Hours**

Directional derivatives, solenoidal - Irrotational vectors.

Unit III **7 Hours**

Line integrals.

Unit IV **10Hours**

Matrices-consistency of equation

Unit V **5 Hours**

Eigen values and Eigen vectors.

Text Book

1. Arumugam.S, (2011),"*Ancillary Mathematics vol II*", New Gamm Publications, Palayamkottai.

Reference Books

1.Manickavasagam Pillai.T.K.&Narayanan.T, (2002), "*Analytical Geometry of Three Dimensions and Vector Calculus*", Viswanathan Publishing Company, Chennai.

2.Venkatachalapathy.S.G,(2011),"*Modern Algebra*", Margham Publications, Chennai.

3.Vittal.P.R., (2011), "*Allied Mathematics*", Margham Publications, Chennai.

Course Title: Allied Mathematics - III Semester : 2
Course Code : 17UMAA22 Part : III Contact Hours /Week : 3 Credit : 2

Objectives

The aim of this course is to enable the students to acquire the basic tools in statistical methods and numerical methods for solving real life problem in business, industry, agriculture and medicine. It enables the students to have understand of the mathematical pattern of physical phenomenon. This course includes correlation, regression ,curve fitting, Lagranges, Newtons and Fourier series.

Unit I **10 Hours**

Curve fitting – Straight lines, Parabola and Exponential curves -Correlations – properties - simple problems.

Unit II **8Hours**

Rank correlations-– properties - simple problems .Regression– properties - simple problems .

Unit III **9 Hours**

Interpolation methods Lagrange‘s - Newton‘s forward difference - Newton‘s backward difference.

Unit IV **9 Hours**

Attributes – Consistency of data- Index numbers-simple index number –weighted index number.

Unit V **10 Hours**

Fourier series-Trigonometric series-Even and odd functions-Half Range Fourier series.

Text Book

1. Dr. Arumugam. S , (2011),"*Ancillary Mathematics Vol II* ",New Gamma Publications **,**Palayamkottai**.**

Reference Books

1. Gupta S.C and Kapoor V.K , (2000), "*Elements of Mathematical Statistics*" , Sultan Chand & sons, New Delhi.
2. Pillai .R.S.N, Bagavathi .V ,(2005),"*Statistics*", S.Chand & Company Limited, New Delhi.
3. Dr. Arumugam .S , (2009),"*Statistics*" , New Gamma Publishing House, Palayamkottai.

Course Title: English For Better Life -II Semester : 2
Course Code : 17UENN21 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

To make the students meet the challenges in the competitive professional world and to make them fix themselves in jobs.

Unit I **6 Hours**

Writing application for a job
Preparing a Curriculum Vitae or a Resume

Unit II **7 Hours**

Group Discussion
Job interview

Unit III **5 Hours**

Business correspondence

Unit IV **7 Hours**

Preparing the minutes of a meeting
Presenting Data in verbal and Non- verbal modes

Unit V **5 Hours**

Body Language
Etiquettes
Stress Management

Text Book

1. Anushya, K. "*English for Better Life I* " (For Private Circulation)

Reference Books

1. Saraswathi, V and Maya K Mudbhatkal,"*English for Competitive Examination.",*Chennai Emerald Publishers, 2000.
2. Green David, (2015),"*Comtemporary English Grammer Structures and Compositions*" , Maemillen India Limited,Chennai.
3. Nesfield.J.C. (2004),"*English Grammer,Composition and usage*", Maemillen India Ltd,Chennai.

Course Title: History Of Modern Tamil Nadu From 1800 To 1947 Semester : 2
Course Code : 17UHIN21 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

To provide a survey of different facets of the Modern Tamil Nadu and to bring to limelight the role of Tamil Nadu in Indian Freedom Movement.

Unit I **7Hours**

The South Indian Rebellion of 1800 -801- Causes – Course and Results -- Vellore Mutiny of 1806 – Results.

Unit II **5Hours**

The British Land Revenue Administration – Ryotwari System - Judiciary.

Unit III **6 Hours**

Introduction of Western Education – Temple Entry Movement – The Rise and Fall of Justice Party.

Unit IV **5Hours**

Role of Tamil Nadu in Freedom Movement - TheEarly Phase : Tamilnadu and early Congress-Extremists-Moderates-Militant Nationalists-Chidamabaram Pillai – Subramaniya Bharathi-Vanchinathan – Subramaniya Siva.

Unit V **7 Hours**

The Later Phase : Justice Party - Neil Statue Satyagraha - Rajaji – Individual Satyagraha - Satyamoorthy – Kamaraj.

Text Books

1. Rajayyan K., (1995), "*History of Tamil Nadu Past to Present*", Ratna Publications, Madurai.
2. Subramaniyan N., (1924),"*History of Tamil Nadu (1565- 1982)*", Koodal Publications, Madurai.

Reference Books

1. Manoranjitha Mani C., (2015), "*History of Tamilnadu*",Create Space Independent Publishing Platform.
2. Mangala Murugaesan N.K, (1979),"*Self-Respect Movement*",Koodal Publications,Madurai.
3. Sailendranath Sen, (2008),"*History of Freedom Movement in India*", New Age International Private Limited.
4. Venkatesan G., (2011),"*Tharkala Tamilnattu Varalaru*" (History of Modern Tamilnadu1600-2011),V.C.Publications.

Course Title: Advertising and Salesmanship Semester : 2
Course Code : 17UCON21 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

To enable the students to know the fundamentals of advertising and salesmanship and to gain an insight on the nature of advertising and salesmanship

Unit I **7 Hours**

Meaning of advertising – Characteristic Features of Advertising – Nature and Scope of Advertising – Benefits or Advantages of Advertising – Criticisms of Advertising – Is Advertising an Economic Waste? – Difference between Advertising and Salesmanship.

Unit II **6 Hours**

Advertising Media – Indoor and Outdoor Advertising – Advertising agency – Role – Importance.

Unit III **5 Hours**

Personal Selling – Definition – Salesmanship – Definition – Features – Objectives – Benefits – Criticisms against Salesmanship.

Unit IV **6 Hours**

Qualities of a successful salesman; Physical, Mental, Social and Moral Qualities – Other Requisites of a Salesman

Unit V **6 Hours**

Recruitment of Salesman – Sources – Remuneration of Salesman – Methods.

Text Book

1. Inbalakshmi, M,(2014) "*Advertising and Salesmanship*", Kalyani Publishers, Ludhiana, 2014.

Reference Books

1. Gupta, C.B, (2014) "*Advertising and Personal Selling*", Sultan Chand & Sons, New Delhi.
2. Chunawalla, S.A., Sethis, K.C., (2017), "*Foundation of Advertising- Theory and Practice*", Himalaya Publishing House, New Delhi.
3. Ken Kaser, (2013), "*Advertising and Sales Promotion*", South-Western Cencgage Learning.

Course Title: Fundamentals of Mathematics -II Semester : 2
Course Code : 17UMAN21 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

The aim of this course is to enable the student to acquire basic tools in statistical methods for solving real life problems in business, industry, agriculture and medicine. This course includes measure of central tendency, dispersion, correlation, method of least square and curve fitting.

Unit I **7 Hours**

Statistics – Averages – Mean and Median

Unit II **5 Hours**

Dispersion – Range, Quartile deviation, Standard deviation

Unit III **4 Hours**

Correlation – Pearson‘s coefficient of correlation, rank correlation coefficient.

Unit IV **6 Hours**

Index numbers – Calculation of indices using simple aggregate method and average of price relative methods – Weighted index numbers – Laspeyre‘s, paasche‘s and Fisher‘s index numbers.

Unit V **6 Hours**

Curve fitting – Fitting of a straight line and parabola.

Text Book

1. Arumugam.S., (2009*), "Statistics"*, New Gamma Publishing House, Palayamkottai.

Reference Books

1. Saxena.H.C, Kapur.J.N, (2009), "*Mathematical Statistics"*, S.Chand & Company Ltd, New Delhi.
2. Pillai.R.S.N, Bagavathi.V, (2008*), "Statistics"*, S.Chand & Company Ltd, New Delhi.
3. Vittal.P.R., (2013), "*Business Mathematics and Statistics"*, Margham Publications, Chennai.

Course Title: Drugs & Cosmetics Semester : 2
Course Code : 17UCHN21 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

To study the chemical principles, importance and applications of Drugs and Cosmetics.

Unit I **6 Hours**

Importance of Drugs: Important terminologies, their meaning – Bacteria, virus, fungi, Names of drugs.

Unit II **6 Hours**

Antibiotics: Definition – uses of Antibiotics. Ampicillin, streptomycin, tetracycline, Rifomycin, Erythromycin, drug actions and side effects.

Unit III **6 Hours**

Antipyretics and Analgesics: Antipyretics, Analgesics, and anti-inflammatory agents sulphonamide – Drug actions – uses of sulpha drugs, pain balm

Unit IV **6 Hours**

Preparation of domestically useful products

Preparation of Washing Powder, Cleaning Powder, Phenoyls (White, Black, Yellow, Rose coloured phenoyls), liquid blue, soap oils

Unit V **6 Hours**

Cosmetics: Preparation of shampoo, Face powder, Soap -Manufacturing of soap (Kettle process and Hydrolyser process)

Text Book

1. Sharma.B.K.,(2016), "*Industrial Chemistry (Including Chemical Engineering)",*Goel Publishing House,16th Revised and Enlarged Edition.

Reference Books

1. Jayashree Ghosh,(2010), "*A Text book of Pharmaceutical Chemistry"*,Sultan Chand & company limited,New Delhi.
2. Dr.Lakshmi.S.,(2004), "*A Textbook of Pharmaceutical Chemistry"*,Sultan Chand & company Limited,New Delhi.
3. Vijay Malik,(2010),"*Law relating to Drugs & Cosmetics"*,Eastern Book Company, 25th edition.

Course Title: Entrepreneurial Zoology Semester : 2

Course Code : 17UZON21 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

To provide a comprehensive knowledge in various thrust areas to start profitable business and to develop a dynamic and successful entrepreneur skill which includes animal husbandry, poultry, and aquaculture, apiculture and sericulture techniques.

UNIT I Animal Husbandry & Dairy technology 6 Hours

Animal Husbandry: Introduction – Breeds of Cattle – cow and diseases – Mastitis, foot and mouth diseases – Dairy technology: Introduction – Scope of dairy farming, Pasteurization of milk, Standard composition of milk, food and nutritive value, grading of milk- Lactometer and dairy products.(Yohort, Cheese).

UNIT II Poultry farming 6 Hours

Indian and Exotic breeds, construction of poultry house, Equipments - Brooder, Waterer and feeder - Rearing of broiler, layers and nutritive value of eggs - Lighting, Summer and winter management.

UNIT III Aquaculture 6 Hours

Marine and freshwater fishes - Biological value of fish and Economy of ornamental fishes - Commercial values of shell fish, prawn, edible oyster, pearls, crab.

UNIT IV Apiculture and Lac culture 6 Hours

Apiculture: Bees – queen, drones, worker, royal jelly, life history, hive types and nutritional value of Honey - Lac culture: Lac insect – host plant, collection and processing Lac –types– uses.

UNIT V Sericulture 6 Hours

Mulberry sericulture: Silk Industry in India, Mulberry cultivation, Life history of *Bombyx mori*. Seed production, rearing appliances, rearing of silk worm, Silk reeling, reeling appliances and Commercial value of silk - Non mulberry sericulture: Tasar, Muga, Erisilk and commercial value.

Text Book

1. Jayasurya.R., Arumugam.N.,Leelavathy S., Soundara Pandian N., Murugan T.,Thangamani A., Prasannakumar S., Narayanan.L.M., Johnson Rajeshwar. J.,Nair .N.C.,(2013),"*Economic Zoology*",Saras Publication,Nagercoil.

Reference Books

1. Ganga.G., Sulochana chetty.J.,(1977)," *An Introduction of Sericulture*",Oxford,New Delhi.
2. Gnanamani.R.,(2003),"*Modern aspects of commercial poultry keeping*",Giri Pub,Madurai.
3. Gupta.C. B.,Srinivasan.N. P.,(1997)," *Entrepreneurship development in India*",Sultan Chand and Sons, Educational Publishers,New Delhi.

Course Title: Introduction to Physical Education - II			Semester : 2
Course Code : 17UPEN21	Part : IV	Contact Hours /Week : 2	Credit : 2

Objectives

To educate the History and Rules and regulations of Basketball, Hockey, Cricket, and Kho-Kho.

Unit I **6 Hours**

History and Development of Games – Organization of Games

Unit II **6 Hours**

Basketball – Measurements – Ground Marking – Major Rules of the Game

Unit III **6 Hours**

Hockey – Measurements – Ground Marking – Major Rules of the Game

Unit IV **6 Hours**

Cricket – Measurements – Ground Marking – Major Rules of the Game

Unit V **6 Hours**

Kho - Kho – Measurements – Ground Marking – Major Rules of the Game

Text Book

1. National Council of YMCA, (2011), "Rules book of Games and Sports", KK Jacob National Council of YMCA, New Delhi

Reference Books

1. Gale Reference, (2006),"Team Coaches corner.(Basketball competitions)",An article from: Coach and Athletic Director.
2. "Tripura KHO-KHO Association,(2011) @ Tripura4u". http://www.kho-kho.tripurasports.com/.
3. Ralph Dellor,(2010),*"Cricket Steps to Success"* Human Kinetics Publication.
4. Elizabeth Andrers with Sue Myers,(2008), 2nd Ed *"Field Hockey steps to Success"*. USA.

Course Title: Major Physics Practicals – I | Semester : 2
Course Code : 17UPHC2P | Part : III | Contact Hours /Week : 2 | Credit : 3

List of Practicals

1. Young's Modulus - Cantilever (Pin and Microscope)
2. Rigidity Modulus -Torsion Pendulum with loads
3. A.C. Frequency - Sonometer
4. Potentiometer - Calibration of Ammeter
5. Carey Foster's bridge - Resistance and Specific Resistance
6. Young's Modulus - Non - Uniform Bending Optic Lever
7. Compound pendulum "g"
8. Potentiometer - Calibration of Voltmeter
9. Thermal conductivity of bad conductor using Lee's disc.
10. Moment of Inertia – Torsion pendulum
11. Young's Modulus - Cantilever (Dynamic method)
12. Young's Modulus – Uniform bending (Pin and Microscope)
13. Melde's apparatus- Frequency of vibrator

Semester – 3

Course Title: fhg;gpa ,yf;fpaKk; ehlfKk; Semester : 3
Course Code : 17UTAL31 Part : I Contact Hours /Week : 6 Credit : 3

Nehf;fk;

jkpopy; cs;s fhg;gpaq;fspd; rpwg;Gf;fis vLj;Jiuj;jy; - ehlff;fiyia khzth;fSf;F czh;j;Jjy; - ahg;G> mzp ,yf;fzq;fis khzth;fs; mwpAk;gbr; nra;jy;.

gad;

khzth;fsplk; jk; jha; nkhopahd jkpo; nkhopapd; ,yf;fpak; ,yf;fzj; jpwid Nkk;ghL milar; nra;jy; - ehlfg; gilg;ghf;fg; gapw;rpia cUthf;Fjy; -fhg;gpaq;fspd; cs;shh;e;j fUj;Jf;fis mwpe;J nfhs;Sjy;.

$W 1 fhg;gpaq;fs; 30 kzpfs;

rpyg;gjpfhuk; tof;Fiu fhij (KOtJk;) – kzpNkfiy Mjpiu gpr;irapl;l fhij (KOtJk;) - fk;guhkhazk; thyp tijg;glyk; (gh.vz;-322-365 tiu cs;s 44 ghly;fs;) - nghpaGuhzk; mg;G+jpabfs; ehadhh; Guhzk; (KOtJk;)

$W 2 jw;fhy fhg;gpaq;fs; 15 kzpfs;

,NaRfhtpak; kiyg;nghopT (10 ghly;fs;) - egpfs;ehaff; fhtpak; kjPdhf;fhz;lk; (11 ghly;fs;)

$W 3 ehlfk; 15 kzpfs;

,uhkRthkp K.> nusj;jpuk; goF – NrJgjp itifapy; nts;sk; tUk; - NrJgjp nksdj;jpd; Funyhd;W - NrJgjp md;gpd; nka; - rptf;fz;zd; FUNrj;jpuq;fs; Xa;tjpy;iy.

$W 4 ,yf;fzk; 15 kzpfs;

gh tiffs; ntz;gh> Mrphpag;gh> tQ;rpg;gh> fypg;gh – mzpfs; ctik cUtfk;- jw;Fwpg;Ngw;wk;- Ntw;Wik- gpwpJnkhopjy;- tQ;rg;Gfo;r;rp- rpNyil

$W 5 ,yf;fpa tuyhWk;> gad;ghl;Lj;jkpOk; 15 kzpfs;

Ik;ngUq;fhg;gpaq;fs; – IQ;rpWfhg;gpaq;fs; – ehlfj;jpd; Njhw;wKk; tsh;r;rpAk; – ehlfj;jpd; tiffs; – ehlfk; gilj;jy;.

ghl E}y;

1. khrpyhNjtp.r.,(njh.M).>(2018)>"fhg;gpa ,yf;fpaKk; ehlfKk">epA+ nrQ;Rhp Gf; `T];,nrd;id.

ghh;it E}y;fs;

1.,uhkRthkp.K.,.,(2015*),",nusj;jpuk; goF*">epA+ nrQ;Rhp Gf; `T];>nrd;id.
2.rptf;fz;zd;.m.>(2007),"MW ehlfq;fs;">ghit gg;spNf\d;];>nrd;id.
3.Rg;gpukzpa Njrpfh;(c.M)>(1966),"*jz;bayq;fhuk*;",fof ntspaPL>jpUney;Ntyp.
4.NrJgjp>(2007),"*itifapy; nts;sk; tUk*">ghit gg;spNf\d;];>nrd;id.
5.tujuhrd;.K.>(2007),"*jkpo; ,yf;fpa tuyhW*">rhfpj;a mfhnjkp>GJnly;yp.
6.Ntq;flrhkp ehl;lhh;.e.K.>(c.M)>(2006),"*ahg;ngUq;fyf;fhhpif*">rhujhgjpg;gfk;>nrd;id.

Course Title: English for Enrichment - III Semester : 3
Course Code : 17UENL31 Part : II Contact Hours /Week : 6 Credit : 3

Objectives

To teach language through Literature and to enable students to learn and imbibe good values of life gained from Literature

Unit I – Romantic Plays **20 Hours**

1. As you like it : Cartons of love Act IV – Scene I
2. Merchant of Venice : Trial for a pound of flesh Act IV – Scene I

Unit II - Roman Plays **20 Hours**

3. Antony and Cleopatra : Terrifying moments of Titanic Love Act V Scene II
4. Julius Caesar : Funeral oration Act III Scene II & III

Unit III – Tragedy plays **15 Hours**

5. Macbeth : He kills sleep Act I, Scene VII & Act II Scene II
6. Othello : When the moor kills so good a wife:ActV Scene II

Unit IV – Grammar **15 Hours**

1. Sentence Improvement
2. Sentence Arrangement
3. Sentence Completion

Unit V – Composition **20 Hours**

1. E-Mail & Fax
2. Filling a bank challan
3. Attending Interview

Text Book

1. Moorthy.N and V.Amardeep ((Eds.),(2018),"*English for Enrichment III*,Chennai: New Century Book House.

Reference Books

1. Nesfield. J.C.,(2010),"*Manual of English Grammar and Composition"*.Delhi: Surjeet Publications.
2. Shakespeare, William,(2005),"*Greatest Collections of William Shakespeare"*. Delhi: Black Rose Publications.
3. Green David, (2015),"*Contemporary English Grammar Structures and Compositions*" , Macmillan India Limited, Chennai.

Course Title: Electromagnetism Semester : 3
Course Code : 17UPHC31 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To enable the learners to understand Basics of electromagnetic induction, Self induction and mutual induction and their experimental determination, Growth and decay of current in LR and CR circuits, Inducing emf, LCR series, LCR parallel circuits, Working of transformer and Skin effect, Definition of B,H and M, Hysteresis, Loss of energy in hysteresis cycle, Maxwell's equations, idea of displacement current, Poynting vector.

Unit: I **12 Hours**

Faraday's laws of electromagnetic induction - Lenz's law - Self-induction - Self induction of a long Solenoid - Determination of Self-inductance by Rayleigh's method - Anderson's bridge method - Mutual induction - Mutual inductance between two co-axial solenoids - Experimental determination of mutual inductance - Coefficient of coupling - Eddy currents.

Unit: II **14 Hours**

Growth and decay of current in LR circuit - Growth and decay of charges in CR circuit - Determination of High resistance by leakage (B.G) - Growth and decay of charge in a circuit with inductance, capacitance and resistance in series

Unit: III **10 Hours**

E.M.F induced in a coil rotating in a magnetic field - Mean value of alternating e.m.f - RMS value of alternating current / voltage - Alternating current circuit containing LCR in series (Series resonance circuit) - Q - factor- Parallel resonance circuit - Power in an A.C. circuit - Wattless current - Power factor - Choke coil - The transformer - Skin effect .

Unit: IV **11 Hours**

Definition of B, H, M and magnetic susceptibility - Relation between B,H and M - Magnetic susceptibility - magnetic permeability - Properties of dia, para and ferro magnetic materials - Antiferromagnetism and Ferrimagnetism - Electron theory of Magnetism - Experiment to draw M-H cure (Horizontal method) - Hysteresis - Energy loss due to hysteresis - The importance of hysteresis curve .

Unit: V **13 Hours**

Derivations of Maxwell's equations - Displacement current - Magnitude of displacement current - Maxwell's equations in material media - Plane electromagnetic waves in free space - Velocity of light - Poynting Vector.

Text Book

1. Murugesan.R.,(2004),"*Electricity & Magnetism*",Sultan Chand & Company,sNew Delhi.

Reference Books

1. Brijlal and Subramaniyam,(1997),"*Electricity and Magnetism 20th revised edition*",Ravi Offset Printers and Publishers Private, Limited.
2. Narayanamoorthy & Nagarathinam,(1997),"*Electricity and Magnetism*",2nd revised edition National Publishing & Company.
3. Sehgal,Chopra and Sehgal,(1998),"*Electricity and Magnetism*",Sultan Chand and Sons.

Course Title: Allied mathematics–IV Semester : 3
Course Code : 17UMAA31 Part : III Contact Hours /Week : 6 Credit : 5

Objectives

The objective of this course is to enable the student to model real life problems in business into optimization models and to solve those using methods in linear programming and other related quantitative techniques such as transportation problems and assignment problems.

Unit I **20 Hours**

Definition of a standard linear programming problem - Solution of LPP - Definition of feasible solution – optimal solution – basic feasible solution – Degenerate solution of LPP- Graphical solution of a LPP.

Unit II **20 Hours**

Mathematical Formulation of a LPP-Slack and surplus variables-Simplex method of solving LPP.

Unit III **15 Hours**

Charnes and method of penalty -concept of Duality-Formation of Dual LPP-the dual of the dual is the primal (only problems).

Unit IV **20 Hours**

Transportation problem - Finding Initial basic feasible solution by North West corner method and Vogel's Approximation method - Optimal solution of Transportation problem. (Except Degenerate problems)

Unit V **15 Hours**

Assignment problem - solution of Assignment problems - Travelling salesman problem.

Text Book

1. Arumugam.S, Prof.Thangapandi Issac.A.,(2010),"*Topics in Operations Research Linear Programming*",New Gamma Publishing House, Palayamkottai.

Reference Books

1. KantiSwarup, P. K.,Gupta, Man Mohan,(2006),"*Operations Research*",Sultan Chand & Sons Publications, New Delhi.
2. Vittal.P.R.,(2011),"*Introduction to Operations Research*",Margham Publications,Chennai.
3. Paneerselvam.R.,(2006),"*Operations Research*",PHI Learning private Limited,New Delhi.

Course Title: Inorganic,Organic & Physical Chemistry Semester : 3
Course Code : 17UCHA11 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To study and understand the chemistry of Water &Oxides, the Preparation & Properties of Hydrogen &H_2O_2, the type of Chemical reactions, the chemical bonding, hybridization and the colloids & its applications

Unit I Water & Oxides. **12 Hours**

Oxides: Definition – classification – examples.

Water: Hardness of water – types of hardness – removal of hardness – industrial implications of hardness in water – estimation by EDTA method (outline only) Units of hardness of water.

Unit II Hydrogen & Hydrogen Peroxide **12 Hours**

Hydrogen : Isotopes of hydrogen – preparation, properties and uses of heavy hydrogen – *ortho*- and *para*-hydrogen – hydrides – definition – classification – examples

Hydrogen peroxide – Manufacture, properties, structure and uses – estimation by permanganometry method – strength of hydrogen peroxide.

Unit III Type of reactions, Nucleophiles & Organic compounds **12 Hours**

Type of reactions: substitution (S_N1 and S_N2) – addition – elimination (E1 and E2) – rearrangement and polymerization – illustration with examples.

Nucleophiles & Organic compounds: **12 Hours**

Definition, types and examples – specific reactions involving these detection and estimation of nitrogen and halogens in organic compounds

Unit IV Bonding **12 Hours**

V.B. Theory – postulates of V.B. theory – application to the formation of simple molecules like H_2 and O_2 – overlap of atomic orbitals – s-s, s-p and p-p overlap – principle of hybridization – sp, sp^2 and sp^3 hybridization – VSEPR theory.

Unit V Colloids **12 Hours**

Colloidal state of matter – various types – classification. Sols – dialysis – electro osmosis – electrophoresis – stability of colloids – protective action – Handy Schulze law – gold number. Emulsion: Types of emulsions – emulsifier with examples. Gels: Classification, preparation Application of colloids

Text Books

1.Puri and Sharma,(2016),"*Text Book for Inorganic Chemistry*",Sultan Chand & company Limited, New Delhi.

2.Soni. P.L.,(2016),"*Text Book for Organic Chemistry*",Sultan Chand & company Limited,New Delhi.

Reference Books

1. Glasstone S.,(2018) "*A Textbook of Physical Chemistry"*.
2. Jerry March,(2015),"*Reaction Mechanism of Organic compounds*",Wiley India Edition7.
3. Soni. P.L.,(2016),"*Text Book for Physical Chemistry*",Sultan Chand & company Limited,New Delhi.

Course Title: goe;jkp;o; ,yf;fpaKk; ciueilAk; Semester : 4
Course Code : 17UTAL41 Part : I Contact Hours /Week : 6 Credit : 3

Nehf;fk;

goikf;Fg; goikaha; GJikf;Fg; GJikaha; ,d;wsTk; nrk;khe;J epw;Fk; rq;f ,yf;fpaj;ij mwpKfk; nra;jy;> jkpo; nkhopapd; rpwg;Gf;fis czh;j;Jk; ,yf;fpaf; fl;Liufis vLj;Jiuj;jy;> goe;jkpo; kf;fspd; tho;f;ifg; ngl;lfkhd nghUs; ,yf;fzj;ij czh;j;Jjy;.

gad;

nrt;tpay; nkhopahd jkpo;nkhopapd; njhd;ikapid mwpe;J nfhs;Sjy;> ePjp ,yf;fpaq;fspd; top khzth;fSf;F mwf;fUj;Jf;fis czh;j;Jjy;> rq;ffhy kf;fspd; tho;f;if Vw;wq;fSk;> cahpa gz;ghLfSk;> md;gpd; mbg;gilapy; mike;j kdpj cwTnewpKiwfspd; topAk; khzth;fSf;Fg; goe;jkpo; gz;ghl;bd; Nkd;ikia czur;nra;jy;> gilg;ghw;wy; jpwid tsh;j;jy;.

$W 1 **30 kzpfs;**

FwpQ;rpg;ghl;L KOtJk; – ew;wpiz Ky;iyj;jpizg; ghly;fs; (gh.vz;. 21> 89> 99> 139> 364) – FWe;njhif kUjj;jpizg; ghly;fs; (gh.vz;. 8> 31> 46> 61> 113) Iq;FWE}W jha;f;F ciuj;j gj;J (nea;jy;) mk;%tdhh; – fypj;njhif ghiyf;fyp (gh.vz;. 9> 11) - mfehD}W (gh.vz;. 8>122) - GwehD}W (gh.vz;. 8> 86> 182> 192> 312)

$W 2 **15 kzpfs;**

jpUf;Fws; xg;GwT mwpjy; (mwj;Jg;ghy;) – ehybahh; <if (mwj;Jg;ghy;) – gonkhop ehD}W – fy;tp.

$W 3 ciueil (fl;Liuj; njhFg;G) **15 kzpfs;**

gj;kgphpah .kh rq;f ,yf;fpaq;fspy; Rw;Wr;#oy; ghJfhg;G – Kj;ijah .M jkpo;ehl;Lf; fhis tpisahl;Lk; Nky;ehl;Lf; fhisg; NghUk; – Kj;Jf;fpUl;bd ehl;lhh; rp. mwnewp toq;fpa mwpQh; tpj;Jthd; jkpo; – jpyftjp. ,yf;fpaj;jpy; ngz; – =jud; vd;. mwpT mw;wq; fhf;Fk; fUtp – Kj;Jyl;Rkp tP. ,yf;fpaKk; $j;Jk;.

$W 4 ,yf;fzk; **15 kzpfs;**

mfg;nghUs; mfj;jpizfs; - Gwg;nghUs; Gwj;jpizfs;

$W 5 ,yf;fpa tuyhWk;> gad;ghl;Lj; jkpOk; **15 kzpfs;**

,yf;fpa tuyhW vl;Lj;njhif -gj;Jg;ghl;L - gjpndd;fPo;fzf;F E}y;fs; - gad;ghl;Lj; jkpo; - nghJf;fl;Liu vOJtjw;Fg; gapw;rp mspj;jy;.

ghl E}y;

1.ftpjh.tP(njh.M).>(2018)>"*goe;jkpo; ,yf;fpaKk; ciueilAk*";>epA+nrQ;RhpGf; `T];>nrd;id.

ghh;it E}y;fs;

1. milf;fyrhkp.vk;khh;>(2011)>"*jkpo; ,yf;fpa tuyhW*">uhrp gjpg;gfk;>nrd;id-73.
2. Nfhtpe;juhr Kjypahh; .fh.u.,(c.M).>(1966)>"*ek;gpafg;nghUs*";>jpUney;Ntypj; njd;dpe;jpa irtrpj;jhe;j E}w;gjpg;Gf;fofk; ypkpnll;> jpUney;Ntyp-6.
3. nfskhhP];thp .v];.(njh.M).>(2017)>"*gjpndz; fPo;fzf;F E}y;fs; %yKk; KiwAk*";> rhujh gjpg;gfk;> [p-4> rhe;jp mLf;ffk;> 3 = fpU\;zhGuk; njU> uhag;Ngl;il> nrd;id-14.
4. rhkpehja;ah; .c.Nt (njh.M).>(1986)>"*gj;Jg;ghl;L %yKk; er;rpdhh;f;;fpdpaUiuAk*";> jkpo; gy;fiyf;fof kWNjhd;wp mr;rfk;> jQ;rhT+h;.

Course Title: English for Enrichment - IV Semester : 4
Course Code : 17UENL41 Part : II Contact Hours /Week : 6 Credit : 3

Objectives

To teach language through Literature and to enable students to learn and imbibe good values of life gained from Literature

Unit I **20 Hours**

R.K. Narayan: Swami and Friends

Unit II **20 Hours**

George Bernard Shaw: Arms and the Man

Unit III Word Power **15 Hours**

1. Vocabulary
2. Choice of Words
3. Analogy Questions

Unit IV Art of Public speaking **20 Hours**

1. Welcome Address
2. Presidential Address
3. Vote of Thanks

Unit V Writing Skills **15 Hours**

1. Resume Writing
2. Group Discussion
3. Translation.

Text Books

1. Narayan, R .K. (2008),Swami and Friends. Mysore: Indian Thought Publications.
2. For Units III, IV, V: Study material would be supplied by the Department.

Reference Books

1.GreenDavid,(2015),"*Comtemporary English Grammer Structures and Compositions*",Maemillen India Limited,Chennai.

2.Nesfield.J.C.,(2004),"*English Grammer,Composition and usage*",Maemillen India Limited,Chennai.

3.Shaw, George Bernard,(2004),Arms and the Man. Delhi : UBS Publishers.

Course Title: Optics & Spectroscopy Semester : 4
Course Code : 17UPHC41 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To enable the learners to understand Interference in thin films, Michelson's interferometer and its application, Fabrey Perot interferometer and its resolution and Holography, Theory of zone plate, comparison with convex lens and resolving power of optical instruments, Polarisation, Hygene's explanation, wave plates and optical activity, UV and IR Sources and Detectors and its applications, Raman effect and its applications, Doppler effect in optics and applications and the Basic ideas of types of molecular spectra and selection rules

Unit: I **12 Hours**

Coherent Sources - Interference in thin films - Michelson's interferometer - Applications - Determination of wavelength - Resolution of spectral line - Refractive Index of a gas - Fabrey Perot Interferometer - Sharpness of fringes - Resolution - Types of interference fringes - Reflection only - Holography.

Unit: II **14 Hours**

Zone plate - Theory - Comparison with convex lens - Fresnel and Fraunhofer diffraction in straight edge - Rectangular aperture - Circular aperture - Cornu's spiral - Concave grating - Mounting - Resolving power of optical instruments - Telescope , grating and prism .

Unit: III **13 Hours**

Polarization - Polarizer - Analyser - Polaroids and its applications - Double refraction - Nicol prism - Huygen's explanation of double refraction -Quarter and half wave plates - Production and analysis of plane, circularly and elliptically polarized light - Optical activity - Fresnel's explanation - specific rotation - Laurent's half Shade polarimeter .

Unit: IV **11 Hours**

UV spectroscopy - Sources - Detectors and its applications - Infra Red Spectroscopy - Sources - Detectors and its applications - Raman effect – Theory, experiment , characteristics of Raman lines and its applications - Doppler effect in optics and applications .

Unit: V **10 Hours**

Types of molecular spectra (basic ideas) - Molecular spectra of diatomic molecules - pure rotational spectra - vibration - rotation spectra - selection rules

Text Book

1. Murugesan.R.,(2007),"*Optics and Spectroscopy*",Shantha Publications,Madurai.

Reference Books

1. Subramanyam & Brijlal,(2002),"*A text book of optics*",Sultan Chand & Company.
2. Kakani & Bhandari.S.I.,(2005),"*Optics & Spectroscopy*", Sulthan Chand & Sons, New Delhi.
3. Sharma.B.K.,(2006),"*Spectroscopy*",GOEL Publishing House, Meerut.

Course Title: Allied mathematics–V Semester : 4
Course Code : 17UMAA41 Part : III Contact Hours /Week : 3 Credit : 2

Objectives

The objective of this course is to enable the student to model real life problems in business into optimization models and to solve those using methods in linear programming and other related quantitative techniques such as transportation problems and assignment problems.

Unit I **9 Hours**

Definition of a standard linear programming problem - Solution of LPP - Definition of feasible solution – optimal solution – basic feasible solution – Degenerate solution of LPP- Graphical solution of a LPP.

Unit II **9 Hours**

Mathematical Formulation of a LPP-Slack and surplus variables-Simplex method of solving LPP.

Unit III **9 Hours**

Charnes and method of penalty -concept of Duality-Formation of Dual LPP-the dual of the dual is the primal (only problems).

Unit IV **9 Hours**

Transportation problem - Finding Initial basic feasible solution by North West corner method and Vogel's Approximation method - Optimal solution of Transportation problem. (Except Degenerate problems)

Unit V **9 Hours**

Assignment problem - solution of Assignment problems - Travelling salesman problem.

Text Book

1. Arumugam.S.,Prof.Thangapandi Issac.A.,(2010),"*Topics in Operations Research Linear Programming*",New Gamma Publishing House,Palayamkottai.

Reference Books

1. KantiSwarup, P. K.,Gupta,Man Mohan,(2006),"*Operations Research*",Sultan Chand & Sons Publications,New Delhi.
2. Vittal.P.R.,(2011),"*Introduction to Operations Research*",Margham Publications,Chennai.
3. Paneerselvam.R.,(2006),"*Operations Research*",PHI Learning private Limited,New Delhi.

Course Title: Allied mathematics–VI Semester : 4
Course Code : 17UMAA42 Part : III Contact Hours /Week : 3 Credit : 2

Objectives

The objective of this course is to enable the students to solve various types of differential equations and to apply them in various fields. The topics covered includes formations of differential equation, solving various types of ordinary and partial differential equations and Laplace transform as tool for solving differential equations.

Unit I **9 Hours**

Exact Differential equations – Integrating factors.

Unit II **9 Hours**

Linear equation with constant coefficients – Methods of finding complementary function – Second order differential equations with RHS in the form x^n, e^{ax}, sinax, cosbx, e^{ax}sinax,e^{ax}cosbx, $e^{ax}x^n$.

Unit III **9 Hours**

Laplace Transform – Inverse Laplace Transform -Solution of differential equation using Laplace Transform.

Unit IV **9 Hours**

Partial Differential equations –Formation of Partial Differential Equations –Lagrange's equation – Some standard form - Pp+Qq=R.

Unit V **9 Hours**

Orthogonal Trajectories-Growth-Decay-Simple Electric circuits & Planetary Motion.

Text Book

1. Dr. Arumugam.S & Prof. Thangapandi Issac.A, (2012), "Allied Mathematics Paper III", New Gamma Publications, Palayamkottai.

Reference Books

1. Kandasamy.P, Thilagavathy.K,(2013), "Allied mathematics - Paper II", Sultan Chand Publications, Chennai.
2. ManickaVasagam PillaiT.K. and Narayanan, (2001), "Differential equations and its Applications", S.Viswanathan Publications.
3. Venkatachalapathy.S. G, (2007), " Allied Mathematics", Margham publications, Chennai
4. Vittal P.R., (2011), "Allied Mathematics", Margham publications,Chennai

Course Title: Organic and Physical Chemistry Semester : 4
Course Code : 17UCHA21 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To study and understand the structure of atomic nucleus, nuclear reactions such as fission, fusion, radioactivity and its applications, the structures of carbohydrate, the Stereoisomerism, Geometrical isomerism, the Classification, synthesis and properties of amino acids & Proteins, the structure, application and preparation of dyes

Unit I Nuclear Chemistry 12 Hours

1. Composition of the nucleus – nuclear forces – mass defect – binding energy – nuclear stability.
2. Soddy's group displacement law – illustration – law of radioactive disintegration.
3. Nuclear fission : Definition – theories of fusion – application of fission – the principle of atom bomb.
4. Nuclear fusion : Definition – emission of energy – Stellar energy – hydrogen bomb.
5. Application of radioactivity – In medicine, agriculture, industry and analytical fields – carbon dating.

Unit II 12 Hours

1. **Carbohydrates** : Definition – classification – monosaccharides – properties and uses of glucose and fructose – configuration of glucose – Haworth structure – conversion of glucose to fructose and vice versa.
2. **Disaccharides** : Sucrose – manufacture – properties and uses – structure – distinction between sucrose, glucose and fructose.
3. **Polysaccharides** : Starch and cellulose (Structure only) - amylase - amylase – difference between these two.

Unit III 12 Hours

1. **Stereoisomerism** – chiral centre – optical activity of compounds containing one or two chiral centres – R-S notation – enantiomers – diastereoisomers – racemization – resolution.
2. **Geometrical isomerism** of maleic and fumaric acids. E-Z notation of geometrical isomers.

Unit IV 12 Hours

Aminoacids and proteins : Classification – synthesis – properties of aminoacids – polypeptides – proteins – classification and biological functions.

Unit V 12 Hours

Dyes: Definition – theory of colour and constitution – classification based on structure and applications – preparation of methyl organge – bismark brown, malachite green – vat dye – indigo.

Text Books

1. Soni P.L.,(2007),"*Organic Chemistry*",Publisher:Wiley Vch,Edition: 4 Volume Set.

Reference Books

1. Morrison R.T.,and Boyd R.W.,(2016),"*Organic Chemistry*",(Edition: 6,).
2. Puri and Sharma,(2013),"*Principles of Physical Chemistry*",(Latest Edition).
3. Soni.P.L.,(2016),"*Principles of Physical Chemistry*",Sultan Chand & company Limited,New Delhi,(Latest Edition).

Course Title **:**Major Physics Practicals – II Semester : 4
Course Code : 17UPHC4P Part : III Contact Hours /Week : 2 Credit : 3

List of Practicals :

1. Determination of R - Newton's Rings
2. Comparison of emf's - Potentiometer
3. Determination of Resistance & Resistivity - Potentiometer
4. Comparison of Capacitances - De Sauty's Bridge
5. Refractive index of Prism – Spectrometer
6. Dispersive power of prism - Spectrometer
7. Thickness of the wire - Air wedge
8. Inductance of the coil - Owen's Bridge
9. Figure of merit - Spot Galvanometer
10. Figure of merit - Table Galvanometer
11. Determination of B_H - Axial coil
12. Determination of m - Axial coil

Course Title **:** Volumetric Analysis			Semester : 4
Course Code : 17UCHA2P	Part : III	Contact Hours /Week : 2	Credit : 1

A double titration involving the making up of the solution to be estimated and the preparation of a primary standard.

List of Experiments

I. Acidimetry and Alkalimetry

1) Estimation of Hydrochloric acid
2) Estimation of Sodium hydroxide
3) Estimation of Sodium carbonate
4) Estimation of Nitric acid

II. Redox Titrations

Permanganometry

1) Estimation of ferrous ammonium sulphate
2) Estimation of potassium permanganate
3) Estimation of ferrous sulphate
4) Estimation of oxalic acid

III. EDTA Titration

1) Estimation of Hardness of water using EDTA

Semester – 5

Course Title: Atomic Physics & Quantum Mechanics Semester : 5
Course Code : 17UPHC51 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To enable the learners to understand Bohr's atom model, Sommerfield relativistic atomic model, advantages of vector atom model, Basic ideas of X-rays, Compton effect, Zeeman effect and anomalous Zeeman effect, Black body radiation, limitations of classical physics, Uncertainty principle and diffraction of electron through a single slit, Basics of wave mechanics, time independent and time dependent Schrodinger equations, eigen value and eigen function, application of Schrodinger equation, particle in a box and Linear harmonic oscillator

Unit I **14 Hours**

Introduction - Bohr atom model (no derivation) - application of Bohr's theory - Excitation and ionization of atoms - Sommerfield relativistic atom model -Elliptical orbits - relativistic variation of atomic mass- application to the fine structure of spectral lines, vector atom model - spatial quantization and spinning electron hypothesis -Stern and Gerlach experiment -Quantum numbers -coupling schemes - Pauli's exclusion principle.

Unit II **10 Hours**

X rays -characteristics and continuous X ray - its properties - application - Duane and Hunt law - Mosley's law and its importance - Compton effect- theory and experimental verification. Zeeman effect- theory and experiment - Anomalous Zeeman effect - stark effect (Qualitative only)

Unit III **13 Hours**

Introduction - Black body radiation - Planck's Quantum theory of absorption , emission - Limitations of classical theory -Dual nature of matter and radiation - De Broglie's hypothesis of matter waves - Davisson's and Germer experiment - G.P Thomson's experiment with relativistic correction . Concept of packet for a quantum particle - group velocity and wave velocity & their relations - Heisenberg's uncertainty principle thought experiment illustration - Diffraction of electron through a single slit.

Unit IV **11 Hours**

Basic postulates of wave mechanics - Derivation of time dependent and time independent Schrodinger equation - wave function - physical significance of wave function - Probability density and expression for probability current density - Eigen function and Eigen value - energy function - expectation value - normalization of wave function of simpler types - orthogonal and orthonormal properties of wave function

Unit V **12 Hours**

Schrodinger equation for a free particles in one dimensional potential box - its Eigen functions and Eigen values - application of Schrodinger wave equation - The barrier penetration problem (Potential steps) - Linear harmonic oscillator - zero point energy

Text Book

1. Murugesan.R.,(1998),"*Modern Physics*",Sultan Chand & Company.

Reference Books

1. Gupta & Kumar JayPrakash,(2007),"*Quantum Mechanics*",Nata & Company.
2. Mathur.D.S,(2002),"*Mechanics*",Sultan Chand & Co.
3. Stahyaprakash.R.,(1994),"*Quantum Mechanics*",Ratan Prakasan Mandir.
4.Seghal Chopra & Seghal,(1998),"*Modern Physics*",Sultan Chand & Company.

Course Title: Nuclear Physics Semester : 5
Course Code : 17UPHC52 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To enable the learners to understand Isotopes, isobars, nuclear models and binding energy formula, Particle accelerators, particles and antiparticles and conservation laws, Radioactivity laws, Half life period, Geiger Nuttal law, Neutrino theory of Beta decay and origin of gamma rays, Nuclear fission and fusion, origin of cosmic rays, primary and secondary cosmic rays and pair production and annihilation, Utilization of nuclear energy, atom bomb, nuclear reactor and radio isotopes and their applications.

Unit I **14 Hours**

Isotopes - Isotones - Isobars - Atomic mass Unit- Properties of nucleus - Nuclear binding energy - Nuclear forces - Yukawa's theory (No derivation) - Theories of nuclear composition - Proton Electron hypothesis - Model of nuclear structure - The liquid drop model - Binding energy formula - Shell model - Collective model .

Unit II **10 Hours**

Particle accelerators - Synchro cyclotron - Betatron - Proton Synchrotron - Electron synchrotron - Detectors - Wilson Cloud Chamber - Bubble Chamber - Photographic Emulsion technique - Fundamental particles - Particles and antiparticles - Particles instability - Conservation laws

Unit III **13 Hours**

Laws of radioactivity - Half life period - Mean life - Radio Carbon dating - Alpha rays - Geiger Nuttal law - Experimental determination by Geiger Nuttal law - Alpha disintegration energy - Theory of alpha decay - Beta rays - Beta ray spectra - Origin - Neutrino theory of beta decay - Electron capture - Gamma rays - Determination of wavelength by Diamond crystal spectrometer - Origin of gamma rays - internal conversion .

Unit IV **13 Hours**

Nuclear transmutation by alpha particles , protons, deutrons , neutrons and electrons – Photo disintegration - Nuclear fission - Energy release - Explanation (C-N cycle and P-P cycle) - Nuclear fusion - Thermonuclear reaction - controlled thermo nuclear reaction - Cosmic rays - Origin - primary - Secondary - Azimuthal effect - East West effect - Pair production and annihilation - Van Allen belts .

Unit V **12 Hours**

Utilization of nuclear energy - Principle and action of atom bomb and hydrogen bomb - Production of electricity from nuclear energy - Nuclear reactors - General features of nuclear reactors - Different types of nuclear reactors - Pressurized water reactor - Boiling water reactor - Radio isotopes and their applications .

Text Book

1. Murugesan.R.,(1998),"*Modern Physics*",Sultan Chand &Company.

Reference Books

1. Seghal Chopra and Seghal,Sultan,(1998),"*Modern Physics*",Sultan Chand & Company.
2. Thayal,D.C.,(1998), "*Nuclear Physics*",Himalaya Publishing House New Delhi.
3. Richtmayer, Kennard of Cooper,(1998),"*Introduction to Modern Physics*",Tata Mc.Graw Hill.
4. Subramanyan,N.&Brijlal,(2000)," *Atomic and Nuclear Physics*",Sultan Chand & Company.

Course Title: Analog Electronics Semester : 5
Course Code : 17UPHC53 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To enable the learners to understand the analysis of two port networks like Thevenin's theorem and Norton's theorem, Types of transistor configurations, biasing circuits and FET characteristics, Small signal common emitter amplifier, single stage amplifier and operational amplifier and its applications, Feedback system, Barkhausen criteria for oscillator, Hartley and Colpit oscillator, Modulation and demodulation and Block diagram of AM and FM transmitters.

Unit I **11 Hours**

Thevenin's theorem - Norton's theorem - Two port network - Analysis - h parameter only - Filter circuits - General theory - low pass , high pass and band pass filters.

Unit II **12 Hours**

Transistor - Three types of configurations - relation between alpha , beta and gamma -Load line ac and dc and operating point - Biasing circuits - Base bias - Collector feedback bias - Voltage divider bias - Emitter bias.

Unit III **14 Hours**

Small signal C.E. amplifier - Calculation of voltage gain , current gain and power gain - input and output impedance using h-parameter - frequency response of amplifier - single stage amplifier - Operational amplifier - characteristics - applications as adder, subtractor, integrator and differentiator

Unit IV **12 Hours**

Feedback - Positive and Negative feedback - Barkhausen criterion - Transistor oscillators - Hartley , Colpitt and Phase Shift oscillator (With mathematical analysis)

Unit V **11 Hours**

Modulation - types of modulation - amplitude modulation - Modulated Power output - Modulation index - Frequency Modulation (Qualitative) - Block diagram of AM and FM transmitters.

Text Book

1. Mehta.V.K., Rohit Mehta,(2008),"*Principles of Electronics*",Sultan Chand and company.

Reference Books

1.Theraja.B.L.,(2002),"*Basic electronics (Solid state)*", Sultan Chand and Company.

2. Sedha.R.S.,(2002),"*A text book of applied Electronics*", Sultan Chand and Company.

3. Malvino, and Leach,(2000),"*Transistor Approximations*", International Publication.

Course Title: Bio Medical Instrumentation Semester : 5

Course Code : 17UPHE51 Part : III Contact Hours /Week : 2 Credit : 2

Objectives

To enable the learners to understand the Basics of transducers, Characteristics of transducers and types of active transducers, Types of passive transducers and their working, Characteristics of basic recording systems, Block diagram of ECG ,Block diagram of EEG and EMG, and Digital thermometer and C.T scanning

Unit I **7 Hours**

Transducer - Performance & characteristics of transducer - Static and Dynamic - Active Transducers - (a) Magnetic induction type (b) Piezo electric type (c) Photovoltaic type (d) thermoelectric type

Unit II **5 Hours**

Passive transducers - (a) Resistive type - Effect and sensitivity of a bridge - (b) Capactive transducer - (c) Linear variable differential transformer (LVDT)

Unit III **7 Hours**

Characteristics of basic recording system - Origin of electrocardiography (ECG) - Block diagram - ECG leads - Unipolar and bipolar - ECG recording set up

Unit IV **5 Hours**

Electroencephalography (EEG) - Origin - Block diagram of EEG Unit- Electromyogram (MMG) - Block diagram - EMG recorders .

Unit V **6 Hours**

Digital thermometer - Computer tomography (C.T) - Principle - Block diagram of C.T. scanner

Text Book

1. Arumugam.M.,(1997),"*Biomedical Instrumentation*", Anuradha Agencies.

Reference Books

1.Khandpur.R.S.,(1999),"*Hand Book of Biomedical Instrumentation*",Tata Mc Graw Hill.

2.John Cameron.R.,and James Skofronick .G.,(1978),"*Medical Physics*",John Willy and Sons.

3.Webster.J.G.,(1932),"*Medical Instrumentation*; *Application and Design*",Wiley publications.

Course Title: Astro Physics Semester : 5
Course Code : 17UPHE52 Part : III Contact Hours /Week : 2 Credit : 2

Objectives

To study the concepts of Astronomy, understand the optical telescopic methods, concepts of stellar evolution and Classify the types of Galaxy.

Unit I **7 Hours**

Birth of Modern Astronomy – Geocentric and Heliocentric theories —– Kepler's laws of planetary motion – Newtonian gravitation – Celestial sphere – Planets – Terrestrial and Jovian planets (Planets individual description is not required in detail) - Asteroids- Meteorites – Comets.

Unit II **5 Hours**

Telescopes – Elements of telescope – Properties of images – Types of Optical telescopes – Refracting and Reflecting telescopes- Radio telescope –Spectrograph – Limitations – Photographic photometry – Photoelectric photometry – Spectrophotometry – Detectors and image processing.

Unit III **6 Hours**

Sun – Physical properties – Composition – Core – Nuclear Reactions – Photosphere – Chromosphere – Corona – Sunspots – Sunspot cycle – Solar Wind – Auroras – space weather effects – History of the Earth – Temperature of a planet – The atmosphere – Pressure and Temperature distribution – Magnetosphere – Eclipses – Solar and Lunar Eclipses

Unit IV **5 Hours**

Classification of Stars – The Harvard Classification system – Luminosity of a Star – Hertzprung-Russel Diagram – Stellar evolution using the HR diagram – Theoretical evolution of stars – White Dwarfs – Neutron stars-Black holes – Event horizon – Basic physics of Black Holes.

Unit V **7 Hours**

Galaxy nomenclature – Types of Galaxies – Spiral – Elliptical – irregular galaxies – Milky Way Galaxy and its structure – Rotation and Mass Distribution – Rotation curve and Doppler shift – Star clusters – Galactic clusters – Pulsars – Cosmological Models – Big bang theory – Steady state theory – Hubble's law – Olber's paradox.

Text Book

1. Mujiber Rahman.A.,(2019) "*Concepts to Astrophysics*", Scitech Publications,Chennai.

Reference books

1. Abell, Morrison and Wolf,(1987),"*Exploration of the Universe*",Saunders College Publications.
2. Carrol and Ostlie, (2007),"*Introduction to Modern Astrophysics*",Pearson International.
3. Niclolas.A., Pananides and Thomas Arny.,(1979), "*Introductory Astronomy*",Addison Wesley Publication Company.

Course Title: Organic, Inorganic and Physical Chemistry Semester : 5
Course Code : 17UCHA31 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To study and understand the concepts of Adsorption, the Principle and applications of Chromatography, the different types of catalysis, the preparation, properties, application of Polymers, and the photochemical reactions

Unit I **12 Hours**

Adsorption

Definition – difference between adsorption and absorption – adsorbate, adsorbent – physical adsorption – chemical adsorption – differences between these two types – factors influencing adsorption – adsorption isotherm - Langmuir isotherm (no derivation, statement only) adsorption of gases on solid surface.

Unit II Basic Principle of Chromatography Technique **12 Hours**

Principle and application – partition and gas chromatography – thin layer chromatography – column chromatography – paper chromatography – gas-solid and gas-liquid chromatography.

Unit III Catalysis **12 Hours**

Definition – different types of catalysis – acid-base catalysis – surface catalytic reactions – definition and examples – autocatalyst – catalytic poisoning – promoters – enzyme catalysis – characteristics.

Unit IV Polymers **12 Hours**

Definition – classification of polymers – properties of polymers – addition and condensation, polymerization reactions with examples – natural rubber – isoprene Unit – vulcanization of rubber – preparation and application of polystyrene, urea – formaldehyde resin, Teflon and buna-S-rubber.

Unit V Photochemistry **12 Hours**

Comparison of thermal and photochemical reactions – definition of photochemical reactions – laws of photochemistry – Grottus – Draper law – Einstein law – quantum efficiency – reasons for low and high quantum yield with examples – consequence of light absorption by atoms and molecules – Jablonsky diagram – fluorescence – phosphorescence – photosensitization – chemiluminescence – bioluminescence – applications of photochemistry.

Text Books

1. Puri Sharma and Kalia.,(2015),"*Basic Principles of Inorganic Chemistry*", Milestone Publication.
2. Soni.P.L.,(2013),"*Text Book for Organic Chemistry"*, Sultan Chand and Company,

Reference Books

1. Arun Bahl and Bahl.B.S.,(2013),"*A Text Book of Organic Chemistry*",Sultan Chand and Company.
2. Madan.R.D.,(2010),"*Modern Inorganic Chemistry*", Sultan Chand and Company,Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing.
3. Soni.P.L.,(2013),"*Principles of Physical Chemistry*", Sultan Chand and Company.

Course Title: Environmental Studies Semester : 5
Course Code : 17UESV51 Part : IV Contact Hours /Week : 2 Credit : 2

Objectives

To enable the learners to understand That Earth is the only planet so far identified with its unique characteristics supporting life with abundant resources which can fulfill the needs but not the greed of human beings ,That living and non living things are interlinked from micro level as an unbroken chain from sunk to soil, That life is diverse and diversity makes the life successful, joyful and beneficial and that destroying diversity is destroying humanity, that the exploitative human activity is polluting the environment locally and globally which needs attention and urgent action, that man has to live and progress till the earth survives and hence needs sustainable development to hand over to successive generations, the preparation of individual and the society to face and escape from natural and manmade disasters with scientific management and societal involvement.

Unit I Earth and its Environment 7 Hours

Earth - Formation and evolution of Earth over time - Structure of Earth and its components: Atmosphere, Lithosphere, Hydrosphere and Biosphere - Resources - Renewable and Nonrenewable resources.

Unit II Ecology and Ecosystem Concepts 6 Hours

Ecology: Definition - Ecosystem : Definition - Structure and function - Energy flow - Food Chain and Food Web - One example for an eco system - Biogas-chemical cycles - Nitrogen , Carbon , Phosphorous , Water

Unit III Biodiversity and India 5 Hours

Introduction - Definition – Values of Bio-diversity - Threats to Bio-diversity - Conservation of Bio-diversity - Bio-diversity of India as a mega diversity nation - Biogeographical distribution - Hot spots of Bio-diversity - National Bio-diversity Conservation Boards and its function

Unit IV Pollution and Global Issues 5 Hours

Definition - Causes, Effects and Control measures of air, water, soil, marine , noise, thermal and nuclear pollution - Global issues : Global warming and ozone layer depletion .

Unit V Development and Disaster Management 7 Hours

Sustainable Development - Sustainable Agriculture - Organic Farming , Irrigation - Water harvesting and waste recycling - Cyber waste and management - Disaster management - Flood and Drought - Earth Quake and Tsunami - Landslides and Avalanches - Cyclones and Hurricanes - Precautions , Warnings , Rescue and Rehabilitation

Text Book

1.Kanagasabai.S.,(2010), "*Text book on Environmental Studies"*,PHI Learning Private Limited Newdelhi.

Reference Books

1.Rajagopalan.R.,(2005), "*Environmental Studies*",Oxford University Press,NewDelhi.

2.Abhijit Mallick.,(2014), "*Environmental Science and Management"*,Viva Books Private Limited, New Delhi.

3.Ulaganathan.S.,(2001), "*Environmental Economics"* ,Oxford University Press,NewDelhi.

Semester – 6

Course Title: Classical Mechanics & Statistical Physics Semester : 6
Course Code : 17UPHC61 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To enable the learners to understand the Frame of reference, Work energy theorem, Degrees of freedom and generalized velocities and momentum, D'Alembertz principle, Hamilton's principle and Deduction of Hamilton's principle from D'Alembertz principle, Cyclic co-ordinates, Physical significance of Hamilton's function, Variational principle , Simple applications, Microscopic and macroscopic system , Ensembles , Phase space , Basic Postulates of statistical mechanics and Maxwell Boltzmann statistics, Bose - Einstein statistics , Planck's law of black body radiation Fermi Dirac Statistics , Electron gas and Comparison between the three statistics

Unit I **13 Hours**

Frame of reference - Inertial frame of reference - Mechanics of particles - conservation of linear momentum - conservation of angular momentum - conservation of energy - Mechanics of system of particles - conservation of linear momentum - conservation of angular momentum - conservation of energy - Work energy theorem - conservative forces - examples - constraints - Degrees of freedom under constraints - forces of constraints - generalized velocities .

Unit II **11 Hours**

Introduction - Principle of virtual work - D'Alemberts principle - Lagrange's equations of motion from D'Alemberts principle (Derivation) - Deduction of Lagrange's equation of motion using variation principle for system involving forces - derivable from potential function simple application - simple applications (simple pendulum, compound pendulum, Atwood's machine) - Hamilton's principle and Lagrange's equations of motion from Hamilton's principle - Deduction of Hamilton's principle from D'Alemberts principle-simple applications (simple pendulum, compound pendulum, Atwood's machine , One Dimension Harmonic oscillator) - Superiority of Lagrangian approach to Newton's approach .

Unit III **10 Hours**

Introduction - Cyclic co-ordinates - Hamiltonian functions H - Physical significance - Hamilton's equation of motion (derivation) - Variational principle - Hamilton's equation of motion from variational principle - Simple applications (Harmonic oscillator , Compound pendulum , motion of a particle in central force field) .

Unit IV **13 Hours**

Microscopic and macroscopic system - Ensembles - Phase space - Probability - Basic Postulates of statistical mechanics - Definition of mathematical probability - thermodynamic probability - Boltzmann theorem of entropy and probability - Statistical equilibrium - Maxwell Boltzmann statistics - Maxwell Boltzmann energy distribution law - Maxwell Boltzmann velocity distribution law

Unit V **13 Hours**

Bose - Einstein statistics - Bose - Einstein distribution law - Photon gas - Planck's law of black body radiation (Derivation) - deduction of Wien's and Rayleigh Jeans law of black body radiation - Fermi Dirac Statistics - Fermi Dirac distribution law - Electron gas - Fermi energy in crystalline solids - Comparison between the three statistics.

Text Book

1. Agarwal ,(1996),"*Statistical Physics and Thermodynamics"*, Sultan Chand and Company, New Delhi .

Reference Books

1. Goldstein,(1998),"*Classical Mechanics"*, Narosa Publishing House, New Delhi.
2. Sears.F.W., and Salinger.G.L.,(1986),"*Kinetic theory and statistical thermodynamics"*, Narosa Publishing House, New Delhi.
3. Upadhya.J.C., (1999), "*Classical Mechanics"*, Himalaya Publishing House, Delhi, Bangalore, Hyderabad.

Course Title: Materials Science | Semester : 6
Course Code : 17UPHC62 | Part : III | Contact Hours /Week : 4 | Credit : 4

Objectives

To enable the learners to understand the Bonding in solids, types of bonding in solids, Bravais lattice, classification of crystals and Miller indices,Free electron theory of metals, Wiedmann-Frantz law, Superconductivity and BCS theory, Different types of magnetism, Langevin's theory of dia & para magnetism, Wiess theory of ferromagnetism, ferrites and concept of domains and hysteresis, Dielectrics , polarization, dependence of polarisation on frequency and temperature and dielectric loss, Laser materials, Laser and its applications , Ruby laser , He-Ne laser and Semiconductor Laser.

Unit I **13 Hours**

Bonding in solids- types of bonding in solids - Ionic, covalent and metallic, molecular and hydrogen bonds - crystal structure - crystal lattice and crystal structure - Unitcell - Bravais lattice, classification of crystals - Miller indices - Structure of Diamond and zinc blende - Thermal properties - concept of phonons - heat capacity of solids - limitations of Einstein theory, Debye's theory of lattice - Specific heat , thermal expansion of solids (Qualitative)

Unit II **10 Hours**

Free electron theory of metals ; electron drift , mobility , mean free path , relaxation time - electrical and thermal conductivities of metals - Wiedmann-Frantz law - Sources of resistivity of metals - Matthiessen's rule -Superconductivity– Applications - BCS theory .

Unit III **13 Hours**

Different types of magentism - Dia , para , ferro, antiferro and ferri magnetism - Langevin's theory of dia & para magnetism - Wiess theory of ferromagnetism - Magnetic materials - Properties and applications - Hard and soft magnetic materials - magnetostriction materials, ferrites and concept of domains and hysteresis.

Unit IV **13 Hours**

Dielectrics - polarization - polar and non-polar dielectrics - dielectric constant , polarisibility - Clausius-Mossoti equation - Different types of polarization - electronic , ionic , orientation , space charge - dependence of polarization on frequency and temperature ; dielectric loss - sources ; dielectric strength and breakdown - contributing factors.

Unit V **11 Hours**

Laser materials - Instrumentation of radiation with matter (qualitative) - Emission and absorption of light - spontaneous and stimulated emission , Laser - Principle - Properties - Applications , construction , working and characteristics of Ruby laser , He-Ne laser , Semiconductor Laser .

Text Book

1. Arumugam. M.,(1997), "Material Science", Anuradha Agencies.

Reference Books

1. Puri.R.K., and Babbar,V.K.,(1997), "*Solid state Physics*" , Sultan Chand and Company.
2. Murugesan R., (2003),"*Modern Physics"*, Sultan Chand and Company.
3. Saxena and Gupta Saxena.,(1991),"*Fundamentals of Solid state Physics"*, Pragati Prakashan Publications.
4. Keer.H.V., (1993),*"Principles of the solid state"*, Wiley Eastern Limited.

Course Title: Digital Electronics Semester : 6
Course Code : 17UPHC63 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To enable the learners to understand the Number Systems , Basic laws of Boolean algebra , Properties of Boolean algebra and De Morgan's theorems,Positive and negative logic gates , Universal Gates - Logic families Sum of products (SOP) , Karnaugh map and simplification using K-map,Half adder , full adder , Multiplexer (MUX) , Demultiplexer , Encoders and Decoders,Timer - IC 555 , Flip-Flops and its applications, Registers , Counters , Digital to Analog converter (D/A) and Analog to digital converter (A/D) .

Unit I **10 Hours**

Number Systems - Binary , Decimal , Octal , Hexadecimal - Conversion from one another - Binary Addition , Subtraction , Multiplication , Division - Binary subtraction by one's and two's complements - Basic laws of Boolean algebra - Boolean addition - Properties of Boolean algebra - Principle of Duality - De Morgan's theorems and their proof.

Unit II **12Hours**

Positive and negative logic gates - OR, AND, NOT, NOR, NAND and X-OR gates - Universal Gates - Logic families - Diode Resistor Logic (DRL) - OR gate , AND gate - RTL (NOT gate), DTL NOR , TTL NOR - DTL NAND - Sum of products (SOP) - Expression from a truth table - Karnaugh map – two varibales, three variables and four variables - simplification using K-map .

Unit III **14 Hours**

Half adder - full adder - Four bit binary adder - Half Subtractor - full subtractor - Four bit parallel subtractor - Multiplexer (MUX) - Four to one MUX Demultiplexer (DMUX) - One to four DMUX - Encoder - 8 to 3 encoder - Decimal to BCD encoder - Decoder - 3 to 8 Decoder , BCD to Decimal decoder - BCD to seven segment Decoder .

Unit IV **12 Hours**

IC 555 Timer – mono stable, Bistable and astable multivibrators - Flip-Flops - R-S flip flop - Clocked R-S flip flop - J-K flip flop - JK master Slave flip flop - D flip-flop - applications of flip flops

Unit V **12 Hours**

Registers - Shift Register - Classification - Serial in - Serial out Registers - Counters - Ring counter , 4-bit binary ripple counter - Decade counter – Digital to Analog converter (D/A) – Binary ladder type - Analog to Digital converter (A/D) - Successive approximation type .

Text Book

1. Malvino and Leach, VI Edn,(2008),"*Digital Principles and Application*",4th Ed.,Tata McGraw Hill,New Delhi.

Reference Books

1. Vijeyandran.V.S and Viswanathan,(2007),"Introduction to Integrated Electronics Digital and Analog",Tata Mc-Graw Hill Publication.
2. Salivaganan,Suresh Kumar and Vallavaraj,(2006),"*Electronics Devices and Circuit*",Tata Mc-Graw Hill,(23rd Print).
3. Anokh Singh and Chhabra.A.K.,(2005),"*Fundamentals of Digital Electronics and Microprocessors*", Sultan Chand and Company Limited,New Delhi.

Course Title: Opto Electronics Semester : 6
Course Code : 17UPHE61 Part : III Contact Hours /Week :2 Credit : 2

Objectives

To enable the learners to understand PN junction as a Light Source (LED) , LED materials , Advantages of LCD , characteristics and action of LCD,Laser , Einstein coefficients , condition for population inversion , three level laser and semiconductor laser, Photo detector characteristics , PN junction photo detector , Avalanche photo diode and photo transistor, Principle of optical fibre , light transmission in optical fibre , acceptance angle and numerical aperture, Fibre index profiles and Advantages of fibre optics communication, Optical switching and Logic gates.

Unit I **4 Hours**

Introduction - PN junction as a Light Source (LED) - LED materials - Advantages - LCD - characteristics and action of LCD - Advantages .

Unit II **5 Hours**

Laser - Introduction - characteristics of Laser - spontaneous and stimulated emission - Einstein coefficients - condition for population inversion - three level laser - semiconductor laser .

Unit III **8 Hours**

Photo detector – characteristics of photo detectors - PN junction photo detector - PIN photo diode - Avalanche photo diode - photo transistor.

Unit IV **7 Hours**

Introduction - Principle of optical fibre - light transmission in optical fibre - acceptance angle - numerical aperture.

Unit V **6 Hours**

Fibre index profiles - step index, graded index fibre (transmission of signals) - Advantages of fibre optics communication - Optical switching - Logic gates.

Text Book

1. Palanisamy.P.K.,(2002),"*Semiconductor Physics and opto electronics*",Scitech Publication, Chennai.

Reference Books

1. Wilson & Hawker, (2004), "*Opto Electronics*",Prentice Hall of India .
2. Sabir Kumar, Sarkar, (2003),"*Optical fibres and Fibre Optic Communication*",IV Revised Edition.
3. Ajoy Ghatak.Thiyagarajan.K.,(2017),"*Optical Electronics*",Cambridge India.

Course Title: Laser Physics Semester : 6
Course Code : 17UPHE62 Part : III Contact Hours /Week : 2 Credit : 2

Objectives

To Study the basic principles of Laser, types of Lasers and the applications of Laser in various fields.

Unit I Fundamentals of LASER 6 Hours

Spontaneous emission – Stimulated emission – Meta stable state –Population inversion – Pumping – Laser Characteristics

Unit II Production of LASER 6 Hours

Helium – Neon Laser – Ruby Laser – CO2 Laser – Semiconductor Laser

Unit III Industrial Applications of LASER 5 Hours

Laser cutting – Welding – Drilling – Hologram – Recording and reconstruction of hologram

Unit IV Lasers in Medicine 7 Hours

Lasers in Surgery – Lasers in ophthalmology – Lasers in cancer treatment

Unit V Lasers in Communication 6 Hours

Optic fibre communication – Total internal reflection – Block diagram of fibre optic communication system – Advantages of fibre optic communication.

Text Book

1. Avadhanulu.N.,(2001),"*An introduction to Lasers"*,Sultan Chand & Company.

Reference Books

1. William.T.Silfvast,(1998),"*Laser fundamentals"*,University Press,Published in South Asia by Foundation books, New Delhi.
2. Thyagarajan.K. and Ghatak.A.K.,(1984),*Laser Theory and Application*,MC Millan,India Limited.
3.Subir Kumar Sarkar (IV Edn, 2010),"*Optical fibres & Fibre optic communication systems*", Sultan Chand & Company,New Delhi.

Course Title: Organic and Physical Chemistry Semester : 6
Course Code : 17UCHA41 Part : III Contact Hours /Week : 4 Credit : 4

Objectives

To study and understand the definition, classification and uses of Alkaloids, Vitamins and antibiotics, the importance of thermodynamics, the Order and rate of reactions, the electrolyte, electrode, cell, EMF of the cell and the spectroscopic techniques like UV, IR, NMR.

Unit I Alkaloids and Vitamins and Antibiotics 10 Hours

1. **Alkaloids**
   Pharmacologicl properties and importance of the following alkaloids – nicotine, quinine, piperine and cocaine (Structural elucidation not necessary).
2. **Vitamins and antibiotics**
   a. Classification and biological functions of vitamins A, B_6, B_{12}, C, D, E and K (Structural elucidation not required).
   b. Classification and biological functions of antibiotics – penicillin, chloroamphenicol, streptomycin and tetracyclins.

Unit II Thermodynamics 14 Hours

Importance of thermodynamics – terms used in thermodynamics – open and closed systems, state functions and path functions, extensive and intensive properties, reversible and irreversible processes, statement and mathematical form of first law of thermodynamics – heat capacity at constant volume and pressure, relation between C_p and C_v.

Unit III Chemical Kinetics 12 Hours

Reaction rate – order and molecularity of a reaction – zero order – first order. First order rate equation derivative and half life period. Examples of first order reactions – second order reactions – examples. Carbon dating – enzyme catalysis – Michaelis and Menten mechanism

Unit IV Electrochemistry 10 Hours

Faraday's law of electrolysis – specific and equivalent conductance – electrochemical cell – Nerst equation – convention regarding the sign of EMF of a cell – electrodes – reference electrodes – hydrogen, calomel electrodes and glass electrode – pH measurement using glass electrode.

Unit V Basic Principles of Spectroscopy 14 Hours

Basic principles of UV and IR spectroscopy – identification of simple organic molecules (ethanol and dimethyl ether, acetaldehyde and acetone) ethylene and acetylene, cis – 2 – butene and trans – 2 – butene, methylamine, dimethyl amine and trimethylamine – Proton NMR spectroscopy – principle – instrumentation – chemical shift – spectrum of ethanol.

Text Books

1.Puri,Sharma and Kalia,(2015),"*Basic Principles of Inorganic Chemistry*",Milestone Publication, Revised Edition.
2.Soni.P.L.,(2013),"*Text Book for Organic Chemistry*",Sultan Chand and Sons,(Latest Edition).

Reference Books

1.Arun Bahl and Bahl.B.S.,(Latest Edition 2013), "*A Text Book of Organic Chemistry*",Chand & Company Limited.
2.Madan.R.D.,(2010),"*Modern Inorganic Chemistry*",Sultan Chand and Sons.
3.Soni.P.L.,(2013), "*Principles of Physical Chemistry*", Sultan Chand and Sons,(Latest Edition).

Course Title: Value Education | Semester : 6
Course Code : 17UVEV61 | Part : IV | Contact Hours /Week : 2 | Credit : 2

Objectives

To enable the learners to understand the Meaning of values, the significance of values , classification of values, self confidence , self initiative , empathy , compassion , forgiveness, honesty and courage, Karma Yoga in Hinduism , Love and justice in Christianity, Brotherhood in Islam , Compassion in Buddhism , Ahimsa in Jainism and Courage in Sikhism ,Definition of society , Democracy , Secularism , Socialism ,Gender justice , Human rights and Socio political awareness.

Unit I **6 Hours**

Values meaning - The significance of values - classification of values - need of value education - values and the individual - self discipline - self confidence - self initiative - empathy , compassion , forgiveness , honesty and courage .

Unit II **6 Hours**

Karma Yoga in Hinduism - Love and justice in Christianity - Brotherhood in Islam - Compassion in Buddhism - Ahimsa in Jainism and Courage in Sikhism - Need for religious harmony .

Unit III **6 Hours**

Definition of society - Democracy - Secularism - Socialism - Gender justice - Human rights - Socio political awareness - Social integration - Social justice .

Unit IV **6 Hours**

Definition - Accountability - Willingness to learn - Team spirit - Competence development - Honesty - Transparency - Respecting others - Democratic functioning - integrity and commitment .

Unit V **6 Hours**

Role of family - Peer Group - Society - Educational Institutions – Role Models and Mass media in value formation.

Text book

Reference Books

Course Title: Major Physics Practicals – III | Semester : 6
Course Code : 17UPHC6P | Part : III | Contact Hours /Week : 3 | Credit : 4

List of Practicals

1. Spectrometer - Small angled Prism.
2. Spectrometer - Grating – normal Incidence method.
3. Spectrometer - Cauchy's constants.
4. Spectrometer - Grating - Minimum Deviation Method.
5. Spectrometer – i- d curve.
6. Spectrometer – i-i' curve.
7. LCR - Series resonance circuit.
8. LCR - Parallel resonance circuit
9. LR Circuit - Impedance and Power Factor .
10. CR Circuit - Impedance and Power Factor .
11. Maxwell's Bridge - Self Inductance.
12. Anderson's Bridge – Self inductance.

Course Title: Major Physics Practicals – IV			Semester : 6
Course Code : 17UPHC6Q	Part : III	Contact Hours /Week : 3	Credit : 4

List of Practicals

1. Junction Diode characteristics.
2. Zener Diode characteristics.
3. Transistor characteristics – CE Mode.
4. FET characteristics .
5. Bridge Rectifier .
6. Full Wave Rectifier.
7. Zener voltage Regulation.
8. Hartley Oscillator – Frequency and Inductance.
9. Colpitt's Oscillator - Frequency & Inductance.
10. Astable multivibrator using discrete components.
11. Logic gates using discrete components.
12. Single stage Amplifier.

Course Title: Major Physics Practicals –V | Semester : 6

Course Code : 17UPHC6R | Part : III | Contact Hours /Week : 2 | Credit : 4

List of Practicals

1. Logic gates using IC's
2. Universal NAND Gate- IC
3. Universal NOR Gate- IC
4. Half Adder, Full Adder using NAND gate.
5. Half Subtractor and Full Subtractor using NAND gate.
6. Astable multivibrator using IC -555.
7. Schmitt Trigger - IC 555.
8. Astable Multivibrator using IC 741.
9. OP AMP- Adder and Subtractor
10. OP AMP - Integrator and Differentiator
11. Voltage Doubler.
12. Voltage tripler.

Course Title: Inorganic Semi Micro Qualitative Analysis Semester: 6
Course Code: 17UCHA4P Part: III Contact Hours /Week: 2 Credit : 1

I. Inorganic Semi Micro Qualitative Analysis

Analysis of a mixture containing two anions of which one is an interfering ion-semi-micro method and two cations.

Anions : Carbonate, sulphate, nitrate, fluoride, chloride, bromide, iodide, oxalate, borate, phosphate, arsenide, arsenate and chromate.

Cations: Lead, bismuth, copper, cadmium, antimony, iron (II & III), aluminium, chromium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium.

II. Organic Analysis (Demo only)

Analysis of an organic compound containing one or two functional groups and confirmation by the preparation of a solid derivative – acids, phenols, aldehydes, ketones, esters, nitrocompounds, amines (primary, secondary and tertiary), amides, anilides, aliphatic diamide, side chain and nuclear halogen compounds, aliphatic diamide containing sulphur and monosaccharides.

CERTIFICATE/ DIPLOMA IN MECHATRONICS - I

Course Title: Mechatronics - I Semester: 5

Course Code: 17CPHY51 Part: Contact Hours /Week:3 Credit :

Objectives

The aim of this course is to introduce about embedded systems, understand the concept of hardware and architecture, about internet of things, and learn cryptographic fundamentals IoT

UNIT – 1Introduction to Embedded Concepts **6 Hours**

Introduction to embedded systems - Application Areas - Categories of embedded systems - Overview of embedded system architecture - Specialties of embedded systems - recent trends in embedded systems - Architecture of embedded systems - Hardware architecture -Software architecture - Application Software.

UNIT – I1 Introduction to IoT **4 Hours**

IoT-An Architectural Overview– Building an architecture - Main design principles and needed capabilities - An IoT architecture outline - standards considerations - IoT Technology Fundamentals - Devices and gateways - Local and wide area networking - Data management, Everything as a Service(XaaS IoT Analytics, Knowledge Management.

UNIT – II1 Cryptographic Fundamentals For IoT **8 Hours**

Cryptography - Cryptographic primitives and its role in IoT – Encryption and Decryption – Hashes – Digital Signatures – Random number generation – Cipher suites – key management fundamentals – cryptographic controls built into IoT messaging and communication protocols – IoT Node Authentication.

UNIT – IV Hands on Training I **5 Hours**

Temperature control fan speed controller.

UNIT – V Hands on Training II **7 Hours**

Arduino based digital thermometer.

Text Book

1.Certificate Course in mechatronics - I, Materials Prepared by Department of Physics.

Reference Books

1. Robert .H.,Bishop,(2008),"*Mechatronic Systems,Sensors and Actiators*",CRC Press.
2. Godfrey.C.Onwubolu,(2015),"*Mechatronics Principles and Applications*",Elsevier.
3. Dr.Vijayaragaven.G.K.,(2013),"*Mechatronics*",Lakshmi Publications.

CERTIFICATE/ DIPLOMA IN MECHATRONICS - II

Course Title: Mechatronics - II Semester: 6

Course Code: 17CPHY61 Part: Contact Hours /Week:3 Credit :

Objectives

The aim of this course is to understand the coding, encoding of microcontrollers, know about artificial intelligence and Machine Learning and Arduino.

UNIT – I Microcontrollers **6 Hours**

Architecture- memory organization- special function registers - timing and control- port operation- memory interfacing - I/O interfacing - Programming the 8051 resources- interrupts- Measurement of frequency, period and pulse width of a signal- power down operation

UNIT – II Microcontrollers **5 Hours**

Bar codes and RFID basics- Components of an RFID system-Data –Tags Antennas-Connectors-Cables- Readers- encoder/ printers for smart labels Controllers- software- RFID advantages over Bar codes.

UNIT – IIIArtificial Intelligence and Machine Learning **8 Hours**

Introduction of Artificial Intelligence and Machine Learning - Classification of Machine Learning and Deep Learning - Difference between Machine Learning and Artificial Intelligence - Machine Learning Techniques - Types of Learning - Machine Learning System Design - Future scope, Machine Learning And Artificial Intelligence

UNIT – IV Hands on Training I **6 Hours**

Automatic room light controller using visitor counter.

UNIT – V Hands on Training II **5 Hours**

Automatic water level indicator and controller using Arduino.

Text Book

1.Certificate Course in mechatronics - II,Materials Prepared by Department of Physics

Reference Books

2.Robert .H.Bishop,(2008),"*Mechatronic Systems,Sensors and Actiators*",CRC Press.

3.Godfrey.C.Onwubolu,(2015),"*Mechatronics Principles and Applications*",Elsevier.

4.Dr.Vijayaragaven.G.K.,(2013),"*Mechatronics*",Lakshmi Publications