PERIYAR MANIAMMAI INSTITUTE OF SCIENCE & TECHNOLOGY

PERIYAR MANIAMMAI
INSTITUTE OF SCIENCE & TECHNOLOGY
(Deemed to be University)
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think • innovate • transform

Criterion 1 – Curricular Aspects

Key Indicator	1.1	Curriculum Design and Development
Metric	1.1.3	Average percentage of courses having focus on employability/ entrepreneurship/ skilldevelopment offered by Education.

DEPARTMENT OF EDUCATION

SYLLABUS COPY OF THE COURSES HIGHLIGHTING THE FOCUS ON EMPLOYABILITY/ ENTREPRENEURSHIP/ SKILL DEVELOPMENT

1. List of courses for the programmes in order of

S. No.	Programme Name
i.	B.Sc.B.Ed (4 Year Integrated Programmme)
ii.	B.Ed (Two Year Programme)

2. Syllabus of the courses as per the list.

Legend : Words highlighted with **Blue Color** - Entrepreneurship
Words highlighted with **Red Color** - Employability
Words highlighted with **Purple Color** - Skill Development

1. List of Courses

Courses offered in 2020-2021 B.Sc.B.Ed			
Name of the Course	**Course Code**	**Year of introduction**	**Activities/Content with direct bearing on Employability/ Entrepreneurship/ Skill development**
Tamil -I	XBE101	2015-16	Entrepreneurship skill - writing tamil essays, poetry initiated
English - I	XBE102	2015-16	Soft skill - Comprehensive skill developed among the students
Holistic Education	XBE103H	2015-16	*****
Introduction to Computers	XBE104	2015-16	Employability Skill - through making the students able to create the document skills
Understanding Education and its perspective	XBE105	2015-16	*****
Differential Calculus and Trigonometry	XBE106	2015-16	Employability Skill – Assignment activity creates the young mind to assess the physical properties of the materials
Properties of Matter and Sound	XBE107	2015-16	Entrepreneurship skill - Able to carry out the fundamental basic sciences throughout their life
General Chemistry - I	XBEC108	2015-16	Employability skill – tutorial and assignment
Programming in C	XBES108	2015-16	Employability skill – through making the students able to write computer programmes in C
Physics Practical - I	XBE109	2015-16	Employability skill – Students can measure even a tiny particle by practiced in the lab
Volumetric Analysis Lab – I	XBEC110	2015-16	Entrepreneurship skill - through practice using volumetric analysis lab
Programming in C Lab	XBES110	2015-16	Employability Skill – Problem solving activity makes the students with aptitude skill
Tamil - II	XBE201	2015-16	Soft skills – communication skill, writing skill
English - II	XBE202	2015-16	Entrepreneurship skill - debating and verse writing skill
Environmental Education	XBE203E	2015-16	*****
Software Packages - Lab	XBE204	2015-16	Entrepreneurship skill - Document preparation, creating PowerPoint Slides
Educational Psychology – Understanding the	XBE205	2015-16	Entrepreneurship skill - Critical thinking and analytical skills, Abstract reasoning, Communication and

Learner			interpersonal skills.
Algebra and Numerical Analysis	XBE206	2015-16	Employability skill – Implementing skill-applying problem solving, reasoning skill
Mechanics and Relativity	XBE207	2015-16	*****
Data Structures and Algorithms	XBES208	2015-16	Entrepreneurship skill - Abilities of setting goals and preserving to meet them, applying problem solving technique ideas in unfamiliar situation

General Chemistry - II	XBEC208	2015-16	Entrepreneurship skill - Students able to draw shapes of simple inorganic molecules.
Physics Practical - II	XBE209	2015-16	*****
Volumetric Analysis Lab – II	XBEC210	2015-16	Employability skill – Skills of observation and deduction necessary for working in the laboratory. These skills will be fostered when participants conduct experiments on volumetric titration.
Data Structures using C Lab	XBES210	2015-16	Employability skill – applying problem solving technique ideas in unfamiliar situation
Tamil - III	XBE301	2016-17	Entrepreneurship skill - Translation skill developed through various activities
English - III	XBE302	2016-17	Entrepreneurship skill - Communication Skill developed through Seminar presentation
Theatre, Art and Heritage Craft Traditions	XBE303	2016-17	Entrepreneurship skill - through making ornaments from paper and other waste materials
Programming in C (for MPC group Students)	XBEC304	2016-17	Employability skill – through making the students able to write computer programmes in C
Visual Programming (For CsMP group Students)	XBES304	2016-17	Employability skill – through making the students able to write computer programmes in VB
Educational Psychology – Understanding the Learning Process	XBE305	2016-17	*****
Analytical Geometry (3D) and Integral Calculus	XBE306	2016-17	Employability skill – problem solving activity helps to solve real life application problems
Heat and Thermo Dynamics	XBE307	2016-17	Employability skill – Able to solve basic problem related to heat and thermodynamics.

General Chemistry - III	XBEC308	2016-17	Employability skill – Able to analyses any research problems based on the structural properties
Object Oriented Programming with C++ and Java	XBES308	2016-17	Employability skill – through making the students able to write computer programmes in C++ by problem solving activity
Physics Practical - III	XBE309	2016-17	Entrepreneurship skill - By practice in lab, students can identify the properties of electronic components
Semimicro Inorganic Qualitative Analysis (ANIONS) Lab	XBEC310	2016-17	Entrepreneurship skill - identify the chemicals based on the properties by practices in lab
Programming in C++ and Java Lab	XBES310	2016-17	Employability skill – through making the students able to write computer programmes in C++ by problem solving activity
Practicum and School Internship - I	XBES311	2016-17	Employability Skill – developed through observing teachers in schools

Tamil - IV	XBE401	2016-17	Soft skills – communication skill, writing skill
English - IV	XBE402	2016-17	Soft skill and Entrepreneurship skill - Skill of writing English essays, poetry initiated
Social Engineering	XBE403	2016-17	Entrepreneurship skill - Skill of various social movements
Introduction to MATLAB	XBE404	2016-17	Entrepreneurship skill - Students solving the various mathematical problems using MATLAB
Assessment of Learning	XBE405	2016-17	Employability Skill – Skill of problem solving ability
Vector Calculus and Fourier Series.	XBE406	2016-17	Employability Skill – Specifying, relationship, observing, classifying using space/time relationships, ability to understand both concrete and abstract problem
Optics and Spectroscopy	XBE407	2016-17	*****
General Chemistry - IV	XBEC408	2016-17	Employability skill - Students skills acquire to extraction and preparation d-block elements and their compounds
Computer Graphics	XBES408	2016-17	Entrepreneurship skill - Students able to draw a general mechanism for computer graphics procedure like line drawing and various dimensional technique concept
Physics Practical - IV	XBE409	2016-17	*****

Semi micro Inorganic Qualitative Analysis (CATIONS) Lab	XBEC410	2016-17	Entrepreneurship skill - Skills of observation and deduction necessary for working in the laboratory. These skills will be fostered when participants conduct experiments on qualitative analyses of inorganic compounds.
Computer Graphics Lab	XBES410	2016-17	Employability skill - Students able to draw a general mechanism for computer graphics procedure like line drawing and various dimensional technique
Practicum and School Internship-II	XBE411	2016-17	Entrepreneurship skill - Teacher students to organize field visit
Soft Skill Development and Peace Education	XBE501	2017-18	Soft skill and Entrepreneurship skill - Conversation between students, drama making by students, team building
Basics of e – Learning Education	XBE502	2017-18	Entrepreneurship skill - make e-contents and to use multimedia
Teaching Approaches and Strategies	XBE503	2017-18	Employability skill - teaching skill.
Pedagogy of Mathematics - I	XBE504A	2017-18	Employability skill - student teacher acquired skill to teach mathematics
Pedagogy of Physics- I	XBE504B	2017-18	Employability skill - student teacher acquired skill to teach Physics
Pedagogy of Chemistry - I	XBEC504C	2017-18	Employability skill - student teacher acquired skill to teach Chemistry

Pedagogy of Computer Science - I	XBES504C	2017-18	Employability skill – student teacher acquired skill to teach Computer Science
Sequences and Series	XBE505	2017-18	Entrepreneurship skill - Problem solving skill develops the confidence among the students
Electricity and Magnetism	XBE506	2017-18	Entrepreneurship skill - Understanding electric properties and apply
Inorganic Chemistry - I	XBEC507	2017-18	Employability skill – natural and technological occurrences of coordination compounds
Database Management Systems	XBES507	2017-18	Employability skill – learning the students able to storage and retrieval of data
Physics Practical - V	XBE508	2017-18	Entrepreneurship skill - To participate and cooperate the team and analyze the experiments.
Gravimetric Analysis Lab	XBEC509	2017-18	Entrepreneurship skill - observation and deduction necessary for working in the laboratory. These skills will be fostered when participants conduct experiments on qualitative analyses of inorganic

			compounds.
RDBMS Lab	XBES509	2017-18	Employability skill – through making the students able to queries skills
Practicum and School Internship-III	XBE510	2017-18	Employability skill – Students take seminar to acquire teaching skills
Indian Constitutions and Human Rights	XBE601	2017-18	Soft skill - Students skills acquire to attitude and aptitude of Indian constitution and human rights
Introduction to LATEX	XBE602	2017-18	Entrepreneurship skill - Students practicing by creating document in various format
Secondary Education in India – Status, Challenges and Strategies	XBE603	2017-18	Entrepreneurship skill - Students skills acquire to attitude and aptitude of Indian education system
Pedagogy of Mathematics – II	XBE604A	2017-18	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Pedagogy of Physics- II	XBE604B	2017-18	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Pedagogy of Chemistry - II	XBEC604C	2017-18	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Pedagogy of Computer Science - II	XBES604C	2017-18	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Differential Equations and Laplace Transforms	XBE605	2017-18	Employability skill – Inferring, predicting, constructing viable arguments
Atomic and Solid State Physics	XBE606	2017-18	*****

Organic Chemistry - I	XBEC607	2017-18	Employability skill – Students able to draw a general mechanism for electrophilic aromatic substitution. They all follow the same essential pattern.
Operating Systems	XBES607	2017-18	Entrepreneurship skill - Students skills acquire to working principles of operating systems
Physics Practical - VI	XBE608	2017-18	Entrepreneurship skill - To participate and cooperate the team and analyze the experiments.

Organic Qualitative Analysis and Organic Preparation Lab	XBEC609	2017-18	Employability skill – Skills of observation and deduction necessary for working in the laboratory. These skills will be fostered when participants conduct experiments on qualitative analyses of organic compounds.
Operating Systems Lab	XBES609	2017-18	Employability skill – Students skills acquire to working principles of operating systems
Practicum and School nternship - IV	XBE610	2017-18	Entrepreneurship skill and Employability skill – Teacher students preparing case study record, Action research, lesson Plan
Educational Innovation and Management	XBE701	2018-19	*****
Algebra	XBE702	2018-19	Employability skill – Solving quantitative problems, profiency in communicating mathematical ideas
Real Analysis	XBE703	2018-19	Entrepreneurship skill - Able to work independent and on a team, develop confidence and habits of persistence
Basic Electronics	XBE704	2018-19	*****
Wave Mechanics and Nuclear Physics	XBE705	2018-19	*****
Physical Chemistry - I	XBEC706	2018-19	Entrepreneurship skill - problem solving activity helps to solve real life application problems
Computer Networks	XBES706	2018-19	Entrepreneurship skill - Networks skills helps the students to LAN connectivity
Organic Chemistry - II	XBEC707	2018-19	Employability skill – Students able to draw a general mechanism for electrophilic aromatic substitution. They all follow the same essential pattern.
Web Technology	XBES707	2018-19	Employability skill – through making the students able to write computer web designing languages
Physics Practical - VII	XBE708	2018-19	Employability skill – To participate and cooperate the team and analyze the experiments.
Physical Chemistry Lab - I	XBEC709	2018-19	Employability skill – Skills of observation and deduction necessary for working in the laboratory. These skills will be fostered when participants conduct experiments on Physical chemistry.

Web Technology Lab	XBES709	2018-19	Employability skill – through making the students able to write computer web

			designing languages
Practicum and School Internship - V	XBE710	2018-19	Entrepreneurship skill and Employability skill – students preparing case study record, Action research, lesson Plan
Statistics and Operations Research	XBE801	2018-19	Entrepreneurship skill - Interpreting data selecting and controlling variables applying mathematics to everyday situations.
Complex Analysis	XBE802	2018-19	Employability skill – Develop flexibility, emphasis heuristic process
Digital Electronics	XBE803	2018-19	*****
Microprocessor and Microcontroller	XBE804	2018-19	*****
Physical Chemistry - II	XBEC805	2018-19	Employability skill - Students skills acquire to working principles of various electrochemical cells and its applications
Software Engineering	XBES805	2018-19	Employability skill – Skill of various testing methods and project models
Analytical Chemistry	XBEC806	2018-19	Entrepreneurship skill - Solving quantitative problems, profiency in communicating chemical ideas
Data mining	XBES806	2018-19	Entrepreneurship skill - Skill of basic data mining and data processing development
Physics Practical - VIII	XBE807	2018-19	*****
Physical Chemistry Lab - II	XBEC808	2018-19	Employability skill – Skills of observation and deduction necessary for working in the laboratory. These skills will be fostered when participants conduct experiments on Physical chemistry.
Software Development Lab (Mini Project)	XBES808	2018-19	Employability skill – Skill of various programming language and database
Guidance and Counseling in School	XBE809C	2018-19	Entrepreneurship skill - Students skills acquire to problem solving ability and guidance and counseling process
Discrete Mathematics	XBE810A	2018-19	Entrepreneurship skill - Abilities of setting goals and preserving to meet them, applying mathematical ideas in unfamiliar situation
Electrical Appliances and Renewable Energy Sources	XBE810B	2018-19	*****

Food Chemistry	XBE810D	2018-19	Entrepreneurship skill - Abilities of setting goals and preserving to meet them, applying chemical ideas in unfamiliar situation and everyday life
Understanding PHP	XBE810G	2018-19	Entrepreneurship skill - Skill of various looping statements

Courses offered in 2020-2021 B.Ed			
Childhood & Growing Up	BED101	2020-2021	EMPLOYABILITY - Assignments, Sketches, case study
Education In India-Status, Problems And Issues	BED102	2020-2021	EMPLOYABILITY - Assignments, case study, Models
Language Across The Curriculum - I	BED103	2020-2021	**Soft Skill Development**- Assignment and Seminar
Curriculum Development & School	BED104	2020-2021	**Soft Skill Development**- Assignment and Seminar
Reading And Reflecting On Texts	BED105	2020-2021	**Soft Skill Development -** Assignment and Comprehenion
Learning & Teaching	BED201	2020-2021	Employability skill – Students trained in teaching ability and learning skills
Teaching of Tamil – I	BED202T	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of English – I	BED202E	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Mathematics – I	BED202M	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Physical Science – I	BED202P	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Biological Science – I	BED202B	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Computer Science – I	BED202CO	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Commerce – I	BED202C	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Economics – I	BED202EC	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Geography – I	BED202G	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson

			plan, to teach lesson in time
Teaching of History – I	BED202H	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Tamil – II	BED203T	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time

Teaching of English – II	BED203E	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Mathematics – II	BED203M	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Physical Science – II	BED203P	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Biological Science – II	BED203B	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Computer Science – II	BED203CO	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of Commerce – II	BED203C	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Teaching of History – II	BED203H	2020-2021	Employability skill – Mini teaching helps the students to prepare lesson plan, to teach lesson in time
Language Across the Curriculum – II	BED204	2020-2021	---
Understanding the Self	BED205	2020-2021	---

2. Syllabus for Courses

Programme : B.Sc.B.Ed.

Semester	**I**	
Subject Name	**TAMIL – I**	
Subject Code	**XBE101**	
L –T –P –C **2 - 1 – 0 - 3**	**C:P:A** **3:0:0**	**L –T –P –H** **3 - 1 – 0 - 4**

Course Outcome:		**Domain/Level** **C or P or A**
CO1	பல்வேறு கவிஞர்களின் வாழ்க்கை வரலாற்றையும் அவர்களது படைப்புகளையும் அறிந்து கொள்ளல்.	அறிதல்/ பட்டியலிடுதல், வரையறுத்தல், நினைவு கூர்தல்
CO2	நாவல்கள் பற்றியும் படைப்பாளர்களின் திறன்கள் பற்றியும் உணர்ந்து கொள்ளல்.	அறிதல்/ அடையாளம் காணுதல், விவாதித்தல்
CO3	சிறுகதையின் அமைப்பினை தெரிந்து கொள்ளுதல்.	உணர்தல்/ அமைத்தல், மதிப்பிடுதல், பதிலளித்தல்
CO4	கவிதை, உரைநடை ஆகிய இலக்கிய வகை குறித்து தெளிவு பெறுதல்.	உளப்பகுப்பாய்வு செய்தல்/போலச் செய்தல், உள்வாங்குதல்
CO5	வழுஉச்சொல், மரபுச்சொல் அகர வரிசைப்பட்டியல் ஆகியவற்றை	உணர்தல், உளப்பகுப்பாய்வு செய்தல் / உற்றுநோக்குதல், பயிற்சி எடுத்தல்.

COURSE CONTENT

UNIT I	**செய்யுள்**	**15 hrs**
	20ஆம் நூற்றாண்டு கவிஞர்கள் - ஒரு பார்வை - பாரதியார் வாழ்க்கை வரலாறு - படைப்புகள் - தமிழ்த்தாய் - பாடற்கருத்து - பாடல் விளக்கம் - எங்கள் நாடு - பாடற்கருத்து - அதன் விளக்கம். பாரதிதாசன் வாழ்க்கை வரலாறு - படைப்புகள் - தமிழின் இனிமை - உலகம் உன்னுடையது பாடல்களின் கருத்துக்கள் - அவற்றின் விளக்கங்கள்.	
UNIT II	**செய்யுள்**	**15 hrs**
	கவிமணி தேசிக விநாயகம் பிள்ளை - வாழ்க்கைக்குறிப்பு - பல்வேறு படைப்புக்கள் - ஒற்றுமையே உயர்நிலை, இயற்கை வாழ்வு பாடற்கருத்து - அதன் விளக்கம். நாமக்கல் கவிஞர் - ஆசிரியர் குறிப்பு - அவர் தம் படைப்பிலக்கியங்கள் - இளந்தமிழனுக்கு, தமிழ்ப்பண்பைக்காப்போம் - பாடல்களின் கருத்துக்கள் - அவற்றின் விளக்கங்கள்.	
UNIT III	**இலக்கிய வரலாறு - 1**	**15 hrs**
	நாவல் - தோற்றம் - வளர்ச்சி - வகைகள் - வடிவம் - நாவலாசிரியர்கள், தற்கால நாவலாசிரியர்கள் பற்றிய பல்வேறு குறிப்புகள் - சிறுகதை - தோற்றம் - வளர்ச்சி - வகைகள் - தற்போதைய அதன் வடிவம் - சிறுகதையாசிரியர்கள் நவீன கால சிறுகதை ஆசிரியர்கள் பற்றிய பல்வேறு குறிப்புகள் - அவர்களது படைப்புக்கள்.	

UNIT IV	**இலக்கிய வரலாறு -2**	**15 hrs**
	கவிதை - 20 மற்றும் 21 - ஆம் நூற்றாண்டுக் கவிஞர்கள் - அவர்களது படைப்புக்கள் - புதுக்கவிதை - மணிக்கொடிப்பரம்பரை - மற்றும் பலர் - ஹைகூ வடிவம் - தோற்றம் - வளர்ச்சி. உரைநடை - தோற்றம் - வளர்ச்சி - உரையாசிரியர்கள் - படைப்புக்கள். தற்காலத்தவர்களது தகவல்கள் போன்ற பல்வேறு விளக்கங்கள்.	
UNIT V	**இலக்கணம்**	**15 hrs**
	வழுஉச்சொல் திருத்தம் - விளக்கம் - சான்றுகள் மரபுச்சொல் - விளக்கம் - அதற்கான உதாரணங்கள். அகர வரிசைப்படுத்துதல் - விளக்கம் - அவற்றுக்கான சான்றுகள் - அனைத்திற்கும் பயிற்சிகள்.	
	L=45 hrs T=30 hrs Total = 75 hrs	

TEXT BOOKS

1. பாரதியார் கவிதைகள்
2. பாரதிதாசன் கவிதைகள்
3. கவிமணி தேசிய விநாயகம் பிள்ளை பாடல்கள்
4. நாமக்கல் கவிஞர் பாடல்கள்
5. தமிழ் இலக்கிய வரலாறு
6. தமிழிலக்கண நூல்

REFERENCES

1. தமிழ் இலக்கிய வரலாறு
2. பல்வேறு கவிஞர்களின் கவிதைத் தொகுப்புகள்

E-REFERENCES

tamilwebulaham.com

tamilvirtual university.co.in

Mapping of CO with GA's

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO 1	3		3	3	2	2	1	2	3	1	2	1
CO 2	3	2	3	3	0	0	0	1	1	0	1	1
CO 3	3	2	1	1	1	1	1	1	1	1	2	2
CO 4	3	2	3	1	1	2	3	1	1	1	1	2
CO 5	3	2	3	2	1	2	0	1	1	2	3	1
	15	**8**	**13**	**10**	**5**	**7**	**5**	**6**	**7**	**5**	**8**	**7**
	3	**1.6**	**2.6**	**2**	**1**	**2.4**	**1**	**1**	**1.4**	**1**	**1.6**	**1**

1 - Low , 2 – Medium , 3 – High

Semester	**I**	
Subject Name	**ENGLISH-I**	
Subject Code	**XBE102**	
L –T –P –C **2 - 1 – 0- 3**	**C: P: A** **3:0:0**	**L –T -P- H** **3- 1 - 0 -4**

Course Outcome:		**Domain**
CO1	*Generalizes* the basics of grammar, vocabulary, spelling, punctuation and speech.	Cognitive
CO2	*Applies* the concept of grammar in the situations and Workplace	Cognitive
CO3	*Categorizes* the structure of essay writing	Cognitive
CO4	*Interprets* the text and comprehends meaning	Cognitive
CO5	*Develop* the societal Skill	Cognitive

COURSE CONTENT

UNIT-I	**Descriptive Grammar Tenses**	**15 hrs**
	a) Simple present: Habitual action, General truths, Future time, Verbs of state, Verbs of perception, Verbs of sensation, Narration, Use of simple present for demonstration and commentaries, Present perfect, present perfect continuous, Present continuous also indicative of future action. b) Simple past: Past time reference, Present time reference, Future time reference, Past continuous, Past perfect, past perfect continuous.	
UNIT –II	**Skills in Communication**	**15 hrs**
	Negotiating a point of view – learning to talk persuasively so as to get across one's perspective. Debating on an issue – agreeing/ disagreeing.	
UNIT-III	**Study and Reference Skills.**	**15 hrs**
	Note making; Note – taking; Summary writing.	
UNIT –IV	**Literature – Prose & Skills of Communication**	**15 hrs**
	Extract from Abdul Kalam's Wings of Fire; Somerset Maugham – The Ant and the Grashopper. Listening effectively; Taking about one self (likes, dislikes, interests, beliefs, personality traits, ambitions); expressing an opinion about personal belief on a current issue. (Ability to speak fluently for 3 – 4 minutes. Focus would be on organized, logical, sequential presentation of thought spontaneous speech).	
UNIT V	**Sessional Work:**	**15 hrs**
	Politeness competitions – students with partners take turns in using a given number of utterances for negotiation / requests / complaints / small talk. Students introduce themselves though using symbols / metaphors. Students collect newspaper / magazine cuttings on topical and / or cultural issues of interest – write and share their opinion with peers.	

	L=45 hrs T = 30 hrs Total = 75 hrs

Suggested Readings:

1. Block, C.C. (1997). *Teaching the Language Arts*, 2nd Ed. Allyn and Bacon.
2. Mckay. Et all. (1995). *The Communication Skills Book*, 2nd Ed. New Harbinger Publications.
3. Hornby, A. S. (2001). *Oxford Advance Learner's dictionary*, OUP
4. Thomsan, A. J. & *Martinet. (2002). A. Practical English Grammar*. OUP.
5. Dr. Palani Arangasamy (2010) Senior English Grammar July 2011 – Siva publications – Thanjavur.

Mapping of CO's with GA 's:

	GA1	GA2	GA3	GA 4	GA5	GA6	GA7	GA 8	GA9	GA10	GA11	GA12
CO1	2	3	1	3	2	2	02	2	1	1	0	2
CO2	0	3	0	2	2	1	1	2	2	2	2	2
CO3	0	0	2	0	2	1	0	2	0	0	1	2
CO4	3	3	1	1	2	3	3	2	1	2	0	1
CO5	3	3	2	2	1	2	0	3	2	3	3	2
Total	8	12	6	8	9	9	6	11	6	8	6	9
Scaled Values	1.6.	2.4	1.2	1.6	1.8	1.8	1.2	2.2	1.2	1.6	1.2	1.8

1 - Low , 2 – Medium , 3 – High

Semester	**I**		
Subject Name	**INTRODUCTION TO COMPUTERS**		
Subject Code	**XBE104**		
L –T –P –C **2 - 1 – 0– 3**		**C:P:A** **2:0:1**	**L –T –P –H** **2 - 1 – 0 - 3**
Course Outcome			**Domain** **C or P or A**
CO1	Summaries the uses of computer applications in various field		Cognitive
CO2	Define and describe the fundamental concepts of digital computer		Cognitive
CO3	Explain the different types of Operating systems		Cognitive
CO4	List out various computer networks and differentiate them		Cognitive Affective
CO5	Identify the uses of internet and tell about the uses of internet		Cognitive/ Affective
COURSE CONTENT			
UNIT I			**5 hrs**
	Overview – Computers for individual users- computer for organizations – role of		

	computers in home, education, entertainment, business, industry, healthcare and government – parts of a computer	
UNIT II		**15 hrs**
	Input / Output devices- Keyboard, Mouse, Joystick, light pen, scanner, digital camera, printers Memory Devices – RAM, ROM, Hard disc, CD, DVD, Magnetic tape – Software – System software- application software.	
UNIT III		**5 hrs**
	Operating System – Types of Operating System – backup utilities – virus and antivirus – firewall – screen savers – DOS – Windows – Windows NT, Unix, Linux	
UNIT IV		**10 hrs**
	Networks – Basics of network – Uses of network – common network types – LAN,WAN, hybrid network – intranet and extranet – client server network	
UNIT V		**10 hrs**
	Internet and WWW – Internet – concept of WWW – web browsers – HTML tags – URL – hyperlinks – Email services.	

TEXT BOOKS

Peter Norton, 'Introduction to Computers', Sixth Edition, Tata McGraw Hill, New Delhi

REFERENCES

Gary B. Shelly, Steven M. Freund, Mesty E. Vermaat, 'Introduction to Computers', Eighth Edition, Shelly Cashman Series.

Mapping of CO's with GA's:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	2			2								
CO2	2		1	2					**1**			**1**
CO3	5	2	1	1	2				**1**			**2**
CO4	5	3	1	1					**1**			**1**
CO5	1	1	1		3							**1**
Total	15	6	4	6	5				**3**			**5**
Scaled Value	3	1	1	1	1				**.5**			**1**

1 - Low, 2 – Medium, 3 – High

Semester	**I**	
Subject Name	**DIFFERENTIAL CALCULUS AND TRIGONOMETRY**	
Subject Code	**XBE106**	
L –T –P –C **4- 1 – 0– 5**	**C:P:A** **4:1:0**	**L –T –P –H** **5– 1 – 0 – 6**

Course Outcome		**Domain/Level** **C or P or A**
CO1	***Apply*** basic differentiation rules to various functions and ***Understand*** the concept of maxima and minima.	Coginitive
CO2	***Understand*** the meaning of radius of curvatures and able to ***find*** the RCs for the conics in Cartesian and polar forms	Coginitive
CO3	Able to ***understand*** the concepts of properties of the complex number and ***solve*** the trigonometric expansions	Coginitive/ Psychomotor
CO4	***Recognise*** the relation between the circular and hyperbolic functions.	Coginitive/ Psychomotor
CO5	***Remembering*** the concepts of logarithm of complex number and valuing trigonometric series	Coginitive

COURSE CONTENT

UNIT I		**5 hrs**
	Methods of Successive Differentiation - Leibnitz's Theorem and its applications - Increasing & Decreasing functions - Maxima and Minima of function of two variables.	
UNIT II		**15 hrs**
	Curvature - Radius of curvature in Cartesian and in Polar Coordinates - Centre of curvature - Evolutes & Involutes.	
UNIT III		**5hrs**
	Modulus and amplitude form of a complex number, DeMoivre' theorem - Expansions of sin*nx*, cos*nx*, tan*nx* - Expansions of $\sin^n x$, $\cos^n x$ - Expansions of Sin*x*, Cos*x*, Tan*x* in powers of *x*.	
UNIT IV		**10hrs**
	Hyperbolic functions - Relation between hyperbolic & circular functions - Inverse hyperbolic functions.	
UNIT V	Logarithm of a complex number - Summation of Trigonometric series.	**10 hrs**
	L = 20hrs P = 20 hrs Library = 5 hrs Total = 45 hrs	

TEXT BOOKS

1. T.K.Manicavachagam Pillai & others, Differential Calculus, S.V Publications, Chennai –1985 Revised Edition.
2. Engineering Mathematics, volume1, M.K.Venkataraman, Second Edition, National

Publishing & Co.

REFERENCE

1. Shanti Narayan and P.K.Mittal, Differential Calculus, S.Chand & Company Ltd, Fifteenth Edition.
2. S. Narayanan, T.K. Manichavasagam Pillai, Trigonometry, S. Viswanathan Pvt Limited, and Vijay Nicole Imprints Pvt Ltd, 2004.
3. Schaum's Outlines, Advanced Calculus, Tata Mcgraw- Hill Company Limited, New Delhi.
4. Schaum's Outlines, Trigonometry, Tata Mcgraw- Hill Company Limited, New Delhi

Mapping of COs with GAs

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	1	3	1	2	1	2	2	3	0	1	2	1
CO2	1	3	2	2	1	2	2	1	1	1	2	2
CO3	1	3	1	1	1	2	2	2	1	1	2	3
CO4	1	3	2	2	1	2	0	2	1	1	2	1
CO5	3	3	2	1	1	1	0	1	1	1	2	2
Total	7	15	8	8	5	9	6	9	4	5	10	9
Scaled Value												

1 - Low , 2 – Medium , 3 – High

Semester	**I**		
Subject Name	**PROPERTIES OF MATTER AND SOUND**		
Subject Code	**XBE107**		
L –T –P –C **4- 1 – 0– 5**		**C:P:A** **4:1:0**	**L –T –P –H** **4-1-0-5**

Course Outcome		**Domain C or P or A**
CO1	***Identify*** the principles of elasticity, ***derive*** expression for twisting couple and ***determine*** rigidity modulus of a wire	Cognitive
CO2	***Develop Knowledge*** on bending of beams, its properties and ***application***	Cognitive/ Psychomotor
CO3	***Define*** surface tension, ***recall*** the concepts of low pressure and ***explain*** the methods of production of low pressure.	Cognitive
CO4	***Understand*** flow of liquid, viscosity and ***identify*** its ***applications.***	Cognitive/ Psychmotor
CO5	***Describe*** the production, propagation, perception & ***analysis*** of acoustical wave.	Cognitive

COURSE CONTENT

UNIT I	**ELASTICITY**	**5 hrs**

	Stress – Strain Diagram – Elastic Module, Work done per unit volume in shearing strain – relation between elastic constants – Poisson's Ratio- Expression for Poisson's ratio in terms of elastic constants – Twisting couple on a wire – Work done in twisting – Torsional pendulum – Determination of rigidity modulus of a wire.	
UNIT II	**BENDING OF BEAMS**	**15 hrs**
	Expression for bending moment – Cantilever – Expression for depression – Experiment to find Young's Modulus – Cantilever oscillation – Expression for period – Uniform bending – Expression for elevation – Experiment to find Young's modulus using microscope – Non Uniform bending – Expression for depression – Experiment to determine Young's modulus using mirror and telescope.	
UNIT III	**SURFACE TENSION**	**5 hrs**
	Definition and dimensions of surface tension - Excess of pressure over curved surfaces - Application to spherical and cylindrical drops and bubbles - Variation of Surface tension with temperature - Jaegar's method. Physics of Low Pressure. Production and Measurement of low pressure - Grades' molecular pump - Rotary pump - Knudsen absolute gauge.	
UNIT IV	**VISCOSITY**	**10 hrs**
	Co-efficient of viscosity and its dimensions - Rate of flow of liquid in a capillary tube - Poiseuilles' formula - Experiment to determine co-efficient of viscosity of a liquid - Variation of viscosity of a liquid with temperature - Applications of viscosity.	
UNIT V	**SOUND**	**10hrs**
	Laws of transverse vibrations in strings – verification by Sonometer - Music and noise- Characteristics of musical sound. Reverberation and Reverberation time – Sabine's formula – Optimum reverberation – Measurement of reverberation time – Absorption coefficient – Acoustics design – Ultrasonics – Production- Piezo electric oscillator and magnetostriction oscillator method – Properties – Applications.	
	L = 60 hrs T = 15 hrs Total = 755 hrs	

TEXT BOOKS

1. Properties of matter – Brijlal and Subramanian
2. A text book of sound – N. Subrahmaniyam and Brijlal

REFERENCES

1. Properties of matter – D.S. Mathur.
2. Properties of matter – Subramanian Iyer and Jeyaraman.
3. Oscillations, waves and sound – L.P. Sharma, H.C. Saxena.
4. A text book of sound R. L. Saigal .

Mapping of COs with GAs

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	3	2	3	2	2				**2**			2
CO2	3	2	2	2	2				**2**			2
CO3	3	2	1	2	2				**2**		3	2
CO4	3	2	1	2	2				**2**			2
CO5	3	2	1	1	2				2		3	2
Total	15	10	8	9	10				10		6	10
Scaled Value	3	2	2	2	2				2		1	2

1 - Low , 2 – Medium , 3 – High

Semester	**I**	
Subject Name	**GENERAL CHEMISTRY-I**	
Subject Code	**XBEC108**	
L –T –P –C **3- 1 –0– 4**	**C:P:A** **3:0:1**	**L –T –P –H** **4 – 1 – 0- 5**

Course Outcome		**Domain** **C or P or A**
CO1	***Identify*** the various families of elements and ***describe*** the periodic properties like periodic trends, extraction preparation and properties of p- Block elements and their compounds.	Cognitive
CO2	***Explain*** the behavior and chemical properties of compounds of p- Block elements and Nobel gases.	Cognitive
CO3	***Illustrate*** the various haloalkanes compounds and ***Describe*** the mechanism of nucleophile and electrophonic substitution reactions.	Cognitive/ Affective
CO4	***Describe*** the stereochemistry of molecules and ***Discuss*** the properties related to their conformations.	Cognitive /Affective
CO5	***Identify*** and ***Relate*** the structure and properties of solid state, liquid crystals and colloids	Cognitive

COURSE CONTENT

UNIT I	**ATOMIC STRUCTURE AND BASIC QUANTUM MECHANICS**	**9+3 hrs**
	Dualism of light – Wave nature of radiation classical theory of electromagnetic, radiation and classical expression for energy in term of amplitude. Particle nature of radiation – Black body radiation and Planck's quantum theory, photoelectric effect and Compton effect – de Broglie hypothesis and Davisson and Germer experiment. Heisenberg's uncertainty principle. Schrödinger wave equation – Physical significance of psi function. Properties of psi function	
UNIT II	**ATOMIC STRUCTURE AND PERIODIC PROPERTIES**	**9+3 hrs**
	Quantum numbers and their significance. Wave picture of electron – Concept of atomic orbitals. Shapes of s, p and d orbitals. Nodal planes and nodal points in atomic orbitals g and u character of atomic orbitals-Principles governing the occupancy of electrons in various quantum levels-Pauli's exclusion principle, Hund's rule, Aufbau Principle, stability of half-filled and fully filled orbitals. Classification as s, p, d & f block elements, variation of atomic volume, atomic and ionic radii, ionisation potential, electron affinity and electro negativity along periods and groups – Variation of metallic characters – Factors influencing the periodic properties.	
UNIT III	**PRINCIPLES OF WET CHEMICAL ANALYSIS AND ACID – BASE THEORY**	**9+3hrs**
	Qualitative Analysis: Solubility Product – Principle of Elimination of interfering anions, Common Ion Effect – Complexation reactions including spot tests in qualitative analysis – Reactions involved in separation and identifications of cations and anions in the analysis – Semi Micro Technique.	

	Titrimetry: Definitions of molarity, normality, molality and mole fraction – Primary and Secondary standards – Types of titrimetric reactions – acid-base, redox, precipitation and complexo metric titrations – Indicators – Effect of change in pH – Neutralization, redox, adsorption and metal ion indicators. **Acids and Bases:** Arrhenius, Protonic and Lewis Theories of Acids and Bases – Usanovich's generalized definition – Relative strengths of Acids and Bases – Dissociation constant of Acids and Bases – Levelling effect of water. Hard and soft acids and bases (HSAB) **Oxidation and Reduction Reactions:** Oxidation number concept – Balancing redox equations by Oxidation number method and lon-electron method – Equivalent weight of oxidizing and reducing agents.	
UNIT IV	**COVALENT BONDING AND STRUCTURE**	**9+3hrs**
	Covalent bonding – Concept of hybridization – Structure of organic molecules based on sp^3, sp^2 and sp hybridization – Covalent bond properties of organic molecules: bond length, bond angle, bond energy, bond polarity, dipolemoment, inductive, mesomeric, electromeric, resonance and hyperconjugative effects – Naming of organic compounds (up to 10 carbon systems) – Hydrocarbons – Mono functional compounds – Bi – functional compounds – Isomerism – Types of isomerism (structural and stereoisomerisms) with appropriate examples .	
UNIT V	**CHEMISTRY OF ALKANES AND CYCLOALKANES**	**9+3 hrs**
	Petroleum source of alkanes – Methods of preparing alkanes and cycloalkanes - Chemical properties – Mechanism of free radical substitution in alkanes by halogenation – Uses – Conformational study of ethane and n-butane-Relative stability of cycloalkanes from cyclopropane upto cyclooctane – Bayer's Strain theory – Limitations – Cyclohexane and mono –cyclohexanes.	
		L = 45 hrs T =15 hrs Total = 60 hr

REFERENCES

1. Puri B.R..,Sharma L.R., Kalia K.K.,Principles of Inorganic Chemistry, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co., (1993).
2. Lee J.D., Concise Inorganic Chemistry, UK, Black well science (2006).
3. Puri B.R..,Sharma L.R., Pathania M.S.,Principles of Physical Chemistry, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co., (1993).
4. Glasstone S., Lewis D.,Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
5. Morrison R.T. and Boyd R.N., Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (1976).
6. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (12th edition), New Delhi, Sultan Chand & Co., (1997).
7. Frank J. Welcher and Richard B. Hahn, Semi micro Qualitative Analysis, New Delhi, Affiliated East-west Press Pvt. Ltd. (1969).

Mapping of COs with GAs

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	3	2	3	2	2				**2**			2
CO2	3	2	2	2	2				**2**			2
CO3	3	2	1	2	2				**2**			2
CO4	3	2	1	2	2				**2**		2	2
CO5	3	2	1	1	2				2		3	2
Total	15	10	8	9	10				10		5	10
Scaled Value	3	2	2	2	2				2		1	2

1 - Low , 2 – Medium , 3 – High

Semester	**I**		
Subject Name	**PROGRAMMING IN C**		
Subject Code	**XBES108**		
L –T –P –C **3- 1 - 0- 4**	**C:P:A** **3.0:0.5:0.5**	**L –T –P –H** **4- 1- 0- 5**	

Course Outcome:		**Domain** (C or P or A)
CO1	Identify and explain the data types in C and basic arithmetic operators in C	Cognitive
CO2	Explain the different looping statement and choose appropriate C statement	Cognitive/Affective
CO3	Understand the concepts of functions and procedures	Cognitive
CO4	Recognizes the uses of arrays	Cognitive
CO5	Explain the function concept in C and choose function to write C Programme.	Cognitive/ Affective

COURSE CONTENT		
UNIT-I		
	C fundamentals Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical , Assignment and Conditional Operators - Library functions.	
UNIT –II		**9+3 hrs**
	Data input output functions - Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.	
UNIT-III		**9+3 hrs**
	Functions – Definition, prototypes, passing arguments, Recursion. Storage Classes – Automatic, External, Static, Register Variables.	
UNIT -IV		**9+3 hrs**
	Arrays - Defining and Processing - Passing arrays to functions - Multi-	

	dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Self-referential structures - Unions - Bit wise operations.	
UNIT V		**9+3 hrs**
	Pointers - Declarations - Passing pointers to Functions - Operation on Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers - Files: Creating, Processing, Opening and Closing a data file.	
		L=45 hrs P=0 hrs T=15 hrs Total = 60 hrs

TEXT BOOKS

1. Balagurusamy E., Programming in ANSI C, Third edition, Tata McGraw-Hill, 2006
2. Ashok N.Kamthane, Programming with ANSI and Turbo C, Pearson Education, 2006

REFERENCES

1. B.W. Kernighan and D.M.Ritchie, The C Programming Language, 2nd Edition, PHI, 1988.
2. H. Schildt, C: The Complete Reference, 4th Edition, TMH Edition, 2000.
3. Kanetkar Y., Let us C, BPB Pub., New Delhi, 1999.
4. Byron S Gottfried,"Programming with C", Schaum's Outline Series – Tata McGraw Hill Publications, New Delhi.

Mapping of CO's with GA's:

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	2			2								
CO2	2		1	2					**1**			**1**
CO3	5	2	1	1	2				**1**			**2**
CO4	5	3	1	1					**1**			**1**
CO5	1	1	1		3							**1**
Total	15	6	4	6	5				**3**			**5**
Scaled Value	3	1	1	1	1				**1**			**1**

1 - Low, 2 – Medium, 3 – High

Semester	**I**		
Subject Name	**PHYSICS PRACTICAL –I**		
Subject Code	**XBE109**		
L –T –P –C **0- 0 - 2- 2**	**C:P:A** **1.2:0.4 :0.4**	**L –T –P –H** **0 - 0-2-2**	
Course Outcome:		**Domain**(C or P or A)	
CO1	***Use*** laboratory techniques such as ***accuracy*** of measurements and ***determination*** of modulus of material.	Cognitive / Psychomotor	
CO2	***Explain*** *and* ***give*** the characteristics of semiconductor devices.	Cognitive Psychomotor	
CO3	Gain ***knowledge*** and ***identify*** the various laws of thermal, viscous and surface tension.	Cognitive Psychomotor	
CO4	***Manipulate*** the optical, electrical and heat properties with excellent ***application*** knowledge.	Cognitive/ Affective Psychomotor	
CO5	***Use*** *basic* ***knowledge*** *to find resistance material.*	Cognitive /Affective Psychomotor	
COURSE CONTENT			
Choose any **EIGHT** Experiments only		**7 + 8 +9 hrs**	
	1. Young's modulus - Non uniform bending – Scale and telescope 2. Young's modulus – Non uniform bending –Pin and microscope. 3. Koenings – Uniform Bending Method – Young's Modulus. 4. Screw Gauge and Vernier Caliper (Measurements) 5. Surface tension and interfacial surface tension by drop weight method. 6. Coefficient of viscosity – burette method. 7. Newton's law of cooling – Specific heat capacity of the liquid. 8. Convex lens –Focal length – Combination method(two types) 9. Transistor characteristics – common base. 10. Potentiometer –Voltmeter calibration(low range) 11. Meter bridge – determination of specific resistance. 12. Potentiometer – Thermister – Temperature Coefficient.		
	L= 0hrs T=0hrs P= 30hrs Total =30 hrs		

Semester	**I**	
Subject Name	**VOLUMETRIC ANALYSIS LAB – I**	
Subject Code	**XBEC110**	
L –T –P –C **0- 0 –2 - 2**	**C:P:A** **1.2:0.4:0.4**	**L - T –P –H** **0– 0- 2– 2**

Course Outcome		**Domain (C or P or A)**
CO1	***Recall*** the concept of acida and bases	Cognitive Psychomotor
CO2	***Estimate*** the amount of acids and bases using volumetric method.	Cognitive/Psychomotor /Affective
CO3	***Analyse*** the strength of acids and bases	Understand

COURSE CONTENT

Titrimetric Analysis	**9 hrs**
	1. Estimation of HCl by NaOH using a standard oxalic acid solution 2. Estimation of Na_2CO_3 by HCl using a standard Na_2CO_3 solution 3. Estimation of oxalic acid by $KMnO_4$ using a standard oxalic acid solution 4. Estimation of Iron (II) sulphate by $KMnO_4$ using a standard Mohr's salt solution. 5. Estimation of Ca (II) by $KMnO_4$ using a standard oxalic acid solution. 6. Estimation of $KMnO_4$ by thio using a standard $K_2Cr_2O_7$ solution.
	P= 30 hrs Total = 30 hrs

Semester	**I**	
Subject Name	**PROGRAMMING IN C LAB**	
Subject Code	**XBES110**	
L –T –P –C **0- 0 – 2– 2**	**C:P:A** **1.2:0.8:0**	**L –T –P –H** **0-0-2-2**

Course Outcome		**Domain** **C or P or A**
CO1	***Ability*** to write C programmes for simple problems and ***construct*** flow chart for real time problems.	Cognitive Affective
CO2	***Demonstrate the use of*** various C statements. ***Write*** C Programmes with arrays	Cognitive
CO3	***Use*** the concept of pointers to write programmes	Cognitive /Affective

COURSE CONTENT		
		30hrs
	1. Solution of a Quadratic Equation (all cases) 2. Sum of Series (sine, cosine, exponential). 3. Ascending and descending order of numbers using Arrays (Use it to find Largest and Smallest Numbers). 4. Sorting of names in Alphabetical order. 5. Matrix operations (Addition, Subtraction, Multiplication – using functions). 6. Finding factorials, generating Fibonacci Numbers using recursive functions. 7. String manipulations without using string functions (string length, string comparison, string copy, palindrome checking, counting words and lines in strings (Use function pointers)). 8. Creation and processing of Sequential files for payroll and Mark list preparation (use structures for Record Description). 9. Basic exercise in dynamic memory allocation & Pointer usage.	
		L = 0 hrs P = 30 hrs Total = 30 hrs

Mapping COs with Pos

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	**3**			2		2			2	2	1
CO2	**3**			1		1			1	3	
CO3	**3**			1		3			2	3	1
	6			4		6			5	6	2

1- Low 2- Medium 3 – High

Semester	**II**		
Subject Name	**TAMIL - II**		
Subject Code	**XBE201**		
L –T –P –C **2- 1 – 0–3**		**C:P:A** **2:0:1**	**L –T –P –H** **3 - 1– 0 - 4**
Course Outcome			**Domain** **C or P or A**
CO1	சிற்றிலக்கியங்களின் சிறப்புக்களைத் தெரிந்து கொள்ளல்.		அறிதல்/பட்டியலிடுதல், வரையறுத்தல், நினைவுகூர்தல்
CO2	இடைக்கால இலக்கியத்தினையும், சமய இலக்கியத்தினையும் நடைமுறையில் பயன்படுத்துதல்.		அறிதல்/அடையாளம் காணுதல், விவாதித்தல்,
CO3	உலா மற்றும் முக்கூடற்பள்ளு இலக்கியங்களின் வழி மக்கட்பண்புணர்தல்.		அறிதல்/அமைத்தல், மதிப்பிடுதல், பதிலளித்தல்
CO4	புதின இலக்கிய வரலாற்றில் தெளிவு பெறல்.		உணர்தல், உளப் பகுப்பாய்வு செய்தல்/போலச்செய்தல், உள்வாங்குதல்
CO5	தமிழிலக்கண ஒற்றுப்பிழைகளை நீக்கும் வழிவகைஅறிதல் மற்றும் கலைச் சொல்லாக்கம் குறித்து தெளிவு பெறல்.		உணர்தல், உளப் பகுப்பாய்வு செய்தல் / உற்றுநோக்கல், பயிற்சி எடுத்தல்
COURSE CONTENT			
UNIT I	**செய்யுள்**		**15 hrs**
	சிற்றிலக்கியங்கள் வரலாறு - வகைப்பாடுகள் - பரணி இலக்கியம் - இலக்கணம்- விளக்கங்கள் - கலிங்கத்துப்பரணி - வரையறை - போர் பாடியது பற்றிய பாடல்கள் - முதல் 11 பாடல்கள் மட்டும் - அப்பாடல்களின் விளக்கங்கள். குறவஞ்சி - இலக்கணம் - குற்றாலக்குறவஞ்சி - வரையறை -மலைவளச்சிறப்புக்கள் பற்றிய பாடல்கள் மற்றும் அவற்றின் விளக்கங்கள்.		
UNIT II	**செய்யுள்**		**15 hrs**
	பள்ளு இலக்கியம் பற்றிய குறிப்புகள் - முக்கூடற்பள்ளு -நூற்குறிப்பு -கருத்து வளம் - நாட்டு வளம் பற்றிய பாடல்கள் - அவற்றின் விளக்கங்கள். உலா இலக்கியம் - இலக்கணம் - பல்வேறு உலா இலக்கியங்கள் குறித்த தகவல்கள் - எழு வகைப் பருவப்பெண்டிரின் செயல்பாடுகள் - அவற்றின் விளக்கங்கள்.		

UNIT III	**இலக்கிய வரலாறு - 3**	**15 hrs**
	சங்க காலம் பற்றிய குறிப்புகள் - சான்றுகள் - இடைக்கால இலக்கியங்கள் - அவை பற்றிய குறிப்புகள். சமய இலக்கியங்கள் தோன்றிய காலம் - சமய வகைப்பாடுகள் - சமயம் வளர்த்த சான்றோர்கள் - பல்வேறு சமய இலக்கியங்கள் - அவற்றின் விளக்கங்கள்.	
UNIT IV	**இலக்கிய வரலாறு** - 4	**15 hrs**
	சிற்றிலக்கிய காலம் - சிற்றிலக்கிய கால இலக்கியங்கள் - அவற்றின் தோற்றம் மற்றும் வயர்ச்சி - அவற்றின் விளக்கங்கள். புதின இலக்கியங்கள் - தோற்றம் - வளர்ச்சி - வகைப்பாடுகள் - அவை பற்றிய விளக்கங்கள்.	
UNIT V	**இலக்கணம்**	**15hrs**
	வல்லெழுத்து மிகும் இடம் வல்லெழுத்து மிகா இடங்கள் பற்றிய விளக்கங்கள் - உதாரணங்கள். கலைச்சொல்லாக்கம் - விளக்கம் - அவை பற்றிய குறிப்புகள் - உதாரணங்கள்.	
		L = 45 hrs T = 30 hrs Total = 75 hrs

TEXT BOOKS

1. கலிங்கத்துப்பரணி
2. குற்றாலக்குறவஞ்சி
3. முக்கூடற்பள்ளு
4. தமிழிலக்கிய வரலாறு
5. தமிழிலக்கணம்

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	1		2	2		1	1	1	1	1
CO2	3	2	1		2	1	2	1	1	2	1	1
CO3	3	2	2		2	1	1	1	2	1	1	2
CO4	3	2	1		3	3	1	1	1	1	1	2
CO5	3	2	2		2	1	1	1	1	1	1	1
Total	15	10	7		11	8	5	5	6	6	5	7
Scaled Value	3	2	1		2	2	1	1	1	1	1	1

1 - Low , 2 – Medium , 3- High

Semester	**II**		
Subject Name	**ENGLISH - II**		
Subject Code	**XBE202**		
L –T –P –C **2- 1 – 0- 3**	**C:P:A** **3:0:0**	**L –T –P –H** **2- 2 – 0 – 4**	

Course Outcomes		**Domain C or P or A**
CO1	*Creates* new content of the writing and meaning	Cognitive
CO2	*Paraphrases* the speeches and interprets the principles of speakers	Cognitive
CO3	*Prepares* letters with modern style of writing	Cognitive
CO4	*Interprets* the meaning and understands the poems	Cognitive

COURSE CONTENT

UNIT-I	**Descriptive Grammar**	**12 hrs**
	Function of Auxiliaries: Modals; Question form	
UNIT –II	**Development of Language Competence**	
	To be based on the use of multiple texts which address issues of multiculturalism, gender, racism and texts which relate with current issues and contemporary trends. Short stories, comic strips, cartoons and animations (both print and non – print media) to be used, speeches of famous persons, diaries, travelogues can also be used.	
UNIT-III	**Writing for Functional Purpose**	
	Letter – writing (Professional / Personal) / Samples of Letters	
UNIT-IV	**Literature - Short Poems**	
	Walter de la Marc – the Listeners Tennyson – Charge of the Light Bridge Robert Frost – Stopping by Woods. Nissim Ezekiel – Night of the Scorpion	
UNIT-V	**Sessional Work:**	
	Students write letters to the editor of a newspaper about their opinion with respect to an issue which is currently being debated. Groups collect folklore, tales and legends of their region / language. They relate them in class focusing on fluency, logical arrangement of information and the use of body language in storytelling. Collection of short stories.	
	L=45 hrs T =15 hrs Total = 60 hrs	

Suggested Readings:

1. Chan . et. Al. (1997) *Professional Writing Skills*, San Anselma, CA.
2. Fiderer, A. (1994) *Teaching Writing: A Workshop Approach*. Scholastic.
3. Block, C. C. (1997). *Teaching the Language Arts*, 2nd Ed. Allyn and Bacon
4. Mckay. Et al. (1995). The Communication skills Book, 2nd Ed. New Harbinger publication.
5. Dr. Palani Arangasamy. Senior English Grammar July 2011. Siva Publications. Thanjavur.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	3	3	3		3	2	2	3	2	2				
CO2	3	3	2					3	2	2			2	2
CO3	3	3	2			3		3	3					2
CO4	3	3	2		3		2	3	2				2	
Total	12	12	9		6	5	4	12	9	4			4	4
Scaled Value	3	3	2		2	1	1	3	2	1			1	1

1 - Low, 2 – Medium, 3 – High

Semester	**II**	
Subject Name	**SOFTWARE PACKAGES - LAB**	
Subject Code	**XBE 204**	
L –T –P –C **0- 0 – 3- 3**	**C:P:A** **1.5:1:0.5**	**L –T –P –H** **0-0 - 3- 3**

Course Outcomes		**Domain** **C or P or A**
CO1	Apply the concept of windows and identifies the command	Cognitive Psychomotor
CO2	Apply the concept of MS-Word and identifies the command	Cognitive Psychomotor
CO3	Apply the concept of MS-Excel and identifies the command	Cognitive Psychomotor
CO4	Apply the concept of MS Powerpoint and identifies the command	Cognitive Psychomotor

COURSE CONTENT		
UNIT I	**WINDOWS**	
	1. Creating folder, cut, copy, paste, managing file and folder in windows. 2. Arrange icons, set display properties 3. Adding and removing software and hardware 4. Setting date and time, screen saver and appearance. 5. Using windows accessories. 6. Settings of all control panel items 7. Search file	
UNIT II	**MS-Excel**	
	1.Creating & Editing Worksheet, Fill Handle	

	2. Use Formulas and Functions 3. Preparing Charts
UNIT III	**MS-Powerpoint**
	1. Creating, Manipulating & Enhancing Slides, 2. Inserting Organizational Charts, Excel Charts 3. Using Word Art 4. Putting Animations and Sounds 5. Inserting Animated Pictures 6. Inserting Recorded Sound Effect
TEXT BOOKS	
[1] Peter Norton, ' Introduction to Computers', Sixth Edition, Tata McGraw Hill, New Delhi.	
REFERENCES	
[1]. Gary B Shelly, Steven M. Freund, Mesty E. Vermaat, ' Introduction to Computers', Eighth Edition, Shelly Cashman Series.	

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	2	3		1	3						2		2	
CO2	1	2									1		1	
CO3	1	3				2					2		2	
CO4	1	2	2	1			1	1			2		1	
Total	6	11	3	2	3	2	2	2			7		7	
Scaled Value	2	3	1	1	1	1	1	1			2		2	

1 - Low , 2 – Medium , 3 – High

Semester	**II**	
Subject Name	**EDUCATIONAL PSYCHOLOGY- UNDERSTANDING THE LEARNER**	
Subject Code	**XBE 205**	
L –T –P –C **3- 1 –0– 4**	**C:P:A** **3:0:1**	**L –T –P –H** **3-1-0- 4**

Course Outcome		**Domain** **C or P or A**
CO1	***Explain*** the concepts learning, remembering and forgetting transfer of learning and ***evaluate*** the theories of learning in various learning situations.	Cognitive
CO2	***Explain*** the theories of motivation and ***evaluate*** role of rewards and punishments, success and failure, cooperation and competition, level of aspiration and achievement motivation in an individual's development.	Cognitive
CO3	***Examine*** the various ways of providing education and methods of prevention and treatment of exceptional children	Cognitive
CO4	***Discuss*** the importance of mental health and hygiene and guidance and counselling.	Cognitive
CO5	***Evaluate*** *the personality and its* applications	Cognitive

COURSE CONTENT

UNIT I	**NATURE OF EDUCATIONAL PSYCHOLOGY**	**9 hrs**
	Meaning and nature of psychology, branches (pure and applied); Educational psychology- Meaning, scope, limitations and significance of educational psychology to the teacher; Methods of studying Educational Psychology- Introspection, Observation, Experimental and Case Study	
UNIT II	**HUMAN GROWTH AND DEVELOPMENT**	**9 hrs**
	Interaction of nature and nurture; Growth and Development: Principles and factors influencing growth and development, distinction among maturation, learning and development. Stages of development- Infancy to Adolescence, Needs and problems of adolescents. Dimensions of Development- physical and motor development, Social development – factors of social development – social maturity – Erikson's stages of social development – meaning , positive and negative emotions – emotional control and maturity – moral development – Kohlberg's stages of moral development – Aesthetic development – developmental tasks.	
UNIT III	**COGNITIVE DEVELOPMENT**	**9 hrs**
	Cognitive Process, Attention – Factors relating to attention, Kinds of attention – Inattention, distraction and division of attention – Span of Attention. Sensation and	

	Perception – Factors relating to Perception, Perceptual errors- Concept formation - Nature and Types of Concepts Piaget's stages of cognitive development – Bruner's theory - Concept maps –Imagery – Language and Thinking- Reasoning and Problem Solving –Implications to the teacher.	
UNIT IV	**INTELLIGENCE AND CREATIVITY**	**9 hrs**
	Nature of Intelligence - Distribution of Intelligence – Theories of Intelligence: Single, Two factor and Multifactor theories, Guilford's structure of the Intellect, Gardner's Multiple Intelligence Theory- Constancy of IQ – Assessment of Intelligence- Uses of Intelligence tests. The Process of Creativity - Creativity and Intelligence – Identification and promotion of Creativity- Thinking: Convergent and Divergent thinking.	
UNIT V	**PERSONALITY AND ASSESSMENT**	**9 hrs**
	Meaning and Definitions of Personality – Major Determinants of Personality – Theories of Personality - Type, Trait, Type and Trait, Psychoanalytic. Assessment of Personality: Projective and Non projective Techniques. Aptitude: concept, types and measurement. Attitude, self-concept, self-esteem and interest: concept and measurement, Integrated Personality.	
		L = 45 hrs T – 15 hrs Total = 60 hrs

REFERENCES

1. Alison, G. (2004). Exploring cognitive development: The Child as problem solver (1st Ed). U.S: Blackwell Pub.
2. Allport, G.W, (1960). Personality: A psychological Interpretation .New York: Henry Holt and Company.
3. Benjamin, W.B., (1985). Hand book of Human Intelligence:Theories,Measurement and Application John, London : Wiley of Sons Inc.
4. Berk,Laura E, (2003). Child Development (6th ed). New Delhi : Prentice Hall of India.
5. Cara, F. (1998). Practicals for psychology: A student workbook. London :Routledge.
6. Chauhan, S.S., (1983). Psychology of Adolescence. New Delhi: AlliedPublication.
7. Chobra, R. K. (2006). Elements of educational psychology. New Delhi: Arise Publishers.
8. Graham, R. (2008). Psychology: The key concepts. London: Routledge.
9. Hilgard, E.F., & Richard, E. C. (1971). Introduction to psychology (5th ed). New York: Harcourt Brace.
10. John, W. S. (2006).Educational psychology: Classroom update preparing for PRAXIS and the classroom. U.S: Mc Graw Hill Company.
11. Mangal, S. K. (1981). Psychological foundations of education. Ludhiana: Parkash Bros.
12. Michael, W. E. (2004). Psychology: An international perspective. USA: Psychology Press.

13. Morgon., &King. (1976). Introduction to psychology. Delhi: Tata McGraw Hill.
14. Murthy, S. K. (1970). Essential foundations of educational psychology. Ludhiana: Tandon Pub.
15. Samuel, W. (2007). The intellectual and moral development of the present age. U. Kessinger Pub Co.
16. Thomas, M. H.(2005). A student's guide to studying psychology- London: Psychology Press.

Mapping of COs with GAs

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1										3	3	
CO2			1	2	2	2	1	1	1	2	3	
CO3			1	1	3	1		2		3	1	
CO4	2		1	1		1	1		3		3	3
CO5	2		1	3		1	1					3
Total	4		4	7	5	5	3	3	4	8	10	6
Scaled Value	1		1	1	1	1	1	1	1	2	2	1

1- Low; 2- Medium; 3- High

Semester	**II**		
Subject Name	**ALGEBRA AND NUMERICAL ANALYSIS**		
Subject Code	**XBE206**		
L –T –P –C **4 - 1 – 0 - 5**		**C:P:A** **4:1:0**	**L –T –P –H** **5 – 1 –0- 6**

Course Outcome:		**Domain/Level** **C or P or A**
CO1	***Explain*** the concept of Theory of Equations and apply it for solving the problems Forming equations with the given roots and all types of Descarte's rule.	Cognitive
CO2	***Explain*** an algebraic or transcendental equation and ***Solve* using** a Newton Raphson Method, Bisection method, Gaussian Elimination method, Gauss Jacobi iterative methods. **Follows the a**ppropriate numerical methods for solving problems	Cognitive Affective
CO3	***Apply*** Finite differences methods to approximate and interpolate a polynomial function**.** ***Perform*** Finite differences methods to solve a polynomial function using Newton's forward & backward difference interpolation formulae, Lagrange's interpolating polynomial and Divided differences.	Cognitive Affective
CO4	***Explain*** the use of interpolation methods and numerical differentiation to ***Find*** the first, second order derivatives and integration problems using Trapezoidal rule & Simpson's 1/3 and 3/8 rules.	Cognitive/

COURSE CONTENT

UNIT I		**9+3 hrs**
	Theory of Equations: Transformations of equations - Diminishing, Increasing and multiplying the roots by a constant – Forming equations with the given roots - Reciprocal equations – all types of Descarte's rules of signs (statement only) – simple problems.	
UNIT II		**9 +3hrs**
	Algebraic & Transcendental equations – Bisection Method, Method of False Position, Newton Raphson Method, Iteration method. Solutions to Linear systems – Gaussian Elimination method – Gauss Jacobi & Gauss Seidel iterative methods. Statement of the Convergence conditions.	
UNIT III		**9+3 hrs**
	Finite differences – Forward, Backward & Central differences – Their symbolic relations – Newton's forward & backward difference interpolation formulae – Interpolation with unevenly spaced intervals - Lagrange's interpolating	

	polynomial – Divided differences and their properties – Newton's divided differences interpolation formula.	
UNIT IV		**9+3 hrs**
	Numerical differentiation, Numerical Integration using Trapezoidal rule & Simpson's 1/3 and 3/8 rules.	
UNIT V		**9+3 hrs**
	Numerical solution of ODE – Solution by Taylor Series Method , Picard's method, Euler's Method , Modified Euler's Method , Runge Kutta 2^{nd} and 4^{th} order methods, Adam's Predictor Corrector Method & Milne's Predictor Corrector Methods.	
	L=45 hrs T= 15 hrs Total = 60 hrs	

TEXT BOOKS

[1] K.Manickavasagam Pillai & others, Algebra volume I, S. V. Publications – 1985 revised Edition.

[2] S.S.Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt.Limited, 1995.

REFERENCES

[1] A. Singaravelu, Numerical Methods, Meenachi Agency, June 2000.

[2]. P.Kandasamy, K.Thilagavathy, K.Gunavathy, Numerical Methods, S.Chand & Company Ltd, New Delhi.

[3]. Schaum's Outlines, Numerical Analysis 2^{nd} edition, Tata Mcgraw- Hill Company Limited, New Delhi

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Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO2**
CO1	2	1	1	1	1	1		1		1		2		2
CO2	1	1	1	2	2	2	2	1		1		1		2
CO3	1	2	1	2	1		1	1		1		1		1
CO4	2	2	4	2	2			1		1		2		1
Total	6	6	7	7	6	3	3	4		4		6		**6**
Scaled Value	2	2	2	2	2	1	1	1		1		2		**2**

1 - Low, 2 – Medium, 3 – High

Semester	**II**	
Subject Name	**GENERAL CHEMISTRY-II**	
Subject Code	**XBEC208**	

L –T –P –C	**C:P:A**	**L –T –P –H**
3- 1 – 0– 4	**3:1:0**	**4- 1– 0–5**

Course Outcome		**Domain C or P or A**
CO1	***Recall*** and ***Explain*** the basic concepts of ionic bonding; ***Display*** the shapes of simple inorganic molecules using VSEPR theory	Cognitive Psychomotor
CO2	***Summarize and Report*** extraction, properties and uses of I A and IIA group s-block elements.	Cognitive Affective
CO3	***Discuss*** the preparation, properties of alkenes, alkynes and dienes and ***Apply*** the mechanism of elimination, electrophilic and free radical addition reactions; ***Classify*** the types of polymerization reactions and polymers uses.	Cognitive Affective
CO4	***Describe*** the preparation and properties of benzene and benznenoid compounds; ***Analyze*** the mechanism of aromatic eletrophilic substitution reactions.	Cognitive Psychomotor
CO5	***Classify*** the types of Molecular velocity of gases and its properties; Derive Vander walls equation of real gases.	Cognitive

COURSE CONTENT

UNIT I	**Chemical Bonding**	**9+3hrs**
	Ionic bond – Lattice Energy – Born – Haber Cycle – Pauling and Muliken's scales of electro negativity – Polarizing power and Polarisability – partial ionic character from electro negativity – Transitions from ionic to covalent character and vice versa – Fajan's rule. **VSEPR Theory** – Shapes of simple inorganic molecules ($BeCl_2$, $SiCl_4$, PCl_5, SF_6,IF_7, NH_3, XeF_6, BF_3,H_2O) - VB Theory – Principles of hybridization – $BeCl_2$ – MO Theory – Bonding and antibonding orbitals – Application of MO Theory to H_2,He_2,N_2,O_2,HF and CO – Comparison of VB and MO theories.	
UNIT II	**CHEMISTRY OF s-BLOCK ELEMENTS**	**9+3 hrs**
	Position of Hydrogen in the Periodic Table, atomic hydrogen, nascent hydrogen, occluded hydrogen and uses of hydrogen. General characteristics of s-block elements – General characteristics of Group IA – diagonal relationship between Li and Mg – Extraction of Lithium, Sodium and Potassium – Physical and Chemical properties – Uses – Preparation of NaOH, Na_2CO_3, $NaHCO_3$ (Laboratory and Industrial methods) – Properties – Uses.	

	General characteristics of Elements of Group 11A – diagonal relationship between Be and Al – Extraction of Beryllium, Magnesium and Calcium – Physical and Chemical properties – Uses – Preparation and uses of Mg: $MgCO_3$, $MgSO_4$,$MgCl_2$, Mg (NH_4) PO_4 $6H_2O$ – Cement manufacture – Types – Chemistry of setting of cement.	
UNIT III	**CHEMISTRY OFALKENES, ALKYNES AND DIENES 9+3hrs**	
	Nomenclature – Geometrical Isomerism – Petroleum source of alkenes and aromatics – General methods of preparation of alkenes – Chemical properties – Uses – Elimination mechanisms (E_1,E_2,E_1cB**)** **–** Electrophilic, Free radical additions – Ziegler – Natta Catalytic polymerization of ethylene – polymers of alkene derivatives. General methods of preparation of alkynes – Physical properties – Chemical properties – Uses – Types of alkadienes – General methods of preparation of Dienes – Physical properties – Chemical properties – Uses – Mechanisms of electrophilic and Free radical addition reactions – Polymers – Rubber as a natural polymer – Types of polymerization reactions – Mechanisms of lonic and Free radical polymerization reactions – Chemistry of Vulcanization of rubber – Chemistry of manufacture of Film sheets, Rayon and Polycyclic fibres – Uses of Polymers.	
UNIT IV	**CHEMISTRY OF BENZENE AND OTHER BENZENOID COMPOUNDS 9+3hrs**	
	General methods of preparation of benzene – Chemical properties – Uses – Electrophillic substitution mechanism – Orientation and reactivity in substituted benzenes. Types of Polynuclear Aromatic compounds – Nomenclature – Naphthalene from coal tar and petroleum – Laboratory preparation and Structure of Naphthalene – Aromatic character – Physical properties – Chemical properties – Uses – Mechanism of Aromatic electrophilic substitution – Theory of orientation and reactivity – Anthracene, Phenanthrene from tar and petroleum – Laboratory preparation- Molecular Orbital structures – Aromatic Characters – Physical Properties - Chemical properties – Uses – Preparation of biphenyls – Physical and Chemical properties – Uses.	
UNIT V	**GASEOUS STATE 9+3 hrs**	
	Maxwell's distribution of Molecular velocities (Derivation not required). Types of Molecular velocities – Mean, Most probable and root mean square velocities – Collision diameter, Mean free path and collision number – Transport properties – Thermal conductivity, Viscosity and Diffusion – Law of equipartition of energies –	

	Degree of freedom. Molecular basis of Heat capacity – Real gases – vander. Waals equation of states – derivation – significance of critical constants – Virial equations of state – Law of corresponding states – Compressibility factor.
	L = 30 hrs IS = 15 hrs Total = 45 hrs

REFERENCES

1. Puri B.R..,Sharma L.R., Kalia K.K.,Principles of Inorganic Chemistry, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co., (1993).
2. Lee J.D.,Concise Inorganic Chemistry, UK, Black well science (2006).
3. Puri B.R..,Sharma L.R., Pathania M.S.,Principles of Physical Chemistry, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co., (1993).
4. Glasstone S., Lewis D., Elements of Physical Chemistry, London, Mac Millan & Co. Ltd.
5. Morrison R.T. and Boyd R.N., Organic Chemistry (6th edition), New York, Allyn & Bacon Ltd., (1976).
6. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (12th edition), New Delhi, Sultan Chand & Co., (1997).

Mapping of Cos with Gas

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	**3**		**2**	**3**	**3**					**1**	**3**	
CO2	3		3	3						1	3	
CO3	3		3	3	2	1				1	3	
CO4	3		2	2	1	1				1	3	
CO5	3		2	3		1				1	3	
Total	15	0	12	14	6	3	0	0	0	5	15	0
Scaled Value	3		2	3	1	1				1	3	0

1-Low , 2 – Medium ,3-High

Semester	**II**	
Subject Name	**DATA STRUCTURES AND ALGORITHMS**	
Subject Code	**XBES208**	
L –T –P –C **3- 1 –0– 4**	**C:P:A** **2.8:0.8:0.4**	**L –T –P –H** **4 – 1 –0 - 5**

Course Outcome		**Domain/Level** **C or P or A**
CO1	***Recognize*** the concept of different data structure and ***relate*** them. Able to ***discuss*** about the various applications of stack and queues	Cognitive , Affective
CO2	***Summarize*** the non linear data structures and ***explain*** the various operations with them. Able to ***present*** different traversal concepts of tree and graph.	Cognitive , Affective
CO3	***explain*** the various sorting methods and ***illustrate*** with examples able to ***solve*** simple problems in sorting concepts	Cognitive
CO4	***Rewrite*** the concepts of Greedy algorithm and able to give an ***example*** Able to ***follow*** the greedy algorithm applications	Cognitive , Psychomotor
CO5	Able to ***explain*** the back tracking method. ***Acknowledge*** the concept of backtracking algorithm with 8-queens problem and graph coloring	Cognitive , Affective

UNIT I		9 hrs
	Arrays and sequential representations – ordered lists – Stacks and Queues – Evaluation of Expressions – Multiple Stacks and Queues – Singly Linked List – Linked Stacks and queues – Polynomial addition.	
UNIT II		
	Trees – Binary tree representations – Tree Traversal – Threaded Binary Trees – Binary Tree Representation of Trees – Graphs and Representations – Traversals, Connected Components and Spanning Trees – Shortest Paths and Transitive closure – Activity Networks – Topological Sort and Critical Paths.	
UNIT III		
	Algorithms – Pseudo code conventions - Sorting – Heap Sort – Merge Sort – Quick Sort – Binary Search – Finding the Maximum and Minimum.	
UNIT IV		
	Greedy Method : The general method – optimal storage on tapes – Knapsack Problem – Job Sequencing with dead lines – Optimal Merge Patterns.	
UNIT V		
	Back tracking: The general method – The 8-Queens Problem – Sum of Subsets – Graph Coloring.	
		L = 45 hrs Total = 45 hrs

Text Books:
1. Fundamentals of Data Structure – Ellis Horowiz, Sartaj Sahni and Sanguthevar. 2. Fundamentals of Computer Algorithms – Ellis Horowiz, Sartaj Sahni and Sanguthevar Rajasekaran, Galgotia Publications, 2001.
REFERENCES
1.Data Structures – LIPSCHUTA, Tata Mcgraw Hill, Schaum's Outline Series.

Mapping of COs with GAs

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	2											
CO2							1	3			1	
CO3									3	1	3	1
CO4		1	2	1	3							3
CO5				3						3		1
	2	1	2	4	3		1	3	3	4	4	5

1-Low , 2- Medium ,3-High

Semester	**II**	
Subject Name	**VOLUMETRIC ANALYSIS LAB – II**	
Subject Code	**XBEC 210**	
L –T –P –C **0- 0 – 2- 2**	**C:P:A** **1.2:0.4:0.4**	**L –T –P –H** **0- 0 –2- 2**

Course Outcome		**Domain/Level C or P or A**
CO1	***Identify*** the various Metals in the solution	Cognitive Psychomotor
CO2	***Explain and understand*** the law and principle of volumetric analysis	Cognitive Psychomotor
CO3	***Describe*** the various types of volumetric titration and Apply in their applications	Cognitive Affective

COURSE CONTENT		
I.		
	1. Estimation of Fe (III) by using $K_2Cr_2O_7$ using a standard Mohr's salt solution using internal and external indicators.	

	2. Estimation of copper (II) sulphate by $K_2Cr_2O_7$ solution 3. Estimation of Mg (II) by EDTA solution 4. 10.Estimation of Ca (II) by EDTA solution 5. 11.Estimation of As_2O_3 using I_2 solution and standard As_2O_3 solution 6. 12.Estimation of chloride by Argentimetry.
II. Applied Experiments	
	1. Estimation of Total Hardness of water 2. Estimation of Bleaching Powder 3. Estimation of saponification value of an oil 4. Estimation of copper in brass
	L - 45 hrs P - 30hrs Total - 75 hrs

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	2	1	1			1				1			1	
CO2	2	1					1	1		2			1	
CO3		1	1				1	1		2		2		
	1	1	1			0.3	.67	.67		2		.67	.67	

1-Low , 2- Medium ,3-High

Semester	**II**	
Subject Name	**DATA STRUCTURES USING C LAB**	
Subject Code	**XBES210**	
L –T –P –C **0- 0 – 2- 2**	**C:P:A** **1.2:0.8:0**	**L –T –P –H** **0 - 0 –2- 2**

Course Outcome:		**Domain/Level** **C or P or A**
CO1	***Apply*** C programmes for basic data structures like arrays and ordered list and ***demonstrate*** programme for stack and queue operations	**Cognitive Psychomotor**
CO2	***Implementing*** C programming skill to linked lists and ***show*** some examples	**Cognitive Psychomotor**
CO3	***Explain*** the search and sorting techniques.	**Cognitive**

COURSE CONTENT

	15 hrs
	1. Implement PUSH, POP operations of stack using Arrays. 2. Implement add, delete operations of a queue using Arrays. 3. Creation, insertion, and deletion in Singly linked list. 4. Implement the addition of two polynomials 5. Binary Search tree traversals (in-order, pre-order, and post-order) using Recursion. 6. Sorting the items with Quick sort method. 7. Sorting the items with heap sort method 8. Find the maximum and minimum using binary search method

Mapping of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO2**
CO1	3	3	2				1		2		1			1
CO2	3	3	2		2		1							1
CO3	3	3	2								1			2
Total	9	9	6		2		2		2		2			4
Scaled Value	3	3	2		1		1		1		1			1

1-Low , 2- Medium ,3-High

Course Code	XBE301	L	T	P	C
Course Name	TAMIL - III	2	1	0	3
C:P:A	2:0:0	L	T	P	H
		3	1	0	4

Course Outcome		Domain	Level
CO1	இரட்டைக் காப்பியங்கள் குறித்து புரிந்து கொள்ளல்.	அறிதல்	பட்டியலிடுதல், வரையறுத்தல், நினைவுகூர்தல்
CO2	காப்பியங்கள்(ஐம்பெரும், ஐஞ்சிறு)குறித்து தெளிவு பெறல்.	அறிதல்	அடையாளம் காணுதல், விவாதித்தல்,
CO3	நாடக இலக்கியத்தின் நயம் மற்றும் நடிக்கும் ஆற்றல் போன்றவற்றை வளர்த்தல்.	உணர்தல்	அமைத்தல், மதிப்பிடுதல், பதிலளித்தல்
CO4	ஒலி வேறுபாடுகள் பற்றி புரிந்து கொள்ளல்.	உளப்பகுப்பு செய்தல்	போலச்செய்தல், உள்வாங்குதல்
CO5	மொழிபெயர்ப்பின் அவசியம் குறித்தும், கருத்துச்சிதையாமல் சுருக்கி எழுதும் திறனையும் உணர்ந்து கொள்ளல்.	உணர்தல், உளப்பகுப்பாய்வு செய்தல்	உற்றுநோக்கல், பயிற்சி எடுத்தல்

அலகு - 1	Content	நேரம்
I	செய்யுள்	10

சிலப்பதிகாரம் - நூற்குறிப்பு - ஆசிரியர் குறிப்பு - மதுரைக்காண்டம் விளக்கம் - வழக்குரை காதை - கதைச்சுருக்கம் - பாடல் விளக்கம்.

மணிமேகலை - நூற்குறிப்பு - ஆசிரியர் குறிப்பு - ஆபுத்திரன் திறம் உரைத்த காதை - கதைச்சுருக்கம் - பாடல் விளக்கம்.

அலகு - 2	செய்யுள்	15

காப்பியங்கள் பற்றிய குறிப்புகள் - ஐம்பெருங்காப்பியங்கள் - விளக்கங்கள் - ஆசிரியர் குறிப்புகள் - அவை தோன்றிய காலம் பற்றிய செய்திகள்.

ஐஞ்சிறுகாப்பியங்கள் - தோன்றிய காலம் - அக்காப்பியங்கள் பற்றிய விளக்கங்கள் - காப்பிய ஆசிரியர்கள் பற்றிய குறிப்புகள்.

அலகு - 3	இலக்கிய வரலாறு - 5	10

முத்தமிழ் - விளக்கம் - தமிழ் இலக்கியத்தில் நாடக இலக்கியத்தின் பங்கு - நாடக இலக்கியத்தின் தோற்றம், வளர்ச்சி - வகைப்பாடுகள் - தற்காலத்தில் நாடகம் - தற்கால நாடக ஆசிரியர்கள் பற்றிய குறிப்புகள்.

அலகு - 4	இலக்கிய வரலாறு - 6	10

பல்வேறு நாடகம் மற்றும் நாடக ஆசிரியர்கள் பற்றிய குறிப்புகள் - அறிஞர்அண்ணா - வாழ்க்கை வரலாறு - அவரது படைப்புக்கள் - நீதிதேவன் மயக்கம் நாடகத்தின் கதைச்சுருக்கம் - பாத்திரப்படைப்பு.

அலகு - 5	மொழிப்பயிற்சி			15
ஒலி வேறுபாடு அறிதல் - மொழிபெயர்ப்பு விளக்கம் - அவற்றின் - வகைப்பாடுகள் - மொழிபெயர்ப்பு நடைபெறுதல். கருத்துச் சிதையாமல் சுருக்கி எழுதும் முறை.				
		விரிவுரை முறை	பயிற்சி வகுப்பு முறை	மொத்தம்
		30	30	60

பாடப்புத்தகங்கள்

1. சிலப்பதிகாரம்
2. மணிமேகலை
3. நீதிதேவன் மயக்கம் - நாடகம் - அறிஞர் அண்ணா

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	1					1			1					
CO2	2	1				1		1			1		3	1
CO3	1				1		1				1			
CO4	3	1		3			1						1	
CO5	3	3											1	
	10	5		3	1	2	2	1	1		2		5	1

1-Low , 2- Medium ,3-High

Semester	**III**		
Subject Name	**ENGLISH– III**		
Subject Code	**XBE302**		
L –T –P –C **2- 1 – 0– 3**		**C:P:A** **2:1:0**	**L –T –P –H** **3 - 0– 0 - 4**

Course Outcome		**Domain/Level** **C or P or A**
CO1	*Creates* new content of the writing and meaning	Cognitive
CO2	*Reproduces* the sounds and imitates the pronunciations	Psychomotor
CO3	*Interprets* the meaning and understands the meaning	Cognitive
CO4	*Analyze* the time and content of writing and writer	Cognitive

COURSE CONTENT		
Unit I:	**Language Work.**	
	Clauses: Noun Clause; Reported Speech and Change of Voice	
Unit II:	**Comprehensive Skills**	
	Extracts from literary, scientific and educational journals.	
Unit III:	**Advanced Writing Skills**	
	Writing advertisement copy; Writing a project proposal and Writing Resume, sending an application.	
Unit IV:	**Skills of Communication (Tutorials)**	
	Presenting oneself at an interview, participating in group discussion/ Moral Discussion/ Mock Interview.	
	Sessional Work:	
	Students read sample advertisements form magazines. Discuss in groups and then prepare their own advertisement. Students discuss and prepare interview schedules. Mock interviews are conducted. Editing literary pieces in groups and then re- editing what has been edited by other groups after discussion.	
		L = 45 hrs Total = 45 hrs

TEXT BOOKS

1. Calkins, L (1994). The Arts of Teaching Writing. Heinemann
2. Chan. et al. (1997) Professional Writing Skills, San Anselma, CA
3. Fiderer, A. (1994) *Teaching Writing: A Workshop Approach.* Scholastic.
4. Block, C.C. (1997). Teaching the Language Arts, 2nd Ed. Allyn and Bacon.
5. *Mckay. Et al. (1995). The Communication Skills Book*, 2nd Ed. New Harbinger Publications.

Mapping of COs with GAs

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO 1	2					1	1					
CO 2	2	3										
CO 3	2					1	1					
CO 4	3	1				1			1			
	2.2	1				.75	.5		.25			

1-Low , 2- Medium ,3-High

Semester	**III**	
Subject Name	**THEATRE, ART AND HERITAGE CRAFT TRADITIONS**	
Subject Code	**XBE303**	
L –T –P –C **0- 0 – 2– 2**	**C:P:A** **2:0:0**	**L –T –P –H** **0- 0– 2 - 2**
Course Outcome		**Domain/Level** **C or P or A**
CO1	Calibrates the proficiency in coordination performance	Psychomotor
CO2	Explaining the meaning of concepts of aesthetics	Cognitive
CO3	Reproduces the skills of visual arts and crafts	Psychomotor

COURSE CONTENT		
UNIT I		
	Concept of theatre: Eastern and Western, Natyashasthra, Doctrine of Rasa, Tragedy, Catharsis, Folk and Classical art forms	
UNIT II		
	Forms of Theatre: Drama, Stage Plays. Skits, Mime, Street Plays Introduction to the History of Word Art, Magical Art, Amusement Art	
UNIT III		**9 hrs**
	Visual arts: drawing, painting, sketch, college marking, glass, word and Card	

	board work Heritage of art, meaning of craft, paper craft, simple craft with things found around the hours, make flowers, cards, gifts and toys.	
	Sessional Work:	**9 hrs**
	a. Expression, Body Language, Modulation and Creativity b. Act for any situation c. Preparation of script d. Organization of Competitions at class level and exhibition in the Institute e. Preparation of teaching models, materials.	
		L = 15 hrs SS = 30 hrs Total = 45 hrs

Mapping of COs with GAs

	GA1	GA2	GA3	GA4	GA5	GA6	GA7	GA8	GA9	GA10	GA11	GA12
CO1	2						2			1		
CO2							2	1	1			
CO3	2						2	1	1	1		
	1.33						2	.67	.67	.67		

1-Low , 2- Medium ,3-High

Semester	**III**		
Subject Name	**PROGRAMMING IN C (For MPC group students)**		
Subject Code	**XBEC304**		
L –T –P –C **3- 0 –0- 3**	**C:P:A** **3:0:0**	**L –T –P –H** **3 -0- 0 –0- 3**	

Course Outcome:		**Domain C or P or A**
CO1	Outline the basics of C Language	Cognitive
CO2	Identify the basic operators / statements in C	Cognitive
CO3	Describe the concepts of arrays and functions	Cognitive
CO4	Demonstrate the statements with simple C programme	Cognitive

COURSE CONTENT		
UNIT-I		**1hrs**
	Fundamentals Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions.	
UNIT –II		**15hrs**
	Data input output functions - Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue, go to statements	
UNIT-III		**1hrs**
	Arrays - Defining and Processing - Passing arrays to functions - Multi-dimension arrays - Arrays and String. Pointers - Declarations - Passing pointers to Functions - Operation on Pointers - Structures (Concepts only)	
Practical Programmes in C		
	1. Write a program to convert temperature entered into centigrade to Fahrenheit. 2. Write a program to find maximum of three numbers. 3. Write a program to find student grade using IF-ELSE ladder 4. Write a program for print Fibonacci series up to N number. 5. Write a program to find sum of first 50 odd numbers and even numbers.	

	6. Write a program to find reverse of a given number. 7. Write a program to find factorial of a number. 8. Write a program to find all prime number between two given numbers 9. Write a program to find addition, subtraction, multiplication of matrix. 10. Write a program to print terms of each of the following series i. Sin(x) ii. Cos(x)
	L-45hrs P-00hrs Total – 45hrs
TEXT BOOKS	
E. Balaguruswamy, **" Programming In C ",** TMH Publications. Gottfried, Schaums Outline Series, **" Programming With C "**, TMH Publications.	

Mapping of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO2**
CO1	2	1	1	1			1		1				1	1
CO2		1		1			1		1	1	1	1		1
CO3	1	1	2	1	1	1		1	1	1		1		1
CO4	1	2		1		1		1				1		1
	1	1.25	2	1	.25	.5	.5	.5	.75	.5	.25	.75	.25	1

1 - Low, 2 – Medium, 3 – High

Semester	**III**	
Subject Name	**VISUAL PROGRAMMING (For CsMP Students)**	
Subject Code	**XBES304**	
L –T –P –C **3- 0– 0- 3**	**C:P:A** **3:0:0**	**L –T –P –H** **3- 0 –0- 3**

Course Outcome		**Domain/Level** **C or P or A**
CO1	Recognise the basics of window programming	Cognitive
CO2	Reproduce the window controls	Cognitive
CO3	Identify the VB Commmands	Cognitive
CO4	Demonstrate the VB Basic tools with simple VB applications	Cognitive

COURSE CONTENT

UNIT I	**WINDOWS PROGRAMMING**	**9hrs**
	Overview – Data Types – Resources – Windows Messages – Basic Drawings: GDI – Device Context –Dots and Lines - Window Controls: Button Class – Color – Scroll bar – Edit Class – List box Class – Resources: Menu – Icon – Cursor – Dialog box.	
UNIT II	**VB PROGRAMMING FUNDAMENTALS**	
	User Interface: Forms – Intrinsic controls – Properties, Methods and Events – Programming Fundamentals: Variables – Data Types - Constants –Arrays - Built-in Functions – Control Structures: Decision – Looping – Select Case.	
UNIT III	**ADVANCED CONTROLS**	
	Menu bar - Tool bar - Message box - Input box - Dialog box - MDI – Tree view – List view – Tab strib - Basic File Handling : File handling Functions – File System Controls : File List Box – Directory List Box – Drive List Box – File System Objects.	
UNIT IV	**VB AND DATABASES**	**9hrs**
	Data Control – DAO – Manipulation of records – Database management with ODBC – RDO –ADO – ADO Control – Data Grid Control – Database Applications - Classes – User defined DLLs	
UNIT V	**Practical Work**	
	1. Program using static and dynamic controls Test box, button, combo box, list box, radio button, check box, progress control, list control, tree control, image list, tab control. **2. Program with tool bars and status bars** Tool bar and status bar, **3. Program using SDI and MDI** **4. Program to interface with database** **5. Program using extrinsic controls and reports** MS Flex grid, Crystal Report **6. Program using application wizard :**	

	SDI, MDI, Drawing Inside the View Window, Device Context
	P-45 hrs Total -45 hrs

TEXT BOOKS

Charles Petzold, "Programming Windows", 5th Edition, Microsoft Press, 1999.(Unit I)

2. Gary Carnell, "Visual Basic 6 from Ground Up", Tata McGraw-Hill, 1999. (Unit II, Unit III and Unit IV)

REFERENCES

. Pappar and Murray, "Visual C++, The Complete Reference", TMH, 2000

2. Francesco Balena, "Microsoft Visual Basic 6.0", Microsoft Corporation, 1999

3. David I. Schneider, "Introduction to Programming with Visual Basic 6.0", 4th Edition, Prentice Hall, 2003

4. Avanija J, "Visual Programming", 3rd Edition, Anuradha Publications,2009

Mapping of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO2**
CO1	2	1	1	1	1		1		1		1	1	1	1
CO2		1		1	1		1		1	1	1	1	1	1
CO3	1	1	2	1	1	1		1	1	1	1	1	1	1
CO4	1	2	1	1	1	1		1			1	1	1	1
	1	1.25	1	1	1	.5	.5	.5	.75	.5	1	1	1	1

1 - Low, 2 – Medium, 3 – High

Semester	**III**		
Subject Name	**ANALYTICAL GEOMETRY (3D) AND INTEGRAL CALCULUS**		
Subject Code	**XBE306**		
L –T –P –C **4- 1– 0 – 5**	**C:P:A** **5:0:0**	**L –T –P –H** **5- 1– 0 - 6**	

Course Outcome		**Domain/Level** **C or P or A**
CO1	Solve algebraic and transcendental equations and to find eigen values of a matrix by power method	Cognitive
CO2	Interpret and approximate the data using interpolation methods	Cognitive
CO3	Solve the numerical differentiation and integration and to apply the Trapezoidal and Simpson's rules.	Cognitive
CO4	Solve the first order and second order differential equations using single step and multistep methods.	Cognitive
CO5	Apply finite difference methods to solve two-point linear boundary value problems and to solve one dimensional heat-flow equation and wave equation.	Cognitive

COURSE CONTENT

UNIT I		**12 hrs**
	Standard equation of a plane - intercept form - normal form - plane passing through given points – angle between planes - plane through the line of intersection of two planes - Equation of the straight line - Shortest distance between two skew lines - Equation of the line of shortest distance.	
UNIT II		**12 hrs**
	Sphere - Standard equation - Length of a tangent from any point - Sphere passing through a given circle - Intersection of two spheres - Tangent plane.	
UNIT III		**12 hrs**
	Integration by parts - definite integrals & reduction formula.	
UNIT IV		**12 hrs**
	Double integrals - changing the order of Integration - Triple Integrals.	
UNIT V		
	Beta & Gamma functions and the relation between them - Integration using Beta & Gamma functions.	

L = 30 hrs T = 30 hrs Total = 60hrs

TEXT BOOKS
1. T.K.Manickavasagam Pillai & others, Analytical Geometry, S.V Publications -1985 Revised Edition. 2. T.K.Manickavasagam Pillai & others, Integral Calculus, SV Publications.
REFERENCES
1. Duraipandian and Chatterjee, Analytical Geometry, Narosa Publishing House. 2. Shanti Narayan, Differential & Integral Calculus, S.Chand & Company Ltd, New Delhi. 15th Edition, 2004. 3. Schaum's Outlines, Analytic Geometry, Tata Mcgraw- Hill Company Limited, New Delhi

Mapping of COs with GAs

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PSO1
CO1	3			2	2		1			1	1
CO2	3			2	1		1			1	2
CO3	3			2	2		1			1	1
CO4	3			2	2		1			1	1
CO5	3			2	1		1			1	2
Total Cos	15			10	8		5			5	7
Scaled	3			2	2		1			1	2

1 - Low, 2 – Medium, 3 – High

Semester	**III**	
Subject Name	**HEAT AND THERMODYNAMICS**	
Subject Code	**XBE307**	
L –T –P –C **3 - 1 – 0 - 4**	**C:P:A** **4:0:0**	**L –T –P –H** **4 – 1 -0- 5**

Course Outcome:		**Domain C or P or A**
CO1	***Recall*** Cp and Cv and basic concepts of specific heat and ***Explain*** various theories	Cognitive
CO2	***Explain*** the nature of heat and heat transmission and ***Distinguish*** mono- dia- triatomic gases	Cognitive
CO3	***List*** the laws of thermodynamics and ***Explain*** latent heat and entropy	Cognitive
CO4	***Define*** Coefficient of Thermal Conductivity, ***Determine*** thermal conductivity of bad conductor and ***Discuss*** the various laws for heat flow	Cognitive
CO5	***Analyze*** statistical equilibrium, explain various distribution laws and ***Compare*** the three statistics	Cognitive

COURSE CONTENT

UNIT I	**SPECIFIC HEAT**	**12hrs**
	Specific Heat – Specific Heat of a Liquid by Joule's Electrical Method, Specific Heat of a Gas – Mayer's Relation - Specific Heat of a gas at Cv – Joly's Steam Calorimeter – Cp Regnault's Method - Dulong and Petit's Law – Variation of Specific Heat and Atomic Heat with Temperature – Debye's theory – Einstein's Quantum Theory.	
UNIT II	**NATURE OF HEAT**	**12hrs**
	Degrees of freedom and Maxwell's Law of Equipartition of Energy – Atomicity of Gase – Monatomic – Diatomic – Triatomic Gases – Molecular velocity distribution Maxwell' Derivation – Mean Free Path – Transport Phenomena – Viscosity of Gases – Therma Conductivity of Gases.	
UNIT III	**THERMODYNAMICS**	**12 hrs**
	Carnot's Theorem – Thermodynamic Scale of Temperature –Clapeyron Latent Heat Equation – Entropy – Change of Entropy in a Reversible and Irreversible Process – 3rd Law of Thermodynamics – T-S Diagram – Entropy of a Perfect Gas – Zero Point Energy And Negative Temperature – Maxwell's Thermodynamical Relations Derivation.	
UNIT IV	**TRANSMISSION OF HEAT**	**12hrs**
	Coefficient of Thermal Conductivity – Lee's Disc method for bad conductors. Radial and cylindrical flow of heat – Wiedmann – Franz law – Stefan's law – Mathematical derivation –Newton's law of cooling from Stefan's law –Experimental verification – Stefan's constant – Experimental determination.	
UNIT V	**STATISTICAL THERMODYNAMICS**	**12hrs**
	Statistical equilibrium –M.B. distribution law –M.B. distribution law in terms of temperature – application to ideal gas – Quantum Statistics – Phase space – Fermi-Dirac Distribution Law – Electron gas – Fermi energy – Bose – Einstein Distribution	

	Law – Photon gas – Comparison of three statistics.
	L- 30 hrs T-30hrs Total – 60hrs

TEXT BOOKS

1. Heat and Thermodynamics by Brijlal and Subramanium, S.Chand Publishers & Co, New Delhi 2004.
2. Heat and Thermodynamics by J.B.Rajam, S.Chand Publishers
3. Heat and Thermodynamics, S. D. S. Mathur, Chand & Co, New Delhi 2004.

REFERENCES

1. Thermodynamics and Statistical physics –BriJ Lal, N.Subrahmanyam and P.S.Hemne
2. (multi colour edn.7)
3. Heat and Thermodynamics-Mark W Zemansk,Richard H Dittman (seventh Edn.)
4. Thermodynamics, Kinetic Theory, Statistical –Thermodynamics –Francis W.Sears & Gerhard L Salinger.
5. Concepts of Modern physics-Arthur Beiser (fifth Edn.)

Mapping of CO's with PO's:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	3	2	0	0	0	1	1	1
CO2	3	2	0	0	0	1	0	1
CO3	3	2	0	0	0	1	1	1
CO4	3	2	0	0	0	1	0	1
CO5	3	2	0	0	0	1	1	1
Total	15	10	0	0	0	5	3	5
Scaled value	3	2	0	0	0	1	1	1

1 - Low, 2 – Medium, 3 – High

Semester	**III**	
Subject Name	**GENERAL CHEMISTRY-III**	
Subject Code	**XBEC308**	
L –T –P –C **3- 1– 0 – 4**	**C:P:A** **3:0:1**	**L –T –P –H** **4-1-0-5**

Course Outcome		**Domain/Level C or P or A**
CO1	***Identify*** the various families of elements and describe the periodic properties like periodic trends, extraction preparation and properties of p- Block elements and their compounds.	Cognitive
CO2	***Explain*** the behavior and chemical properties of compounds of p-Block elements and Nobel gases.	Cognitive
CO3	***Illustrate*** the various haloalkanes compounds and ***Describe*** the mechanism of nucleophile and electrophonic substitution reactions.	Cognitive Affective
CO4	***Describe*** the stereochemistry of molecules and ***Discuss*** the properties related to their conformations.	Cognitive Affective
CO5	***Identify*** and ***Relate*** the structure and properties of solid state, liquid crystals and colloids	Cognitive

COURSE CONTENT

UNIT I	**Chemistry of p-Block Elements–B, C and N Families** **9 hrs**
	General characteristics of p-block elements – general characteristics of elements of Group III A-diagonal relationship between B and Si- extraction of boron – Physical and chemical properties of B- uses – chemistry of some compounds of boron: Boric acid, Borax, Diborane, Boron nitride – Extraction of Aluminium – physical and chemical properties – uses – chemistry of some compounds of Al: Al_2O3, AICl3, Alums – Alloys of aluminum. General characteristics of elements of Group IVA – difference of carbon and silicon form the rest of the family- allotropic forms of carbon – Chemistry of charcoal – Chemistry of oxides of carbon (CO & CO2) – use of CO2 in fire extinguishers – fuel gases – preparation of silicon – physical and chemical properties of Si – uses - oxides of silicon – structures of silicates – chemistry of silicones – manufacture of glass – type of glasses – extraction of lead – physical and chemical properties – uses – lead pigments. General characteristics of elements of V A Group – the unique features of nitrogen from the rest of the family – preparation of nitrogen – physical and chemical properties of N2 – uses – industrial preparation of ammonia – physical and chemical properties – uses – chemistry of some compounds of nitrogen: Hydrazine, Hydroxylamine, Hydrazoic acid, Nitric acid – nitrogen cycle – artificial fixation of nitrogen – preparation of phosphorous – physical and chemical properties – uses – chemistry of PH3, PCl3, PCl5, POCl3, P_2O5 and oxyacids of phosphorus – fertilizers.
UNIT II	**Chemistry of p-Block elements–O, X and Noble Gas Families**
	Anomalous behaviour of oxygen – paramagnetic nature of oxygen, Preparation, properties, structure and uses of oxyacids of sulphur, classification of oxides based on their chemical behavior – acidic oxide, amphoteric oxide and neutral oxides. Classification of oxides based on oxygen content – normal oxides, peroxides, super oxides, dioxides, sub oxides and mixed oxides. Chemistry of selenium and tellurium.

	General characteristics of halogen with reference of electro negativity, electron affinity, oxidation states and oxidizing power. Peculiarities of fluorine, Hydrides, oxides and oxo acids of halogens. Inter halogen compounds and pseudo halogens – basic nature of iodine. Noble gases: Position in the periodic table – isolation from atmosphere – General characteristics – structure and shape of xenon compounds – XeF4, FeF6, XeO3 and XeOF4 – uses of noble gases
UNIT III	**9 hrs**
	Nomenclature – general methods of preparation of haloalkanes – physical and chemical properties – uses – nucleophillic substitution mechanisms (SN1, SN2 and SNi) – evidences – stereochemical aspects of nucleophillic substitution mechanisms – general methods of preparation of halobenzenes – physical properties – chemical properties – uses mechanisms of electrophillic and nucleophillic substitution reactions – theory of orientation and reactivity.
UNIT IV	**Stereochemistry**
	Stereoisomerism – types – optical isomerism – chirality's based on symmetry elements (Cn, 5, i and Sn) – idea of asymmetry and dissymmetry – optical activity – measurement of optical activity – concept of enantiomerism, diastereomerism – axial chirality in substituted allenes and spiranes – atropisomerism in substituted biphenyls – R,S and D, L notations to express configurations – erythro, threo conventions – meso and dl – forms of tartaric acid – stereoselectivity and stereospecificity in organic reactions with suitable examples – resolution of racemic mixture using chiral reagent – Walden inversion – asymmetric synthesis – asymmetric induction.
UNIT V	**Solid state,LiquidCrystals and Colloids**
	Classification of solids – Isotropic and anisotropic crystals. Laws of crystallography – representation of planes – Miller indices, space lattice, crystal systems – unit cell – X – ray diffraction – derivation of Bragg's equation – determination of structure of NaCl by Debye Scherrer (powder method) – determination of Avogadro's number – discussion of structure of KCl & CsCl – defects in crystals – stoichiometric and non stoichiometric – methods of growing crystals – from melt and from solution (hydrothermal method, Gel method – packing of ions in crystals – radius ration rule and its limitations. Liquid crystals – types. Definitions – types of colloids – sols – preparation, purification and properties – Kinetic, optical and electrical stability of colloids, gold number, associated colloids, Emulsion – types of emulsions, preparation, properties and application, Gels – types of gels, preparation, properties and applications. Donnan membrane equilibrium –osmosis, reverse osmosis, dialysis and desalination – macromolecules – molecular weight of macro molecules – determination of molecular weight by osmotic pressure method and light scattering method.
	L = 15hrs SS = 30 hrsTotal = 45hrs

TEXT BOOKS&REFERENCES

1. Puri B.R. Sharma, L.R., Kalia K.K. Principles of Inorganic Chemistry, (23rd
1. edition), New Delhi, Shoban Lal Nagin Chand & Co., 1993
2. Lee. J.D. Concise Inorganic Chemistry, UK, Black well science (2006)
3. Puri B.R. Sharma L.R. Pathania M.S. Principles of Physical Chemistry
4. Glasstone S., Lewis D., Elements of Physical Chemistry, London, Mac Millan & Co.

Ltd

5. Morrison R.T. and Boyd R.N. Organic Chemistry (6th edition), New York, Allyn
6. & Bacon Ltd., (1976)
7. 6. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (12th edition), New
8. Delhi, Sultan Chand & Co., (1997)

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	0	2	3	0	0	0	0	2	0
CO2	3	0	3	3	0	0	0	0	2	0
CO3	2	0	3	3	0	0	0	0	2	0
CO4	3	0	2	2	0	0	0	0	2	0
CO5	3	0	2	3	0	0	0	0	2	0
Total	14	0	12	14	0	0	0	0	10	0
Scaled value	3	0	2	3	0	0	0	0	2	0

1 - Low, 2 – Medium, 3 – High

Semester	**III**	
Subject Name	**OBJECT ORIENTED PROGRAMMING WITH C++ AND JAVA**	
Subject Code	**XBES308**	
L –T –P –C **3- 1 – 0- 4**	**C:P:A** **3.2:0:0.8**	**L – T – P – H** **4-1-0-5**

Course Outcome:		**Domain C or P or A**
CO1	Recognise and identify the basics of OOPS concept	Cognitive
CO2	Reproduce the concepts of Functions in C++	Cognitive
		Affective
CO3	Describe the concepts of constructor and destructor	Cognitive
CO4	Discuss the concepts of inheritance	Cognitive
CO5	Reproduce and Describe the java features	Cognitive
		Affective

UNIT I		
	Tokens – Keywords – identifiers and constants – Basic data types – User defined data types – Derived data types – Symbolic constants – Declaration of Variables – Dynamic initialization of variables – Reference Variables – Operators in C++ - Scope Resolution operator – Manipulators – Type cast Operator – Expressions and their types – Special assignment expressions – Control Structures	
UNIT II		
	The main function – Function Prototyping – Call by reference – Return by Reference –Inline functions – Default arguments – Function Overloading. Specifying a Class – Defining Member functions – Private member functions – Arrays within a class Constructors: Parameterized constructors –	
UNIT III		
	Multiple Constructors in a Class – Constructors with default arguments – Dynamic initialization of objects – Copy Constructors – Dynamic Constructors – Destructors, Defining Operator Overloading- Overloading Unary, binary operators, manipulation of strings using operators-rules for overloading operators	
UNIT IV		
	Defining Derived Classes – Single Inheritance – Multilevel Inheritance – Multiple inheritance – Hierarchical Inheritance– Virtual base classes – Abstract Classes – Introduction to pointers to objects– Virtual functions.	
UNIT V		
	Java features: Simple Java program – Java program structure – Java tokens – Java statements – Implementing a java program – Java Virtual Machine – Command line arguments- Constants – Variables – Data types – Scope of Variables – Operators in Java. Define a class – Adding variable and methods – Creating objects – Accessing Class members – Constructors – Method Overloading –Arrays – One dimensional array – Creating an array – Two dimensional arrays	
		L = 45hrs Total = 45hrs

TEXT BOOKS
E. Balagurusamy, Object Oriented Programming with C++, 4th Edition Tata McGraw Hill 2008 E. Balagurusamy, Programming with JAVA, 2nd Edition,Tata McGraw-Hill Publishing Co.Ltd. 2004,
REFERENCES
Herbert Schildt, The Complete Reference Java™ 2, 5th Edition,Tata McGraw-Hill Publishing Co. Ltd. 2005

Mapping of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**
CO 1	3	1	1		1				1		1
CO 2	3	1	1		1				1		1
CO 3	3		1		1				1		1
CO 4	3		1						1		1
CO 5	3		1		1				2		1
Total	15	2	5		4				6		5
Scaled Value	3	1	1		1				2		1

1 - Low, 2 – Medium, 3 – High

Semester	**III**	
Subject Name	**PHYSICS PRACTICAL-III**	
Subject Code	**XBE309**	
L –T –P –C **0 – 0 –2–2**	**C:P:A** **1:0.5:0.5**	**L –T –P –H** **0 – 0 – 2 –2**

Course Outcome:		**Domain C or P or A**
CO1	***Use*** laboratory techniques such as ***accuracy*** of measurements and ***determination*** of unknown frequencies.	Cognitive Psychomotor
CO2	***Explain*** *and* ***give*** the characteristics of various semiconductor devices.	Cognitive Psychomotor
CO3	Gain ***knowledge*** and ***identify*** the various laws of thermo dynamics	Cognitive Psychomotor
CO4	***Manipulate*** the electrical properties with excellent ***application*** knowledge.	Cognitive Affective Psychomotor
CO5	***Use*** *basic* ***knowledge*** *of electronics to* ***construct*** *power supply*	Cognitive Affective Psychomotor

COURSE CONTENT

Choose any **EIGHT** Experiments only

1. Sonometer- Determination of unknown frequency and unknown weight.
2. Melde's string Determination of frequency.
3. Junction diode and Zener – Characteristics.
4. Comparison of surface tension by capillary rise method.
5. Spectrometer –grating- minimum deviation.
6. Searl's Viscometer - viscosity of a liquid
7. Emissivity of a surface – Spherical calorimeter.
8. Static torsion – determine the rigidity modulus.
9. Logic gates – Discrete components.
10. Lee's disc –specific heat capacity of the bad conductor.
11. Mayer's disc – Viscosity of a liquid.

    Specific heat by Joules calorimeter

Mapping of CO's with PO's:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8
CO1	3	3	2			2	1	1
CO2	1	1	2				1	1
CO3	3	3	2	2	2		1	1
CO4	3	1	2				1	1
CO5	1	1	2		2		2	1
Scaled to 1, 2, 3	3	1	2	2	2	2	1	1

1 – Low, 2 – Medium, 3 – High

Semester	**III**		
Subject Name	**SEMIMICRO INORGANIC QUALITATIVE ANALYSIS (ANIONS)**		
Subject Code	**XBEC310**		
L –T –P –C **0- 0 – 2- 2**	**C:P:A** **1.2:0.4:0.4**	**L –T –P –H** **0- 0 –2- 2**	
Course Outcome:			**Domain** **C or P or A**
CO1	***Identify*** the various cations and anions present in the given inorganic mixture and analyses the respective groups.		Cognitive and Psychomotor
CO2	***Explain*** the fundamentals of group separation and chemical reaction takes place in the confirmation test.		Cognitive and Psychomotor
CO3	***Predict*** the results and differentiate the various groups and cations/ anion present in the mixture.		Cognitive and Affective
COURSE CONTENT			
	Analysis of a mixture containing two anions of which one will be an interfering ion. Semi micro method using the conventional scheme with hydrogen sulphide may be adopted. **Anions to be studies:** Carbonate, Sulphide, Sulphate, nitrate, chloride, bromide, fluoride, borate, oxalate, arsenite, arsenate and phosphate		

Mapping of COs with POs

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	0	0	0	0	0	0	0	2	2
CO2	2	0	0	0	0	0	0	0	1	1
CO3	3	0	0	0	0	0	0	0	2	2
Total	8	0	0	0	0	0	0	0	5	5
Scaled value	3	0	0	0	0	0	0	0	2	2

1 – Low, 2 – Medium, 3 – High

Semester	**III**		
Subject Name	**PROGRAMMING IN C++ AND JAVA LAB**		
Subject Code	**XBES310**		
L –T –P –C **0- 0 – 2- 2**	**C:P:A** **1.2 :0.8: 0**	**L –T –P –H** **0- 0 –2- 2**	

Course Outcome:		**Domain C or P or A**
CO1	*Ability* to implement C++ concept for simple problems and *construct* flow chart for real time problems.	Cognitive Psychomotor
CO2	*Demonstrate the use of* various C++ commands And *Write* C++ programmes for simple applications with functions	Cognitive Psychomotor
CO3	*Use* the concept of OOPs concept with Java	Cognitive

COURSE CONTENT

1. String concatenation
2. Implementation of arithmetic operations on complex numbers using constructor overloading.
3. To read a value of distance from one object and add with a value in another object using friend function.
4. Implementation of + and – operator overloading and implementation of addition operation of octal object with integer using operator overloading.
5. Implementation of addition and subtraction of two polynomial objects using operator overloading
6. Managing bank account using inheritance concept.
7. To compute the area of triangle and rectangle using inheritance and virtual function
8. Writing simple programs in java
9. Use of interfaces in java
10. Developing Packages in Java

P-45 hrs Total – 45 hrs

Mapping of CO's with PO's:

COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	0	0	1	1	0	0	0	2	2
CO2	3	0	0	1	1	0	0	0	1	1
CO3	3	0	0	1	1	0	0	0	2	2
Total	9	0	0	3	3	0	0	0	5	5
Scaled value	2	0	0	1	1	0	0	0	1	1

1 - Low, 2 – Medium, 3 – High

Semester	**III**	
Subject Name	**PRACTICUM AND SCHOOL INTERNSHIP - I**	
Subject Code	**XBE311**	
L –T –P –C **0- 0– 2- 8**		**L –T –P –H** **0- 0– 2- 2**
School Internship		
	In the III semester the student's teachers will undergo internship in teaching for 3 weeks the student's teacher will be engaged in the following activities and preparation of records. a. Observation b. Case Study c. Field Visit	

Semester	**IV**	
Subject Name	**TAMIL – IV**	
Subject Code	**XBE401**	
L –T –P –C **2- 1 – 0- 3**	**C:P:A** **2.5 :0: 0.5**	**L –T –P –H** **3 - 1 – 0 - 4**

Course Outcome:		**Domain C or P or A**
CO1	பண்டைய இலக்கியங்களின் பண்பு நலன்களை அறிதல்.	அறிதல்
CO2	எட்டுத்தொகை பத்துப்பாட்டு, திருக்குறள் அறக்கருத்துக்களை அறிந்து அதன்படி வழி நடத்துதல்	அறிதல்
CO3	முச்சங்கம் மற்றும் சங்க காலம், சங்க மருவிய கால இலக்கிய வரலாற்றினை உய்த்துணர்தல்.	உணர்தல்
CO4	தமிழ்ச் செம்மொழிச் சிறப்புக்களை அறிந்து ஏற்றுக் கொள்ளல்.	உளப்பகுப்பு செய்தல்
CO5	மாணவர்களின் பல்வேறு படைப்பாக்கத்திறன்களையும் இதழியல் துறையில் புலமையும் வளர்த்தல்.	உணர்தல், உளப்பகுப்பாய்வு செய்தல்

COURSE CONTENT		
அலகு I	**செய்யுள்**	**5 hrs**
	எட்டுத்தொகை நூற்கள் - அவற்றின் விளக்கங்கள் நற்றிணை நூற்குறிப்பு - ஆசிரியர் குறிப்பு - பாடல் எண் 70 - பாடல் விளக்கம். குறுந்தொகை நூற்குறிப்பு - ஆசிரியர் குறிப்பு - பாடல் எண் 49, 135 - பாடல் விளக்கம்.	
அலகு II	**செய்யுள்**	**15 hrs**
	அகநானூறு நூற்குறிப்பு - ஆசிரியர் குறிப்பு - பாடல் எண் 55 - பாடல் விளக்கம். புறநானூறு நூற்குறிப்பு - ஆசிரியர் குறிப்பு - பாடல் எண் 72, 74, 183, 188, 216 - ஆகிய பாடல்களின் விளக்கங்கள். திருக்குறள் - ஆசிரியர் குறிப்பு - நூற்குறிப்பு ஒழுக்கமுடைமை, பெரியாரைத் துணைக்கோடல் போன்ற	

	அதிகாரங்களின் கருத்துக்கள் - அவை பற்றிய விளக்கங்கள்.	
அலகு III	**இலக்கிய வரலாறு**	**5hrs**
	தமிழ் மொழியின் பழமை - அதன் சிறப்பு - சங்கம் இருந்ததற்கான சான்றுகள் - முச்சங்க வரலாறு பற்றிய குறிப்புகள். சங்க இலக்கிய வரலாறு - அக்கால இலக்கியங்கள் - எட்டுத்தொகை - பத்துப்பாட்டு - நூற்களின் பட்டியல்கள் - மற்றும் அவற்றின் விளக்கங்கள்.	
அலகு 1V	**இலக்கிய வரலாறு**	**10hrs**
	சங்க மருவிய கால இலக்கிய வரலாறு - பதினெண்கீழ்க்கணக்கு நூற்கள் - நீதி நூற்கள் - இரட்டைக்காப்பியங்கள் - பெண்பாற் புலவர்கள் - போன்றவை பற்றிய விளக்கங்கள். செம்மொழித்தமிழ் - வரையரை - விளக்கம் - அதன் வரலாறு - மற்றும் அதற்கான அடிப்படைக் காரணிகள்.	
அலகு V	**படைப்பிலக்கியம்**	**10hrs**
	தழியல் துறை - தோற்றம் - வளர்ச்சி - தமிழ் இதழியல் வரலாறு - அச்சுக்கலை - செய்தித்தாள் வளர்ச்சி - கட்டுரை எழுதுதல் - கடிதம் எழுதுதல் - அதன் வகைகள் மற்றும் சிறு ஆய்வுக்கட்டுரை, இதழ் தயாரித்தல்.	
		L-45 hrs Total – 45hrs

மேற்பார்வை நூல்கள் :

1. அன்புமணி, எட்டுத்தொகை, பத்துப்பாட்டு, மணிமேகலைப் பிரசுரம், சென்னை.
2. திருவள்ளுவர், திருக்குறள், ஸ்ரீஇந்து பதிப்பகம், சென்னை.
3. குழந்தைசாமி,வா.செ, உலக செவ்வியல் மொழிகளின் வரிசையில் தமிழ், பாரதி பதிப்பகம், சென்னை. 2005.
4. மணவை முஸ்தபா, செம்மொழி - உள்ளும் புறமும், அறிவியல் தமிழ் அறக்கட்டளை, அண்ணா நகர், சென்னை. 1975.
5. சாரதாம்பாள், சங்கச் செவ்வியல், 39 மீனாட்சி புத்தக நிலையம், 60,மேலக்கோபுரத் தெரு, மதுரை - 625001 முதற்பதிப்பு - 1993.
6. கால்டுவெல், திராவிட மொழிகளின் ஒப்பிலக்கணம், சாரதா பதிப்பகம், 2011.

Mapping of COs with POs

Cos	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PSO1
CO_1	1	2	1	0	2	2	0	2	0	1	1
CO_2	1	2	1	0	2	1	2	2	1	2	2
CO_3	1	2	1	0	2	1	1	2	0	1	0
CO_4	1	2	1	0	2	3	0	2	0	1	1
CO_5	1	2	2	0	1	2	3	3	1	1	2
Total	5	10	6	0	9	9	6	11	2	6	6
Scaled value	1	2	2	0	2	2	2	3	1	2	2

1 - Low, 2 – Medium, 3 – High

Semester	**IV**		
Subject Name	**ENGLISH– IV**		
Subject Code	**XBE402**		
L –T –P –C **2- 1- 0 – 3**	**C:P:A** **2.5:0.5:0**		**L –T –P –H** **3- 1–0- 4**
Course Outcome			**Domain/Level C or P or A**
CO1	*Recognizes* the difference in understanding tense especially for speaking and writings		Cognitive
CO2	*Analyzes* the various states of interpersonal communication		Cognitive
CO3	Identifies the types of conflicts and adjusts according to situations		Cognitive
CO4	*Responds* to the groups and improves all skills		Psychomotor
COURSE CONTENT			
UNIT I	**- Language Competence**		**10hrs**
	Tense: Present Tense – Past Tense – Future Tense – Prefixes Suffixes – Spotting errors		
UNIT II	**Interpersonal communication**:		**10 hrs**
	. Introduction to Interpersonal Relations, Analysis Relations of different ego states, Analysis of Transactions,Analysis of Strokes, Analysis of Life position		
UNIT III	**- Management**		**25hrs**
	Conflict Introduction to Conflict, Causes of Conflict, Management Managing Conflict Introduction to Stress, Causes of Stress, Impact of Stress, Managing Stress		
UNIT IV	**Skills of Communication**		
	Resume preparation - Presenting oneself at an interview, Group Discussion/Mock Interview.		
			L - 45hrs P - 30 hrs Total - 75 hrs

Reference books

- Mitra, Barun. Personality Development and Soft Skills. New Delhi: Oxford, 2014
- Nelson. English Language Communication Skills. New Delhi: Cengage, 2014
- Lakshminarayanan. A Course book on English. New Delhi: Scitech, 2009

Mapping of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	1	0	3	0	0	2	0	3	2	2
CO2	1	1	1	0	0	0	0	2	2	2
CO3	3	2	1	0	3	0	0	3	3	0
CO4	2	1	1	0	0	0	0	3	2	0
CO5	1	2	0	0	3	3	2	3	3	0
	8	6	6	0	6	5	2	14	12	4
	2	2	2	0	2	1	1	3	3	1

1 - Low, 2 – Medium, 3 – High

Semester	**IV**		
Subject Name	**SOCIAL ENGINEERING**		
Subject Code	**XBE403**		
L –T –P –C **2- 0 –0- 2**	**C:P:A** **1:0.5:0.5**	**L –T –P –H** **2- 0 -0- 2**	

Course Outcome:		**Domain C or P or A**
CO1	***Identify*** the origin of caste and race	Cognitive
CO2	***Listen*** the anti caste struggles in modern India and ***react*** with modern Indian movement.	Affective/ Psychomotor
CO3	***Distinguishes*** the gender inequalities	Cognitive

COURSE CONTENT

UNIT-I	**Origins of Caste and Race**	**12hrs**
	India: A Nation of caste and class Caste and Race: Dravidian and Aryan conflict – An historical Overview	
UNIT –II	**Anti-caste and race movement in Modern India**	**12hrs**
	Anti-Caste struggles in Modern India: Mahatma Gandhi and Phule's contribution Thanthai Periyar Contribution in eradicating social injustice Ambedhkar's approach to eradication of untouchablity and annihilation of caste in the context of dalit movement in India	
UNIT-III	**Gender inequality**	
	Dignity of Labour and Caste: Kancha llaiah's Scientific Method Women and Caste: Issues of gender of inequality. Empowerment of women **Sessional work :** a) Collection of news papers cutting connected with social issues, caste discrimination, women inequality b) Conducting social survey in Villages c) Visiting NGO's activities for women empowerment.	

TEXT BOOKS

1 Dr B.R. Ambedhkar and Untouchablity – Fighting the Indian Caste system – Christophe Jattrelot, Columbia University Press, May 2005
2 Collected works of Periyar EVR, Compiled by Dr K. Veeramani, The Periyar Self-Respect Propaganda Institution Periyar Thidal, 50, EVK Sampath Salai, Chennai – 600 007
3 Mahatma Jothipha Phule Life History
4 Dignity of Labour in our time, Prof. Kanch Illaiah, Hyderabad

L-60 hrs P-15hrs Total – 75 hrs

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	1	3	0	2	1	2	2	**3**	2
CO2	2	1	3	0	2	1	2	2	3	2
CO3	2	1	3	0	2	1	2	1	3	2
Total	8	4	12	0	8	4	8	7	12	8
	2	1	3	0	2	1	2	2	3	2

1 - Low, 2 – Medium, 3 – High

Semester	**IV**		
Subject Name	**INTRODUCTION TO MATLAB**		
Subject Code	**XBE404**		
L –T –P –C **0- 0 – 3- 3**	**C:P:A** **2:1:0**	**L –T –P –H** **0- 0 – 0- 3**	
Course Outcome:			**Domain C or P or A**
CO1	Understand the concept of MATLAB		Cognitive Psychomotor
CO2	Acquire the knowledge and analysis the concept of MATLAB		Cognitive Psychomotor
CO3	Acquire the function and concepts of MATLAB		Cognitive
COURSE CONTENT			
UNIT I			
	Introduction to MATLAB – Variables and assignment statements – expressions – characters and encoding – vectors and matrices – creating row vectors and vectors – matrix variables – dimensions in using functions with vectors and matrices		
UNIT II			
	MATLAB Programmes – Matlab Scripts, Input and Output, scripts with input and output, introduction to file input and output – user defined functions – simple applications.		
UNIT III			**10 hrs**
	Selection Statement – relational expressions, SWITCH statement, menu function, looping – FOR loop, nested FOR loop, WHILE loop, String manipulations, creating string variable, operations on strings, fundamentals of arrays, structure and file operations- simple applications on the above		

	P -45hrs Total – 45hrs
TEXT BOOKS	
1. Stormy Attaway, MATLAB - A Practical Approach, Butterworth-Heinemann publications, 2009	

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	0	0	1	1	0	0	0	**2**	2
CO2	3	0	0	1	1	0	0	0	**1**	1
CO3	3	0	0	1	1	0	0	0	**2**	**2**
	9	0	0	3	3	0	0	0	5	5
	3	0	0	2	2	0	0	0	3	3

1 - Low, 2 – Medium, 3 – High

Semester	**IV**		
Subject Name	**ASSESSMENT OF LEARNING**		
Subject Code	**XBE405**		
L –T –P –C **4 - 0 – 0- 4**	**C:P:A** **3:0.5:0.5**	**L –T –P –H** **4- 0 – 0- 4**	
Course Outcome:			**Domain C or P or A**
CO1	***Identify*** the assessment system and evaluation pattern and their role in teaching learning process		Cognitive
CO2	***Integrate*** the assessment task and tools to assess learner's competence and **construct** the performance with blooms taxonomy.		Cognitive Affective
CO3	**Initiates** the skill of constructing an achievement test scoring and grading procedures		Psychomotor
CO4	**Analyse** the interpretation and **differentiate** the report of the students performance		Cognitive/ Psychomotor
COURSE CONTENT			
UNIT I	**Introduction to Assessment & Evaluation**		
	(a) Concept of test, measurement, examination, appraisal, evaluation and their inter relationships. (b) Purpose and objectives of assessment- for placement, providing feedbacks, grading promotion, certification, diagnostic of learning difficulties. (c) Forms of assessment : - (i) (Formative, Summative, prognostic; diagnostic; Norm referenced; Criterion referenced based on purpose) (ii) (Teacher made; Standardized based on nature & scope)		

	(iii) (Oral, written, performance based on mode of response) (iv) (Internal, External, self, peer, & teacher based on context) (v) Based on nature of information gathered (Quantitative, Qualitative) (d) Importance of assessment & evaluation for Quality Education – as a tool in Pedagogic decision making on as writing instructional objectives, selection of content, teaching learning resources, methodology, strategies & assessment procedures followed. (e) Authentic assessment; school based assessment
UNIT II	**Assessment of Learning**
	(a) Concept of Cognitive, Affective, Psychomotor domain of learning (b) Revised taxonomy of objectives (2001) and its implications for assessment and stating the objectives. (c) Constructing table of specifications & writing different forms of questions – (VSA, SA, ET & objective type, situation based) (d) Construction of achievement tests- steps, procedure and uses (e) Construction of diagnostic test – Steps, uses & limitation
UNIT III	**Assessment for Learning**
	(a) Need for CCE its importance and problems faced by teachers (b) Meaning & Construction of process-oriented tools – observation schedule; check-list; rating scale; anecdotal record; (c) Assessment of group processes – Nature of group dynamics; Socio-metric techniques; steps for formation of groups, criteria for assessing tasks; Criteria's for assessment of social skills in collaborative or cooperative learning situations. (d) Quality assurance in tools – Reliability (Test-retest; equivalent forms, split-half) & Validity (Face, content, construct) – Procedure to establish them; Item – analysis. (e) Portfolio assessment – meaning, scope & uses; developing & assessing portfolio; development of Rubrics.
UNIT IV	**Construction Interpretation and Reporting of student's performance**
	(a) Interpreting student's performance (i) Descriptive statistics (measures of central tendency & measures of variability, percentages) (ii) Graphical representation (Histogram, Frequency Curves) (iii) NPC – percentile. (b) Grading – Meaning, types, and its uses (c) Role of feedback to stake holders (Students, Parents, Teachers) and to improve teaching – learning process; Identifying the strengths & weakness of learners. (d) Reporting student's performance – Progress reports, cumulative records, profiles and their uses, Portfolios.
	Sessional Works to be carried out in Tutorial Sessions 1. Discussion on existing assessment practices in schools and submitting the report. 2. Constructing a table of specification on a specific topic (subject specific) 3. Constructing a unit test using table of specifications and administering it to

	target group and interpreting the result. 4. Construction of any one of the process oriented tools and administering it to group of students & interpreting it. 5. Analysis of question papers(teacher made)
	L- 45 hrsTotal – 45 hrs

REFERENCES

1. Linn, Robert and Norman E Gronland (2000); Measurement and Assessment in teaching, 8th edition, by Prentice Hall, Inc, Pearson Education, Printed in USA
2. Ved Prakash, et.al. (2000): Grading in schools, NCERT, Published at the publication Division by the secretary, NCERT, Sri Aurobindo Marg, New Delhi
3. Tierney, R. J., Carter, M. A., & Desai, L. E. (1991). Portfolio Assessment in the Reading – Writing Classroom. Norwood, MA: Christopher-Gordon Publishers
4. Glatthorn, A. A. (1998). Performance Assessment and Standards-based Curricula: the Achievement Cycle. Larchmont, NY: Eye no Education
5. Gredler, M. E. (1999). Classroom Assessment and Learning. USA: Longman.
6. Likert, R. (1932). A technique for the Measurement of Attitudes. Archives Psychology, 40.
7. Mehrens, W. A. & Lehmann, I. J. (1991). Measurement and Evaluation in Education and Psychology (8th ed.): Chapter 10: Describing Educational Data.
8. Oosterhof, A. (1994). Classroom Applications of Educational Measurement (Second Edition). New York: Macmillan College Publishing Company Inc.
9. Payne, D. A (2003). Applied Educational Assessment. Australia: Wadsworth: Thomson Learning.
10. Popham, W.J. (1981). Modern Educational Measurement. New Jersey, Engle wood Cliffs: Prentice-Hall Inc.
11. Popham, W. J. (2002). Classroom Assessment: What teachers need to know (Third Edition). Boston: Allyn & Bacon.

Mapping of COs with GAs

	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	1	3	0	2	1	2	2	3	2
CO 2	2	1	3	0	2	1	2	2	3	2
CO 3	2	1	3	0	2	1	2	1	3	2
CO 4	2	1	3	0	2	1	2	2	3	2
Total	08	04	12	00	08	04	08	07	12	08
Scaled value	2	1	3	0	2	1	2	2	3	2

1 - Low, 2 – Medium, 3 – High

Semester	**IV**		
Subject Name	**VECTOR CALCULUS AND FOURIER SERIES**		
Subject Code	**XBE406**		
L –T –P –C **4- 1 –0- 5**	**C:P:A** **4:0.5:0.5**	**L –T –P –H** **5- 1 – 0- 6**	
Course Outcome:			**Domain C or P or A**
CO1	***Explain*** the concept of vector differential operators and ***apply*** it for solving the problems		Cognitive/
CO2	***Estimate*** the line integral, surface and volume Integrals, **Listen** and **take part** in solvin g the problems on line, surface and volume integrals.		Cognitive Affective
CO3	***Apply*** Green's, Stokes and Divergence theorems to **solve** the problems **Perform** Green's, Stokes and Divergence theorems to the vector field		Cognitive Psychomotor
CO4	***Explain*** the basic concept and periodic function of ourier series for the given function. ***Apply*** the concepts to solve the problems in even, odd and periodic functions problems.		Cognitive
CO5	***Interpret*** to approximate a given function by a combination of simple cos and sin Functions to **solve** the problems.		Cognitive
COURSE CONTENT			
UNIT I			**9+3 hrs**
	Vector differentiation - velocity & acceleration - Vector & scalar fields - Gradient of a vector - Directional derivative - divergence & curl of a vector solenoidal & irrotational vectors - Laplacian double operator - simple problems.		
UNIT II			**9 +3hrs**
	Vector integration -Tangential line integral - Conservative force field - scalar potential - Work done by a force - Normal surface integral - Volume integral - simple problems.		
UNIT III			**9+3 hrs**
	Gauss Divergence Theorem - Stoke's Theorem - Green's Theorem - Simple problems & Verification of the theorems for simple problems.		
UNIT IV			**9+3 hrs**
	Fourier series - definition - Fourier Series expansion of periodic functions with Period 2z and period 2a – Use of odd & even functions in Fourier Series.		
UNIT V			**9+3 hrs**
	Half - range Fourier series - definition - Development in Cosine series & in Sine series - Change of interval - Combination of series.		
	L=60 hrs T= 15 hrs Total = 75 hrs		

TEXT BOOKS

1. M.L. Khanna, Vector Calculus, Jai Prakash Nath and Co., 8th Edition, 1986.
2. S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol. III, S. Viswanathan Pvt. Limited, and Vijay Nicole Imprints Pvt. Ltd, 2004.

REFERENCES

1. Dr.M.K.Venkataraman, Engineering Mathematics, The national publishing Co., 11th Edition, 1987.
2. Engineering Mathematics, T.Veerarajan, Tata McGraw Hill Publishing Company Ltd, New Delhi, revised edition.
3. Schaum's Outlines, Fourier Analysis, Tata McGraw- Hill Company Limited, New Delhi

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	POS11
CO1	3	3	-	-	-	1	1	1	-	-	-
CO2	2	2	-	1	-	-	-	-	-	-	-
CO3	1	1	1	2	2	1	1	1	-	-	-
CO4	2	2	3	3	3	1	1	1	-	-	-
CO5	1	1	1	1	1	-	-	-	2	3	2
	2	2	1	2	1	.5	.5	.5	.4	.5	.4

1 – Low, 2 – Medium, 3 – High

Semester	**IV**		
Subject Name	**GENERAL CHEMISTRY-IV**		
Subject Code	**XBEC408**		
L –T –P –C **3- 1 – 0- 4**		**C:P:A** **4: 0: 0**	**L –T –P –H** **4- 1 – 0- 5**

Course Outcome:		**Domain C or P or A**
CO1	***Explain*** the periodic trends, extraction, preparation and properties of d-block elements and their compounds	Cognitiveg
CO2	***Describe*** the periodic properties of f- block elements	Cognitive/
CO3	***Describe*** the principles and properties of organo metallic compounds.	Cognitive/
CO4 **CO5**	***Understand*** the chemistry of alcohols, phenols and ether ***Apply*** and ***Identify*** the principles of chemical kinetics and catalysis.	Cognitive/

COURSE CONTENT

UNIT-I	**Metallurgy and d-Block elements**	
	Occurrence of metals – concentration of ores – froth floatation, magnetic separation, calcination, roasting, smelting, flux, aluminothermic process – purification of metals – electrolysis, zone refining, van Arkel de Boer methods – chemistry of transition elements – electronic configuration – general periodic trend – group study of titanium, vanadium, chromium, manganese and iron groups - coinage metals - comparative study and chemistry of photography – comparative study of zinc group metals – galvanization, evidences for the existence of mercurous ion as Hg_2^{2+}	
UNIT –II	**Chemistry of f- Block Elements**	**8 hrs**
	General characteristics of f-block elements – comparative account of lanthanides and actinides – occurrence, oxidation states, magnetic properties, colour and spectra – lanthanides and actinides – separation by ion exchange and solvent extraction methods – lanthanide contraction – chemistry of thorium and uranium – occurrence, ores, extraction and uses – preparation, properties and uses of ceric ammonium sulphate, thorium dioxide, thorium nitrate, uranium hexafluoride, uranylacetate	
UNIT-III	**Chemistry of Organometallic compounds**	
	Introduction – preparation of organo magnesium compounds – physical and chemical properties – uses – preparation of ogranozinc, organolithium compounds – physical and chemical properties – uses- chemistry of organo copper, organolead, organophosphorus and organo boron compounds	

UNIT -IV	**Chemistry of Alcohols, Phenols and Ethers**	
	Nomenclature – preparation of alcohols – industrial source of alcohols – physical properties – chemical properties – uses – chemistry of glycols and glycerols – uses – preparation of phenols including di and tri hydric phenols – physical and chemical properties – uses – aromatic elctrophilic substitution mechanism – theory of orientation and reactivity, laboratory preparation of ethers, epoxides – physical properties – chemical properties – uses – introduction to crown ethers – structures – applications	
UNIT - V	**Chemical Kinetics and Catalysis**	
	Rate of reaction, average and instantaneous rates, rate equation, order of reaction. Rate laws- rate constants – derivation of rate constants and characteristics for zero, first order, second and third order (equal initial concentration) – derivation of time for half change with examples. Methods of determination of order of reactions – experimental methods of determination of rate constant of a reaction – volumetry, manometry, polarimetry, Mechanism of complex reactions – equilibrium and steady state approximations. Effect of temperature on reaction rate – concept of activation energy, energy barrier Arrhenius equation. Theories of reaction rates – collision theory – derivation of rate constant of bimolecular gaseous reaction – failure of collision theory – Lindemann's theory of unimolecular reaction. Theory of absolute reaction rates – derivation of rate for a bimolecular reaction – significance of entropy and free energy of activation. Comparison of collision theory and ARRT. Kinetics of fast reactionm – flow methods and pulse methods. Catalysis – homogeneous and heterogeneous – homogeneous catalysis – kinetic of acid – base and enzyme catalysis. Heterogeneous catalysis – adsorption – types – chemical and physical. Characteristics of adsorption. Different types of isotherms – Freundlich and Langmuir	
	L- 30hrs T- 15hrs Total - 45 hrs	

REFERENCES

1. Puri B.R., Sharma L.R., Kalia K.K., Principls of Inorganic Chemistry, (23rd edition), New Delhi, Shoban Lal Nagin Chand & Co., (1993)
2. Lee J.D. Concise Inorganic Chemistry, UK, Black well Science (2006)
3. Puri. B.R., Sharma L.R., Pathania M.S., Principles of Physical Chemistry
4. 23 rd edition) New Delhi, Shoban Lal, Nagin Chand & Co., (1993)
5. Glasstone S. Lewis D., Elements of Physical Chemistry, London, Macmillan & Co.
6. Morrison R.T. and Boyd R.N., Organic Chemistry (6th edition), New york, Allyn & Bacon Ltd., (1976)
7. Bahl B.S. and Arun Bahl, Advanced Organic Chemistry, (12th edition), New Delhi, Sultan Chand & Co., (1997)

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2		3	3	3		2	-	2
CO2	3	2		3	3	3		2	-	2
CO3	2	2		2	3	3		2	2	2
CO4	3	2		2	3	2		3	3	2
CO5	3	2		3	3	3		3	3	2
TOTAL	14	10		13	15	14		12	8	10
	3	**2**		**3**	**3**	**3**		**3**	**2**	**2**

1 - Low, 2 – Medium, 3 – High

Semester	**IV**		
Subject Name	**COMPUTER GRAPHICS**		
Subject Code	**XBES408**		
L –T –P –C **3- 1 – 0- 4**		**C:P:A** **2.4:0.8:0.8**	**L –T –P –H** **4- 1 – 0- 5**

Course Outcome:		**Domain C or P or A**
CO1	***Recognize*** the display devices and their classifications and ***describe*** about the their functions Able to ***discuss*** about the various Graphics Software	Cognitive Affective
CO2	E***xplain*** the procedure to draw the basic elements of computer graphics like line segment and circle and ***discuss*** about the attributes of line segments Able to ***write*** algorithm for filling a region covered with closed boundary	Cognitive Affective
CO3	Able to ***discuss*** the various graphics transformation on two dimensional and ***explain*** the different clippings. Able to implement simple transformations. Able to ***perform*** composite transformation.	Cognitive Psychomotor
CO4	***summarize*** the different viewing methods.Respond for the basic transformations	Cognitive Affective
CO5	Able to ***explain*** and ***classify*** the different projections. ***Acknowledge*** the different visible surface detection methods of 3D objects	Cognitive, Affective
COURSE CONTENT		

UNIT-I	**INTRODUCTION TO COMPUTER GRAPHICS**	
	Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random-Scan Systems – Input Devices – Hard-Copy Devices – Graphics Software.	
UNIT –II	**OUTPUT PRIMITIVES AND THEIR ATTRIBUTES**	
	Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Area Filling (Boundary-Fill and Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels – Character Attributes – Inquiry Functions.	
UNIT-III	**TWO-DIMENSIONAL TRANSFORMATIONS AND VIEWING**	
	Matrix Representations and Homogeneous Coordinates – Composite Transformations - Other Transformations – Window-to- Viewport Coordinate Transformation – Clipping Algorithms: Cohen-Sutherland Line Clipping and Sutherland- Hodgeman Polygon Clipping – Basic Modeling Concepts - Interactive Input Methods: Logical Classification of Input Devices – Interactive Picture-Construction Techniques.	
UNIT -IV	**THREE-DIMENSIONAL CONCEPTS**	
	Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Cueing - Visible Line and Surface Identification – Polygon Surfaces: Polygon Tables, Three-Dimensional Transformations: Basic, Other and Composite Transformations.	
UNIT - V	**THREE-DIMENSIONAL VIEWING**	
	Viewing Pipeline and Coordinates – Transformation from World to Viewing Coordinates – Projection Transformations - Matrices - View Volumes - Hidden Surface and Hidden Line Elimination Methods: Back-Face Detection , Depth-Buffer and A-Buffer Methods - RGB,CMY and HLS Color Models – Computer Animation: Design of its Sequences and Languages.	
	L- 30hrs T- 15hrs Total - 45 hrs	
TEXT BOOKS		
Donald Hearn and M. Pauline Baker, "Computer Graphics C Version" Second Edition, Pearson Education, 2006.		
REFERENCES		
William M. Neuman, Robert R. Sprout, " Principles of interactive Computer Graphics", McGraw Hill International Edition.		

Mapping of COs with GAs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2		3	3	3	0	3	0	2
CO2	3	2		3	3	3	0	3	0	2
CO3	3	2		3	3	3	0	3	3	2
CO4	3	2		3	3	3	0	3	3	2
CO5	3	2		3	3	3	0	3	3	2
Total	15	10	0	15	15	15	0	15	9	10
	3	2	0	3	3	3	0	3	2	2

1 - Low, 2 – Medium, 3 – High

Semester	**IV**		
Subject Name	**SEMI MICRO INORGANIC QUALITATIVE ANALYSIS (CATIONS) LAB**		
Subject Code	**XBEC410**		
L –T –P –C **0- 0 –2– 2**		**C:P:A** **1:0.6:0.4**	**L –T –P –H** **0 – 0 – 2 - 2**
Course Outcome			**Domain** **C or P or A**
CO1	***Identify*** the various cations present in the given inorganic mixture and analyses the respective groups.		Cognitive and Psychomotor
CO2	***Explain*** the fundamentals of group separation and chemical reaction takes place in the confirmation test.		Cognitive and Psychomotor
CO3	***Predict*** the results and differentiate the various groups and cations/ anion present in the mixture.		Cognitive and Affective

COURSE CONTENT

SEMIMICRO INORGANIC QUALITATIVE ANALYSIS (CATIONS)

Analysis of a mixture containing two cations of which one will be an interfering ion. Semi micro method using the conventional scheme with hydrogen sulphide may be adopted.

Cations to be Studies: lead, copper, bismuth, cadmium, antimony, tin, iron, aluminium, zinc, manganese, cobalt, nickel, barium, calcium, strontium, magnesium and ammonium

P = 30 hrs Total = 30 hrs

TEXT BOOKS

Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, New Delhi, Sultan Chand & sons (1997).

G. Svehla, Vogel's Qualitative Inorganic Analysis, 7th Edition, , Pearson Education India, 2008.

Dr.V.V. Ramanujam, Inorganic Semi Micro Qualitative Analysis, The National Publishing Company, Chennai.

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	0	0	0	0	0	0	0	2	2
CO2	2	0	0	0	0	0	0	0	1	1
CO3	3	0	0	0	0	0	0	0	2	2
Total	8	0	0	0	0	0	0	0	5	5
Scaled value	3	0	0	0	0	0	0	0	2	2

1-Low , 2- Medium ,3-High

Semester	**IV**	
Subject Name	**COMPUER GRAPHICS LAB**	
Subject Code	**XBES410**	
L –T –P –C **0- 0 – 2- 2**	**C:P:A** **1.5:0.5:0.0**	**L –T –P –H** **0- 0 –2- 2**

Course Outcome		**Domain/Level C or P or A**
CO1	***Apply*** C programmes for basic elements of computer graphics and ***demonstrate*** programme for line segment and circle	Cognitive Psychomotor
CO2	***Implementing*** C programming skill to graphics transformations and ***show*** some examples	Cognitive Psychomotor
CO3	***Explain*** the clipping algorithms with basic elements	Cognitive

COURSE CONTENT

1. Implementation of DDA Line Drawing Algorithm using C.
2. Implementation of Bresenham's Line Drawing using C.
3. Implementation of Circle Drawing Algorithm using C.
4. Implementation of the basic transformations – Translation, Rotation and Scaling using C.
5. Implementation of the transformation – Shear and reflection using C
6. Implementation of line clipping algorithm.
7. Implementation of three dimensional transformations.

Reference Books:

1.Donald Hearn and M. Pauline Baker, "Computer Graphics C Version" Second Edition, Pearson Education, 2006.

2..Balagurusamy E ., 2006, *Programming in ANSI C* , 3rd ed, Tata McGraw-Hill.

P - 30hrs Total - 30 hrs

Mapping of COs with POs

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	0	0	1	0	0	0	0	2	2
CO2	3	0	0	1	0	0	0	0	1	1
CO3	3	0	0	1	0	0	0	0	2	2
	9	0	0	3	0	0	0	0	5	5
	3	0	0	2	0	0	0	0	3	3

1-Low , 2- Medium ,3-High

Semester	**IV**
Subject Name	**PRACTICUM AND SCHOOL INTERNSHIP – II**
Subject Code	**XBES411**
COURSE CONTENT	
	15 hrs
In the IV semester the student's teachers will undergo internship in teaching for 3 weeks the student's teacher will be engaged in the following activities and preparation of records. a. Observation b. Case Study c. Text Book Review	

Semester	**V**	
Subject Name	**SOFT SKILL DEVELOPMENT AND PEACE EDUCATION**	
Subject Code	**XBE501**	
L –T –P –C **3- 0 – 0- 3**	**C:P:A** **2.5: 0.5: 0**	**L –T –P –H** **3- 0 – 0- 3**

Course Outcome: ***On the successful completion of the course, students will be able to***		**Domain** **C or P or A**
CO1	Compare the importance of soft skill, communication skill, and self esteem	Cognitive
CO2	Discovering the interpersonal skills	Cognitive
CO3	Evaluate the societal skills and provide awareness on cultural development	Cognitive
CO4	Grasps the knowledge of peace education	Psychomotor

COURSE CONTENT		
UNIT-I	**Personal skills**	
	Meaning and importance of soft skills – communication skill: importance of word power, dictionary and it uses, sentences and their structure, art of eloquence, common mistakes in writing and their correction – group discussion – interview skills Self knowledge, self esteem and self confidence, goal setting, personal health, personal space, personal work space, dress code and grooming, body language, time management, stress management, personal workspace, personal values –	

	regularity, honesty, faithfulness, sincerity, discipline, obedience, forgiveness.
UNIT –II	**Interpersonal Skills**
	Team work, leadership skill, Empathy and sensitivity greetings, Etiquettes
UNIT-III	**Societal skills**
	Responsiveness to the environment, Awareness of the cultural heritage, commitment to society, futuristic vision, knowledge of the Indian Constitution. Social values : service, concern for justice, civil sense, charity, good friendship.
UNIT -IV	**Peace Education**
	Responsiveness to the environment, Awareness of the cultural heritage, commitment to society, futuristic vision, knowledge of the Indian Constitution. Social values : service, concern for justice, civil sense, charity, good friendship. **Peace context** : conditions for promotion of peace, UNESCO'S concerns on peace and understanding. Role of education in promotion of peace: implication of pedagogy. Teacher role in promoting peace. **Session work** • Arranging debated and group discussion • Arranging mock with interview • Displaying five words a day with meaning in the notice board • Organizing function by students. • Conduction awareness a rallies
	L- 15hrs P- 15hrs Total - 30 hrs

TEXT BOOKS

1. Shri. Madhukar, (2008) Soft Skills for life, AVM ware Publishing
2. Thomas Chathamparapil and Kennedy Andrew Thomas (2005), Holistic Education, Centre for Education Beyond curriculum, Christ college, Bangalore.
3. Mcellary. M., & Fenning P, Salf Eteen (2000), Master Mind books, Bangalore

REFERENCES

1. NCERT (1993). Teacher and Education in Emerging Indian Society, New Delhi.
2. NCERT (1986), School Education in Indian – present status and Future Needs, New Delhi.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	-	-	3	1	1	1	2	2	1	0	-	-	-	-
CO2	-	-	2	1	2	1	2	2	1	0	-	-	-	-
CO3	-	-	3	1	1	1	2	2	1	0	-	-	-	-
CO4	-	-	2	1	2	1	1	2	1	1	-	-	-	-
CO5	-	-	2	1	2	1	1	2	1	1	-	-	-	-
Total	-	-	12	5	8	5	8	10	5	1	-	-	-	-
Course			0	3	3	3	0	3	2	3	-	-	-	-

1 - Low, 2 – Medium, 3 – High

Semester	**V**		
Subject Name	**BASICS OF E-LEARNING EDUCATION**		
Subject Code	**XBE502**		
L –T –P –C **3- 0 –0- 3**		**C:P:A** **3: 0: 0**	**L –T –P –H** **3- 0 –0- 3**

Course Outcome: ***On the successful completion of the course, students will be able to***		**Domain** **C or P or A**
CO1	Define the basic knowledge about the principles and usage of e – learning in Education.	Cognitive
CO2	Relate the significance of e - learning	Cognitive
CO3	Identify the different tools of multimedia in developing e - content.	Cognitive

COURSE CONTENT

UNIT-I	**DESIGN CRITERIA AND MATERIALS**	**9 hrs**
	E-Learning- Definition- Aim and objectives of e-learning, - Benefits. Characteristics of e – Learning, Tools of e- Learning – types of e-learning, Growth of e-Learning in education, Concepts of Computer based learning, Computer Supported Collaborative Learning (CSCL), Learning management system.(LMS), Learning content management system(LCMS), Technology enhanced learning (TEL) and Computer aided assessment(CAA)	
UNIT –II	**LOADING**	**8 hrs**
	Meaning, Need, and Significance Multimedia – Components of Multimedia: Text, Graphics, Audio, Animation and Video - e-Content Development: Meaning, Need and Significance – Types and forms of e-content. – Stages of e-content. Development and steps involved – Funding for e-Content Development for Higher Education.	
UNIT-III	**STRUCTURAL FORMS**	**9hrs**
	Directories – Search Engines – On line Conferencing – Video Conferencing – e-Conferencing – e-Forum – News groups – Blog – Wiki – Discussing board – Wi-Fi – Internet – Intranet – Chat rooms – e-Journal – Digital Libraries – UGC Infib net - Mobile Learning.- E-Book – Moodles - Virtual Learning - Web Based Learning - Online Learning	
		P- 15 hrs Total - 15 hrs

TEXT BOOKS

1. Adam, D.M (1985) Computers and Teacher Training: A Practical Guide, The Haworth Pren, Inc, N.Y
2. Das, R.C (1993) Educational Technology _ A Basic Text, Sterling Publishers, Pvt. Ltd.
3. Haas, K.B. and Pecker, H.Q. 91990) Preparation and Use of Audio Visual Aids, 3rd Edition, Prentice Hall, Inc.
4. Mukhopadhyay, M. (1990) Educational Technology – Challenging Issues, Sterling Publishers Pvt. Ltd, New Delhi.
5. Sambath at.al (1981) Introduction to Educational Technology. Sterling Publishers Pvt. Ltd.
6. Sharma. B.M. (1994) Media and Education: New Delhi, Common wealth Publishers.

REFERENCES

1.Venkataiah, N. (1996) Educational Technology, New Delhi: APH Publishing Corporation.

Mapping of COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	0	0	3	1	1	1	2	2	1	3
CO2	0	0	2	1	2	1	2	2	1	3
CO3	0	0	3	1	1	1	2	2	1	3
Total	0	0	8	3	4	3	6	6	3	9
Course	0	0	3	3	3	3	2	2	2	3

1 - Low, 2 – Medium, 3 – High

Semester	**V**	
Subject Name	**TEACHING APPROACHES AND STRATEGIES**	
Subject Code	**XBE503**	
L –T –P –C **3- 1– 0- 4**	**C:P:A** **2:2:0**	**L –T –P –H** **3-1-0-4**

Course Outcome: ***On the successful completion of the course, students will be able to***		**Domain** **C or P or A**
CO1	Identify the basic principles of teaching	Cognitive
CO2	Relating the models of teaching with its characteristics	Cognitive
CO3	Describe the types of teaching and its methods	Psychomotor
CO4	Explain the effectiveness of teaching aids with Educational Technology	Psychomotor

COURSE CONTENT		
UNIT-I	**Understanding Teacher and Teaching**	
	Teaching – Definition, Meaning, Nature, Characteristics and Functions of Teaching. Principles of Teaching Maxim of Teaching. Structure of Teaching and phases of teaching – An analysis of Teacher functions, skills and competencies in the three phases: pre active phase – visualizing decision – making on outcomes and instructional – approaches and strategies, preparation and organization; Interactive Phase – facilitating and managing learning; post -active phase – assessment of leaning outcomes. Evaluation of teachers. Planning for teaching – unit plan and lesson plan. Characteristics associated with effective teachers. Teacher's professional identity	
UNIT –II	**Models of Teaching**	
	Meaning, definitions, characteristics of models of teaching. Concepts of teaching models. Types of Teaching models: Information processing model – concept attainment, Inquiry training, advance organizer, Inductive thinking. Social interaction Models – Social Inquiry, Group Investigation, classroom meeting Personal development model – Non-directive model, Awareness Training, Synaptic, conceptual system Behavior Modification models – Training, Stress reduction, desensitization.	
UNIT-III	**Methods of Teaching**	
	Traditional dynamic and progressive methods of teaching. Seven fold divisions of methods – small group, large group, Individualized teaching methods, autocratic and democratic methods, students centered and teacher centered methods. Lecture method, demonstration method, symposium, seminar, workshop, brainstorming, analytic and synthetic method, inductive and deductive method, project method, Dalton method, heuristic method, laboratory method, team teaching, tutorial method, textbook method. Programmed instruction, Computer Aided Instruction (CAI), Personalized System	

	of Instruction (PSI), Keller plan, role play (stimulation), story telling, play way method, Kinder Garten Method, Montessori Method, ABL Method, ALM method Micro Teaching Skills	
UNIT -IV	**Devices and techniques of teaching**	**12hrs**
	Meaning and significance of devices of teaching – assignments, homework, discussion, dramatization, evaluation, explanation, exposition, narration, note dictation, observation, story telling, study habits, supervised study, teacher's diary, text books. Fixing devices in teaching – importance and nature of fixing devices – drill, review of revision, questioning and answering	
UNIT - V	**Teaching aids and Educational Technology**	**12hrs**
	Effectiveness of teaching aids. Edgar Dale's cone of experience Classification according to stages; non – projected aids, projected aids. Projected aids – films, Filmstrips, OHP, Slides, LCD projector Non projected aids : graphic aids – cartoons, charts, comics, diagram, Flash cards, graphs, maps, photograph, pictures, posters. Display Board – Black board, bulletin, flannel board, magnetic board, pegboard. 3- Dimensional aids – diagram, models, mockups, objectives, puppets, speciemens. Audio aids- radio, recording, television Activity aids – CAI, PSI, CML, Programmed instruction, Audio – Visual aids – use of internet, video conferencing, CD, Multimedia **Sessional Work:** • Comparative study of syllabi of various subjects to identify content categories. • Writing instructional objectives of a lesson under domains and levels. • Practice on the skills of introducing, questioning, stimulus variation, illustrating and organizing learning activity. • Design learning episodes / activities and organize them in the classroom.	
	L-30hrs T-15 hrsTotal-45 hrs	

TEXT BOOKS

1. J. Mezirow and Associates (1990), Fostering critical reflection in adulthood: A guide to transformative and emancipatory learning: San Francisco: Jossey – Bass Publishers.
2. Smith, K. (1993). Becoming the "guide" on the side : Educational Leadership, 51(2), 35-37.
3. Darling – Hammond, Linda, et. Al. Excellence in Teacher Education : Helping Teachers Develop Learner – Centered School. Washington, D.C. National Education Association School Restructuring Series, 1992.
4. Savery, J. and Duffy, Thomas M. (1995). Problem based learning : An instructional model and its constructivist framework. Educational Technology, 35, 31-38.
5. Fosnot, Catherine Twoomey, Constructivism : Theory, Perspective and Practice. New York : Teachers College Press, 1989.

Vygotsky, L.S. Thought and Language, Cambridge, MA : MIT Press, 1962

REFERENCES

1. Austin, F M (1961) Art of Questioning in the Classroom, University of London Press Ltd., London.
2. Brown, J.S., Collins, A. and Duguid, S. (1989). Situated cognition and the culture of learning, *Educational Researcher*, 18(1), 32-42.
3. Davis, Irork (1971), The Management of earning, McGraw Hill, London.
4. L.Steffe and J. Gale (Eds.) 1995). *Constructivism in Education*, New Jersey : Lawrence Erlbaum Associates Inc.
5. B.Wilson, (1996) *Constructivist Learning Environments,* New Jersey : Educational Technology Publications.
6. Resnick, L. and Collins, A. (1996). Cognition and Learning. In T.Plomp and D.Ely, (Ed.) *The International Encyclopaedia of Educational Technology*, 2nd Ed. Oxford : Pergamon Press.
7. Vygotsky, L. (1978). *Mind in Society : The Development of Higher Psychological Processes,* MA : Harvard University Press.
8. G.Boomer, N. Lester, C. Onore and J.Cook (Eds.) (1992). Negotiating the curriculum : Educating for the 21st century, London : The Falmer Press.
9. Dewey, J. (1916). Democracy and Education. New York : The MacMillan Company.
10. Kelly, G.A. (1991). The psychology of personal constructs Volume one – A Theory of Personality, London : Routledge.
11. Langer, J. and Applebee, A.N. (1987). How writing shapes thinking : A Study of Teaching and Learning, National Council of Teachers of English.
12. Lindfors, J. (1984). How children learn or how teachers teach? A Profound confusion: Language Arts, 61 (6), 600-606.
13. Savery, J. and Duffy, Thomas M. (1995). Problem based learning : An instructional model and its constructivist framework. Educational Technology, 35, 31-38.
14. Fosnot, Catherine Twoomey, Constructivism : Theory, Perspective and Practice. New York : Teachers College Press, 1989.
15. Vygotsky, L.S. Thought and Language, Cambridge, MA : MIT Press, 1962

Resource Websites:

- http://www.thirteen.org/edonline/concept2class/constructivism/index.html.
- www.ipn.uni-kiel.de/projekte/esera/book/b001-cha.pdf
- http://www.ericdigests.org/1999-3/theory.htm
- http://www.ncrel.org/sdrs/areas/issues/students/atrisk/at6lk36.htm
- http://saskschoolboards.ca/research/instruction/97-07.htm
- http://www.ed.psu.edu/CI/Journals/1998AETS/t1_7_freeman.rtf

Mapping COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	0	3	3	1	1	1	2	2	1	0
CO2	0	3	2	1	2	1	2	2	1	0
CO3	0	3	3	1	1	1	2	2	1	0
CO4	0	3	2	1	2	1	1	2	1	1
CO5	0	3	2	1	2	1	1	2	1	1
Total	0	15	12	5	8	5	8	10	5	1
Scaled Value	0	2	0	3	3	3	0	3	2	3

0-No relation 3- Highly relation 2- Medium relation 1– Low relation

Semester	**V**		
Subject Name	**PEDAGOGY OF MATHEMATICS-I**		
Subject Code	**XBE504A**		
L –T –P –C **3– 0– 0–3**	**C :P:A** **3:0:0**	**L –T –P –H** **3– 0– 0– 3**	

Course Outcome: ***On the successful completion of the course, students will be able to***		**Domain C or P or A**	**Level**
CO1	**Understanding** the characteristics of Mathematical language and its role in Science	Cognitive	Understanding
CO2	**Identify** the aims and objectives of teaching mathematics for secondary schools	Cognitive	Applying
CO3	**Applying** the strategies for mathematical learning and **elaborate** the attainment and uses of concepts	Cognitive	Applying Creating
CO4	**Trace** the generalization of teaching mathematics & **analyze** the strategies involved in teaching mathematics	Cognitive	Analysing
CO5	**Utilize** the additional resources for learning mathematics and **determine** the recreational followed in mathematics	Cognitive	Evaluating Applying

COURSE CONTENT		
UNIT-I	**Nature and Scope of Mathematics**	
	Meaning and dimensions of mathematics, the nature of mathematical propositions; truth values, compound propositions; truth tables; open sentences; truth sets; Venn diagram; logically valid conclusions; use of quantifiers. Implications - one way and two way - necessary and sufficient conditions. A mathematical theorem and its variants - converse, inverse and contra positive, undefined terms in mathematics; quasi definitions and definitions in mathematics; the defining properties of a definition. Difference between proof and verification - Difference between pure and applied mathematics; History of mathematics with special emphasis on Indian mathematian.	
UNIT –II	**Aims and Objectives of Teaching Secondary School Mathematics and Planning for Instruction**	
	Need for establishing general objectives for teaching mathematics, Study of the aims and general objectives of teaching mathematics vis-à-vis the objectives of secondary education. Writing specific objectives of different content categories in mathematics-Selecting the content for instruction, identifying teaching points	

	for a mathematics lesson; organization of content. Stating instructional objectives for a mathematics lesson and identifying learning outcomes in behavioural terms; Writing lesson plans for mathematics lessons; Planning a unit of instruction in mathematics. Designing – learning experiences; appropriate strategies; teaching aids; evaluation tools, etc.	
UNIT-III	**Strategies for Learning Mathematical Concepts**	
	Nature of concepts, concept formation and concept assimilation, Moves in teaching a concept - defining, stating necessary and/or sufficient condition, giving examples accompanied by a reason. Comparing and contrasting; giving counter examples; non examples; Use of Concept Attainment and Advance Organizer Models, planning and implementation of strategies in teaching a concept	
UNIT -IV	**Teaching of Generalisation**	
	By exposition*:* Teaching by exposition, Moves in teaching a generalization; introduction, Introduction moves - focus move, objective move, motivation move - Assertion move, application move, interpretation moves, justification moves - planning of expository strategies of teaching generalizations. By guided discovery: Nature and purpose of learning by discovery, Inductive, deductive - guided discovery strategies, Maxims for planning and conducting discovery strategies; planning of strategies involving either induction or deduction or both.	
UNIT - V	**Utilizing Additional Resources for learning Mathematics, Strategies and recreational Mathematics**	
	Resources of Learning Mathematics: Organising mathematics laboratory, library, club Strategies for improving effective problem solving skills: Short cut methods – rapid calculation, simple multiplication – tests of divisibility – methods to develop speed and accuracy Recreational Mathematics: Recreational mathematics – riddles, puzzles, paradoxes, beautiful number patterns, magic squares, unsolved problems **Learning Theories and Strategies Resources** Individualized learning techniques – concept mapping, Keller plan and learning packages – Dalton plan – benefits, criticisms – supervised study - Programmed learning and computer assisted instruction. Group learning techniques – Cooperative learning, Buzz sessions, Group discussions –mathematical games. Learning Resources: Classroom conditions for learning mathematics – characteristics and role of mathematics teacher – text book preparation – structure and uses – workbook and its uses **Sessional Work:** 1. Analysis of a unit/chapter in a mathematics textbook to identify the concepts, principles and processes and to understand the underlying mathematical structures. 2. Stating specific objectives for a mathematics lesson. 3. Identification and evaluation of moves and teaching skills used in a	

	lesson/lesson plan. 4. Planning and implementation of appropriate strategies for teaching mathematical concepts and generalizations in simulated and real classroom situations. 5. Construction of appropriate test items to measure different outcomes of learning concepts and generalization. 6. Identification of students' learning difficulties and their remediation.
	L-30hrs T-15 hrsTotal-45 hrs

TEXT BOOKS

:

1. Butler and Wren (1965). , The Teaching of Secondary Mathematics, London: McGraw Hill Book Company.
2. Cooney, T.J. and Others (1975), Dynamics of Teaching Secondary School Mathematics, Boston: Houghton Mifflin.
3. Kapfer, Miriam B (1972). Behavioural objectives in Curriculum Development: Selected Readings and Bibliography. Englewood Cliffs, NJ: Educational Technology.
4. Mager, Robert (1962). Preparing instructional objectives, Palo Alto, C A: Fearon.
5. NCERT, A textbook of Content-cum-Methodology of Teaching Mathematics, New Delhi: NCERT.
6. Polya, George (1957) How to solve it, Garden City, New York: Doubleday.
7. Servas, w and T. Varga. Teaching School Mathematics - UNESCO Source Book.
   State text books in Mathematics of Southern Region from Class VI to X

REFERENCES

1. Butler and Wren (1965). , The Teaching of Secondary Mathematics, London: McGraw Hill Book Company.
2. Cooney, T.J. and Others (1975), Dynamics of Teaching Secondary School Mathematics, Boston:

Periodicals

a Journal of Research in Mathematics
b Mathematics Teaching
c School Science and Mathematics
d. The Mathematics Teacher

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	3	3	1	1	1	2	2	1	0
CO2	2	3	2	1	2	1	2	2	1	0
CO3	2	3	3	1	1	1	2	2	1	0
CO4	2	3	2	1	2	1	1	2	1	1
CO5	2	3	2	1	2	1	1	2	1	1
Total	10	15	12	5	8	5	8	10	5	1
Course	3	2	0	3	3	3	0	3	2	3

1-5 →1, 6-10 →2, 11-15 →3

0-No relation 3- Highly relation 2- Medium relation 1– Low relation

Semester	**V**	
Subject Name	**PEDAGOGY OF PHYSICS – I**	
Subject Code	**XB504B**	
L –T –P –C **3- 0 – 0- 3**	**C:P:A** **2: 1: 0**	**L –T –P –H** **3- 0 – 0- 3**
Course Outcome: On the successful completion of the course, students will be able to		**Domain** **C or P or A**
CO1	**Construct** the teaching objectives and prepare the lesson plan, unit plan and course plan.	Cognitive
CO2	**Analyze** the nature and scope of teaching physical science	Cognitive
CO3	**Demonstrate** the learning approaches in physical science & **construct** the concept mapping tools of learning	Cognitive Psychomotor
CO4	**Explain** the teachers role in learning physical science	Cognitive Psychomotor
COURSE CONTENT		
UNIT-I	**Teaching objectives and planning**	

	Aims and objectives of teaching of physical science - Bloom's taxonomy of educational objectives: General and specific instructional objectives and general and specific learning outcomes (GIOs & SIOs) relating to the cognitive, affective and psychomotor domains'. Lesson plan, Essential features of Lesson planning and its importance. Preparing lesson plans. unit plan, course plan, observation – Demonstration lesson – Teacher educators – guide teachers – peer group – Feed back.
UNIT –II	**Nature and scope of knowledge in physical science**
	What is science? Nature of Science. Development of scientific knowledge – observation, experimentation, classification. Concept, facts, theories and generalizations. Historical status of Physical Science and chemists to the knowledge domain of Physical Science with special reference to the methods of discovery / investigation adopted. The place of Physical Science in the school science curriculum. Integration of knowledge in Physical Sciences with the other school subjects. Application of Physical Science knowledge
UNIT-III	**Learning resources and preparation of materials**
	Preparation and use of learning aids contextually. Planning of science labs – facilities, equipments, materials and manuals, science records, maintenance and management of science labs. Planning of science Parks – utilization of science park as a learning resource in physical science. Audio – visual materials – charts, models, handbooks, laboratory guides, science kits, self-learning materials, worksheets.
UNIT -IV	**The changing emphasis in learning of physical science**
	The changing trends in the goals and objectives of learning of physical science in 21st century. Development of process skills (Observation, Classification, interpretation, control o variables, measuring, experimenting, hypothesizing, inferring, predicting and communicating). Stating objectives in terms of learning process. Metacognitive thinking and learning of physical science. Learner as a constructor of knowledge. Alternative conceptualizations (misconceptions) of students and teachers in physical science (some examples).
UNIT - V	**Approaches to constructing knowledge in Physical Science**
	Approaches to concept learning, conceptual change model (reconstructing ideas about certain Physical science concepts). Different types of inquiry methods; problem solving strategies; investigatory approach; guided discovery approach; inductive method; learning through projects. Concept mapping as a tool of learning. Cooperative and collaborative learning; group investigation, Self learning strategies **Teachers' Role as a facilitator** Providing multiple learning contexts and opportunities, encouraging students ownership of knowledge and engagement in the learning process, effective ways of questioning, engaging in learning episodes, helping learners to develop the attitudes of the rational problem solver, taking account of students' prior knowledge – encouraging students' inquiry abilities, valuing students' ideas and small group work, different ways of scaffolding and negotiating.

	L- 30hrs T- 15hrs Total - 45 hrs

TEXT BOOKS

1. ***Steve Alsop, Keith Kicks (2007)*** Teaching Science: A Handbook for primary and secondary school teacher, Kogan Page, New Delhi.
2. ***Judith Bennett (2003)*** Teaching and Learning Science: A guide to recent research and its applications, Continuum, London.
3. ***Robin Millar(1984)*** Doing Science: Images of science in science education, The Falmer Press, London

REFERENCES

1. National Curriculum Framework 2009, NCERT, New Delhi.
2. ***Steve Alsop, Keith Kicks (2007)*** Teaching Science: A Handbook for primary and secondary school teacher, Kogan Page, New Delhi.
3. ***Judith Bennett (2003)*** Teaching and Learning Science: A guide to recent research and its applications, Continuum, London.
4. ***Robin Millar(1984)*** Doing Science: Images of science in science education,

a. The Falmer Press, London.

5. NCERT Textbook in Physics for VIII to X Students
6. NCERT Textbook in chemistry for VIII to X Students
7. State Textbook in Science for VIII to X Students
8. ***Sharma, P.C. (2006).*** Modern Science Teaching, Dhanpat Rai Publications,

a. New Delhi.

9. ***Nayak, (2003).*** Teaching of Physics, APH Publications, New Delhi.
10. ***Pandey, (2003).*** Major Issues in Science Teaching, Sumit Publications,

a. New Delhi.

11. ***Yadav, M.S. (2003).*** Teaching of Science, Amol Publications.
12. ***Jenkins, E.W. (Ed.) (1997).*** Innovations in Science and Technology Education,

a. Vol. VI,

13. ***Gupta, S.K. (1985).*** Teaching of Physical Science in Secondary Schools, Sterling

a. Publication Pvt. Ltd.

14. ***Heiss, Obourn & Hoffman (1985).*** Modern Science in Secondary Schools, Sterling Publication (Pvt.) Ltd.
15. ***Passi, B.K.,*** Becoming a Better Teacher, Micro Teaching Approach.
16. ***Sharma, R.C. (1985).*** Modern Science Teaching, Dhanpat Rai and Sons.
17. ***Siddifit Siddiqi, (1985).*** Teaching of Science Today and Tomorrow, Doals House.
18. ***Patton, M.Q. (1980).*** Qualitative Evaluation Methods, Sage Publications, India.
19. ***Panner Selvam, A. (1976).*** Teaching of Physical Science (Tamil), Government of Tamil Nadu.
20. ***Nair, C.P.S. (1971),*** Teaching of Science in our Schools, Sulthan Chand & Co. Pvt. Ltd.
21. ***Rao, C.S. (1968).*** Science Teacher's Handbook, American Peace Crops.
22. ***Joseph, (1966).*** The Teaching of Science, Harvard University Press.
23. ***Owen, C.B. (1966).*** Methods of Science Master, The English Language Society and Macmillan Company Limited.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	3	3	1	1	1	2	2	1	0
CO2	2	3	2	1	2	1	2	2	1	0
CO3	2	3	3	1	1	1	2	2	1	0
CO4	2	3	2	1	2	1	1	2	1	1
CO5	2	3	2	1	2	1	1	2	1	1
Total	10	15	12	5	8	5	8	10	5	1
Course	3	2	0	3	3	3	0	3	2	3

1-5 →1, 6-10 →2, 11-15 →3

0-No relation 3- Highly relation 2- Medium relation 1– Low relation

Semester	**V**	
Subject Name	**PEDAGOGY OF COMPUTER SCIENCE - I**	
Subject Code	**XBES504C**	
L –T –P –C **3 – 0 –0–3**	**C:P:A** **2:0:1**	**L –T –P –H** **3 –0 – 0 – 3**

Course Outcome:		**Domain C or P or A**
CO1	Recognize and identify the importance of teaching computer science	Cognitive
CO2	Reproduce the concepts of Bloom's taxonomy	Cognitive Affective
CO3	Classify the different computer aided instruction methods	Cognitive
CO4	Identify the resources for computer science teaching	Cognitive
CO5	Follows the lab planning and managing concepts	Cognitive Affective

COURSE CONTENT

UNIT I	Introduction
	The nature and scope of knowledge in Computer Science- What is Computer Science? – Nature of computer science- historical status of computer science – contributions of Indian and international computer scientists to the knowledge of computer science with special reference to the methods of discovery / investigation adopted – the phase of computer science in the

	school curriculum- integration of knowledge in computer science with other school subjects- applications of computer knowledge in daily life.
UNIT II	**Teaching Objectives and Planning**
	Aim and objectives of teaching of computer science- Bloom's taxonomy of educational objectives – general and specific instructional objectives – general and specific learning outcomes relating to the cognitive, objective and psychomotor domains- lesson plan – unit plan- course plan – model lesson plan – observation – demonstration lesson – teacher educators – guide teachers – peer group – feedback
UNIT III	**Methods of teaching computer science**
	Individualised instruction – Programmed Instruction – Computer Assisted Instruction(CAI) – steps of developing CAI – modes of CAI – benefits of CAI – limitations of CAI – role of teachers in CAI – Computer managed instruction – lecture, demonstration – problem solving – project methods – scientific methods – analytic and synthetic methods – inductive and deductive approaches of teaching computer science.
UNIT IV	Resources of teaching Computer Science
	Text book, programmed instruction materials, co-curricular activities – organisation of computer science club, exhibitions and fairs – community resources – current affairs and issues – websites – online library – ebooks.
UNIT V	**Planning and Maintenance of Computer Science Laboratory**
	Planning and Maintenance of Computer Science Laboratory Need for planning the computer science laboratory – special features of computer laboratory- essential infrastructure – laboratory management – organization of practical – maintenance of records. **Computer Science Teacher and professional development** Academic and professional qualification – special qualities required for a computer science teacher – need and importance of in-service training of a computer science teacher – professional ethics of computer science teacher.
	L: 45 T: P: Total 45

TEXT BOOKS

1. ***V. Natarajan*** (2009), Teaching Methodology in Computer Education (Tamil and English Edition), Santha Publishers, Chennai
2. ***Bhatia, KK***. Measurement and Evaluation in Education, Ludhiana: Prakash brothers.

REFERENCES

1. ***Arul Jothi, D.L.Balaji, Rajash Verma***(2009), Computer and Education, Centrum press, New Delhi, (India)
2. ***V. Natarajan*** (2009), Teaching Methodology in Computer Education (Tamil and English Edition), Santha Publishers, Chennai
3. ***Bhatia, KK***. Measurement and Evaluation in Education, Ludhiana: Prakash brothers.
4. ***Sharma, R.A (2003)***. Advances Statistics in Education and Psychology, Meerut, R. Lall Book Depot.

5. ***Werma E. Gronlund*** - Measurement and Evaluation in teaching, Collier, Macmillan International Edition.
6. ***Singh, Y. K.*** (2009). Teaching Practice. New Delhi: APH Publishing Corporation.
7. ***Sharma, R. N.*** (2008). Principles and Techniques of Education. Delhi: Surjeet Publications.

Mapping of CO's with PO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	3	3	1	1	1	2	2	1	0
CO2	2	3	2	1	2	1	2	2	1	0
CO3	2	3	3	1	1	1	2	2	1	0
CO4	2	3	2	1	2	1	1	2	1	1
CO5	2	3	2	1	2	1	1	2	1	1
Total	10	15	12	5	8	5	8	10	5	1
Course	3	2	0	3	3	3	0	3	2	3

0-No relation 3- Highly relation 2- Medium relation 1– Low relation

Semester	**V**	
Subject Name	**PEDAGOGY OF CHEMISTRY - I**	
Subject Code	**XBEC504C**	
L –T –P –C **3 – 0 –0–3**	**C:P:A** **3:0:0**	**L –T –P –H** **3 –0 – 0 – 3**

Course Outcome: On the successful completion of the course, students will be able to		**Domain C or P or A**
CO1	critically analyze the curriculum/evaluation practices of teaching of Chemistry in school to bring about changes in future to promote better pedagogy	Cognitiv
CO2	Comprehends the objectives of teaching and planning the skills in learning	Cognitive
CO3	Analyze the effective transaction and evaluation in teaching chemistry	Cognitive
CO4	Evaluate the essential of the laboratory professional development of a chemistry teacher	Cognitive

COURSE CONTENT		
UNIT I	**CHEMISTRY IN SCHOOL CURRICULUM**	
	• Aims and Objectives of Teaching Chemistry: meaning and need of Objective Based Teaching - General and specific aims of teaching chemistry at senior secondary level - Specific objectives in behavioural terms in chemistry. • Meaning, nature and scope of Chemistry as a discipline in Science. • Significance of chemistry in daily life and its relevance to Social and Environmental Issues. Major Landmarks and Contributions in the field of Chemistry.	

UNIT II	**INSTRUCTIONAL PLANNING**
	• Micro Teaching, Unit Planning and Lesson Planning • Planning for Laboratory Demonstration/Experimentation • Approaches and Methods of Teaching Chemistry (Illustrations of the use of these approaches methods taking examples from specific content in Chemistry) a) Concept mapping approach - meaning of concept, concept formation with reference to preparation of concept maps B) Process approach - teaching science as a process, Problem solving method. c) Cooperative learning approach. d) Activity based approach - investigatory approach, project method, Laboratory method. e) Constructivist approach
UNIT III	**CHEMISTRY CURRICULUM: EFFECTIVE TRANSACTION AND EVALUATION**
	Characteristics of an effective Chemistry curriculum. • A critical study of present Chemistry curriculum at secondary/senior secondary school. • Textbook in Chemistry - its need and use, evaluation of a textbook. Instructional Aids in Chemistry • Use of audio-visual aids in teaching of Chemistry with special reference to new technologies like interactive TV, Computer Aided Instruction. • Use of community resources and Preparing low cost teaching aids. • Laboratory Demonstrations and Experiments: Organisation and Conduct in the Chemistry Laboratory • Planning and Organization of co-curricular activities in Chemistry Planning and execution of Extended Experiences: • Excursions • Science Exhibition • Science Fair • Science Quizzes • Science Club Evaluation of Learners' Progress • Evaluation: Need, Concept and Scope. • Comprehensive & Continuous evaluation, need & importance of class tests. • Achievement test-its construction, administration and item analysis.
UNIT IV	**PROFESSIONAL DEVELOPMENT OF A CHEMISTRY TEACHER**
	Competencies associated with laboratory techniques. • Maintenance of Chemistry Lab.: Safety, security and preventive measures. • Need for professional development at Individual, Organizational and Government levels. • Need and Relevance of Participation in Seminars, Workshops, Conferences, Symposia etc well as membership of Professional Organisations in Professional development of teachers. • Field Visits to Institutions /Organisations such as Other Schools, Museums, Parks, Research Organisations etc: Need and Relevance for Professional development Preparing the Teacher for Technology Integration: Planning with integrating Technology for inquiry (NTEQ) in Science at secondary school level. • Action research: Concept and Identification of problems faced by the teachers in the classroom
	L: 30 T:15 P: Total -45
TEXT BOOKS	
1. Madan R.D., Juli G.D and Malik S.M.,Selected Topics in Inorganic Chemistry, S. Chand & Co, New Delhi (2006) 2. Lee J.D., Concise Inorganic Chemistry , ELBS Edition.	
REFERENCES	
1. Soni P.L.,Text Book of Inorganic Chemistry, S, Chand & Co, New Delhi (2006). 2. Puri B.R., Sharma L.R. and Kalkithar, Principles of Inorganic Chemistry, New Delhi	

(2002)..

Mapping of CO's with PO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	3	3	1	1	1	2	2	1	0
CO2	2	3	2	1	2	1	2	2	1	0
CO3	2	3	3	1	1	1	2	2	1	0
CO4	2	3	2	1	2	1	1	2	1	1
CO5	2	3	2	1	2	1	1	2	1	1
Total	10	15	12	5	8	5	8	10	5	1
Course	3	2	0	3	3	3	0	3	2	3

1-5 →1, 6-10 →2, 11-15 →3 0-No relation 3- Highly relation 2-Medium relation 1– Low relation

Semester	**V**		
Subject Name	**SEQUENCES AND SERIES**		
Subject Code	**XCB505**		
L –T –P –C **4 –1 –0 – 5**	**C : P: A** **5:0:0**	**L: T:P: H** **5– 1- 0 - 6**	
Course Outcome:			**Domain C or P or A**
CO1	Quote and understand the definition of a limit of sequence or a function and the corresponding theorem		Cognitive
CO2	Define and Explain Infinite series, convergence, divergence and oscillation of a series and necessary condition of a series.		Cognitive
CO3	Apply the basic tests for convergence of infinite series		Cognitive
CO4	Demonstrate an understanding of Cauchy's condensation root test.		Cognitive
CO5	Understand and be able to use Wilson's theorem, Fermat' little theorem and Lagrange's theorem.		Cognitive
COURSE CONTENT			
UNIT-I			**9hrs**
	Sequence (definition), Limit, Convergence of a sequence - Cauchy's general principle of convergence - Cauchy's first theorem on Limits - Bounded sequences – monotonic sequence always tends to a limit, finite or infinite - Limit superior and Limit inferior .		
UNIT –II			**9hrs**

	Infinite series - Definition of Convergence, Divergence & Oscillation – Necessary condition for convergence – Convergence of $\sum \frac{1}{n^p}$ and Geometric series. Comparison test, D'Alembert's ratio test, and Raabe's test (Simple problems based on above tests).	
UNIT-III		**9hrs**
	Cauchy's condensation Test, Cauchy's root test and their simple problems - Alternative series with simple problems.	
UNIT -IV		
	Theory of Numbers – Prime & Composite numbers – divisors of a given number N - Euler's function φ (N) and its value – The highest power of a prime P contained in N ! – Congruences – Fermat's, Wilson's & Lagrange's Theorems.	
	L=60hrs T- 15 hrs Total –75 hrs	

TEXT BOOKS

[1] T.K. Manicavachagam Pillai, T. Natarajan, K.S. Ganapathy, Algebra, Vol. I, S.Viswanathan Pvt. Limited, Chennai, 2004

[2] T.K. Manicavachagam Pillai & others Algebra volume II, S.V.Publications – 1985 Revised Edition.

REFERENCES

[1]. M.K.Singal & Asha Rani Singal, A first course in Real Analysis, R.Chand & Co. 1999.

[2]. D.C.Sancheti, V.K.Kapoor, "Business Mathematics" Sultan Chand & Sons, 1993.

Mapping of CO's with PO's:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PSO1
CO1	3	0	0	2	2	0	1	0	0	1	1
CO2	3	0	0	2	1	0	1	0	0	1	2
CO3	3	0	0	2	2	0	1	0	0	1	1
CO4	3	0	0	2	2	0	1	0	0	1	1
CO5	3	0	0	2	1	0	1	0	0	1	2
Total COs	15	0	0	10	8	0	5	0	0	5	7
Scaled	3	0	0	2	2	0	1	0	0	1	2

1-5 →1, 6-10 →2, 11-15 →3

0-No relation 3- Highly relation 2- Medium relation 1– Low relation

Semester	**V**		
Subject Name	**ELECTRICITY AND MAGNETISM**		
Subject Code	**XBE506**		
L –T –P –C **3- 1 – 0- 4**	**C:P:A** **3:0:1**	**L –T –P –H** **4- 1 – 0- 5**	

Course Outcome:		**Domain** **C or P or A**
CO1	To study Coulomb's law and Gauss theorem and its applications and also the principle and types of capacitors	Cognitive
CO2	To understand the principle of Magneto statics, magnetic effects of electric current and their applications.	Cognitive Psychomotor
CO3	To understand the Kirchhoff's law, Wheatstone's bridge and their applications	Cognitive Affective
CO4	To study See beck effect, Peltier effect and Thomson effect and their applications	Cognitive
CO5	To understand the principle of electromagnetic induct ion and ac circuits	Cognitive Affective

COURSE CONTENT

UNIT-I	**ELECTROSTATICS**
	Coulomb's law – Proof – Mechanical force experienced by unit area of a charged surface – Gauss Theorem (Statement), Derivation of Coulomb's inverse square law from Gauss law – Relation between electric field and potential – Potential at a point due to a uniformly charged conducting, Non conducting spheres.
UNIT –II	**CURRENT ELECTRICITY**
	Kirchoff's Laws of Electricity(Statement), Wheatstone's bridge – Carrey Foster's Bridge – See beck effect, Peltier effect, Thomson effect – Thermodynamics of thermocouple – Thermo electric diagrams – Determination of Thomson, Peltier coefficient
UNIT-III	**ELECTROMAGNETIC INDUCTION**
	Electromagnetic Induction, Laws, Self induction, Mutual Induction, Self Inductance by Rayleigh Method - experimental determination of mutual inductance – coefficient of coupling – Charge and Discharge of a Capacitor through a resistor –High resistance by leakage.
UNIT -IV	**ALTERNATING CURRENT**
	Series and parallel resonance circuit – Resonance condition – their comparison – LC, LR, CR - AC Circuits – choke coil – Transformer – theory with and without load – uses.
UNIT - V	**MAGNETIC PROPERTIES OF MATERIALS**
	Permeability, Susceptibility (Definition only) - Relation between them – Properties of dia,para and Ferro magnetic materials –Lange vein's theory of dia

	and para magnetism – B-H curve-Energy loss due to hysteresis –Importance of hysteresis curves.
	L-45 T- 15 hrs Total-60 hrs

TEXT BOOKS

1. Electricity and Magnetism by R. Murugeshan (2008) S. Chand & Company Ltd. New Delhi.
2. Electricity and Magnetism by Brijlal and N. Subrahmanyam.(2000) Ratan Prakashan Mandir. Agra.
3. A text book of Electricity and Magnetism – K.K.Tiwan

REFERENCES

1. Electricity and Magnetism by D.L. Sehgal, K.L. Chopra and N.K. Sehgal 5th Edition (1996). Sultan chand & Sons. New Delhi.
2. Engineering Electromagnetism – William Hayt – TMH ed.
3. Introduction to Electromagnetic theory – D.Kraus – Wiley Eastern.

Mapping of CO's with PO's:

Course Outcomes	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PSO1
CO1	3	0	0	2	2	0	1	0	0	1	1
CO2	3	0	0	2	1	0	1	0	0	1	2
CO3	3	0	0	2	2	0	1	0	0	1	1
CO4	3	0	0	2	2	0	1	0	0	1	1
CO5	3	0	0	2	1	0	1	0	0	1	2
Total COs	15	0	0	10	8	0	5	0	0	5	7
Scaled	3	0	0	2	2	0	1	0	0	1	2

0-No relation 3- Highly relation 2- Medium relation 1– Low relation

Semester	**V**		
Subject Name	**INORGANIC CHEMISTRY – I**		
Subject Code	**XBEC507**		
L –T –P –C **3- 1 – 0- 4**	**C:P:A** **2.8:0.8:0.4**	**L –T –P –H** **4- 1 – 0- 5**	
Course Outcome:			**Domain** **C or P or A**

CO1	***Recall*** and ***Explain*** the basic concepts of coordination chemistry; ***Display*** the shape and coordination modes of molecules using various theories.	Cognitive Psychomotor
CO2	***Summarize and Discuss*** the stability of octahedral and square planar complexes.	Cognitive Affective
CO3	***Discuss*** and Report the various applications of coordination compounds in quantitative analysis.	Cognitive Affective
CO4	***Describe*** the various packing arrangements of atoms and ***Analyze*** the type of semiconductors	Cognitive Psychomotor
CO5	***Classify*** the types of organometallic compounds and ***Summarize*** their preparation and applications	Cognitive

COURSE CONTENT

UNIT-I	**COORDINATION CHEMISTRY I**
	Types of ligands - IUPAC nomenclature - Isomerism - theories of coordination compounds - Werner, Sidgewick, valence bond, crystal field and molecular orbital theories.
UNIT –II	**COORDINATION CHEMISTRY II**
	Stability of complexes - factors affecting the stability of complexes - unimolecular, bimolecular and nucleophilic substitution reactions in octahedral and square planar complexes - trans effect - magnetic properties of transition metal complexes - elementary idea of electronic spectra of transition metal complexes
UNIT-III	**APPLICATION OF COORDINATION COMPOUNDS**
	Application of coordination compounds - estimation of nickel using DMG and aluminium using oxine – estimation of hardness of water using EDTA - biologically important coordination compounds - chlorophyll, haemoglobin, vitamin B_{12} - Their structure and application - metal carbonyls - mono and poly nuclear carbonyles of Ni, Fe, Cr, Co and Mn - synthesis and structure - nitrosyl compounds - classification, preparation and properties - structure of nitrosyl chloride and sodium nitroprusside.
UNIT -IV	**METALLIC BONDING**
	Metallic state - packing of atoms in metal (BCC, FCC, HCP and Simple cube) - theories of metallic bonding - electron gas, Pauling and band theories - semi conductors - n-type and p-type, transistors - uses - structure of alloys - substitution and interstitial solid solutions
UNIT - V	**SOME SPECIAL TYPE OF COMPOUNDS**
	Organo metallic compounds of alkenes, alkynes and cyclopenta diene - binary compounds - hydrides, borides, carbides and nitrides - classification, preparation, properties and uses. Some special classes of compounds - clathrates - examples and structures - Interstitial and non - stoichiometric compounds - silicones - composition, manufacture, structure, properties and uses - silanes and their polymers -

	applications of phosphazenes – silicates and their polymers - classification into discrete anions - one, two and three dimensional structures with examples - composition, properties and uses of beryl, asbestos, tale, mica, zeolites and ultramarines.
	L-45 hrs T-15 hrs Total 60 hrs

REFERENCES

3. Soni P.L.,Text Book of Inorganic Chemistry, S, Chand & Co, New Delhi (2006).
4. Puri B.R., Sharma L.R. and Kalkithar, Principles of Inorganic Chemistry, New Delhi (2002).
5. Madan R.D., Juli G.D and Malik S.M.,Selected Topics in Inorganic Chemistry, S. Chand & Co, New Delhi (2006)
6. Lee J.D., Concise Inorganic Chemistry , ELBS Edition.

Mapping of COs with Pos

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	0	3	3	3	0	3	0	2
CO2	3	2	0	3	0	3	0	3	0	2
CO3	3	2	0	3	2	3	0	3	0	2
CO4	3	2	0	2	0	3	0	3	0	2
CO5	3	2	0	3	1	3	0	3	0	2
Total	15	10	0	14	6	15	0	15	0	10
Scaled value	3	2	0	3	2	3	0	3	0	2

Semester	**V**	
Subject Name	**DATABASE MANAGEMENT SYSTEMS**	
Subject Code	**XBES507**	
L –T –P –C **3- 1 – 0- 4**	**C:P:A** **3:0:1**	**L –T –P –H** **4- 1– 0- 5**
Course Outcome:		**Domain** C or P or A
CO1	Acquire knowledge about the various Data models	Cognitive
CO2	Understand the concepts data storage and queries	Cognitive

		Affective
CO3	Understand the basic concepts of XML and data mining	Cognitive
CO4	Discuss the transaction management	Cognitive
CO5	Reproduce and Describe the basics of XML	Cognitive
		Affective

COURSE CONTENT	
UNIT-I	**INTRODUCTION AND CONCEPTUAL MODELING**
	Introduction to File and Database systems - Database system structure – Data Models – Introduction to Network and Hierarchical Models – ER model – Relational Model – Relational Algebra and Calculus.
UNIT –II	**RELATIONAL MODEL**
	SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependences and Normalization for Relational Databases (up to BCNF).
UNIT-III	**DATA STORAGE AND QUERY PROCESSING**
	Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of Indexes- B-Tree - B+Tree – Query Processing.
UNIT -IV	**TRANSACTION MANAGEMENT**
	Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of Transaction- Schedule and Recoverability- Serialisability and Schedules – Concurrency Control – Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control – Recovery Techniques – Concepts- Immediate Update- Deferred Update - Shadow Paging.
UNIT V	**CURRENT TRENDS**
	Object Oriented Databases – Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogenous- Distributed data Storage – XML – Structure of XML- Data- XML Document- Schema- Querying and Transformation. – Data Mining and Data Warehousing.
	L=45 hrs T- 15 hrs Total –60 hrs

TEXT BOOKS

- Abraham Silberschatz, Henry F. Korth and S. Sudharsan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006.
- R. Elmasri, S.B. Navathe, “Fundamentals of Database Systems”, Pearson Education, 2004.

REFERENCES

- Raghu Ramakrishnan and Johannesgerhrke, “Database Management Systems”, Third

Edition, McGraw Hill, 2003.
- C.J Date, A. Kannan and S. Swamynathan, "An Introduction to Database Systems", Eighth Edition, Pearson Education, 2006.

Mapping COs with POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO 1	3	2	0	3	3	3	0	3	0	2
CO 2	3	2	0	3	3	3	0	3	0	2
CO 3	3	2	0	3	3	3	0	3	3	2
CO 4	3	2	0	3	3	3	0	3	3	2
CO 5	3	2	0	3	3	3	0	3	3	2
Total	15	10	0	15	15	15	0	15	9	10
Scaled Value	3	2	0	3	3	3	0	3	2	2

0-No relation 3- Highly relation 2- Medium relation 1– Low relation

Semester	**V**	
Subject Name	**PHYSICS PRACTICAL – V**	
Subject Code	**XBE508**	
L –T –P –C **0- 0 –2- 2**	**C-P-A** **1-1-0**	**L –T –P –H** **0 – 0- 2- 2**

	Course Outcome:	**Domain** **C or P or A**
CO1:	***Use*** laboratory techniques such as ***accuracy*** of measurements and ***determination*** of modulus of material.	Cognitive Psychomotor
CO2:	***Explain*** *and* ***give*** the characteristics of semiconductor devices.	Cognitive Psychomotor
CO3:	Gain ***knowledge*** and ***identify*** the various laws of thermal, viscous and surface tension.	Cognitive Psychomotor

CO4:	***Manipulate*** the optical, electrical and heat properties with excellent ***application*** knowledge.	Cognitive Psychomotor
CO5	***Use*** *basic* ***knowledge*** *to find resistance material.*	Cognitive Psychomotor
COURSE CONTENT		
	Choose any **EIGHT** Experiments only 1. Potentiometer- high range voltmeter. 2. Field along the axis of a coil- H determination. 3. Zener regulated power supply. 4. LCR series & parallel resonance circuit. 5. P.O. Box –Length of a resistance coil 6. Torsional pendulum – Comparison of radii. 7. Hartely Oscillator – Frequency and self inductance (L). 8. Carey Foster Bridge – Specific Resistance. 9. Potentiometer – E.M.F of a Thermocouple. 10. Spectrometer – i-d curve. 11. CRO study of wave forms – Lissajous – f-determination. 12. Half adder and full adder using basic logic gates IC's.	
	P-30hrs Total – 30 hrs	

Mapping of CO's with PO's:

COs	**PO_1**	**PO_2**	**PO_3**	**PO_4**	**PO_5**	**PO_6**	**PO_7**	**PO_8**
CO_1	3	3	2			2	1	1
CO_2	1	1	2				1	1
CO_3	3	3	2	2	2		1	1
CO_4	3	1	2				1	1
CO5	1	1	2		2		2	1
Scaled to 1, 2, 3	3	1	2	2	2	2	1	1

0-No Relation, 1- Low Relation, 2-Medium Relation, 3-High Relation

Semester	**V**		
Subject Name	**GRAVIMETRIC ANALYSIS LAB**		
Subject Code	**XBEC509**		
L –T –P –C **0- 0 –2- 2**	**C-P-A** **1-0.2-0.8**	**L –T –P –H** **0- 0 – 2- 2**	

Course Outcome:		**Domain** C or P or A
CO1	***Recall*** and ***Explain*** the basic concepts of coordination chemistry; ***Display*** the shape and coordination modes of molecules using various theories.	Cognitive Psychomotor
CO2	***Summarize and Discuss*** the stability of octahedral and square planar complexes.	Cognitive Affective
CO3	***Discuss*** and Report the various applications of coordination compounds in quantitative analysis.	Cognitive Affective

COURSE CONTENT

GRAVIMETRICANALYSIS:

1. Estimation of Lead as lead chromate.
2. Estimation of Barium as barium chromate.
3. Estimation of Nickel as Nickel - DMG complex.
4. Estimation of Copper as copper (I) thiocyanate
5. Estimation of Magnesium as magnesium oxinate
6. Estimation Calcium as calcium oxalate monohydrate
7. Estimation of Barium as barium sulphate.
8. Estimation of Iron as Iron (III) oxide.

Book for Reference :

1. Venkateswaran V, Veeraswamy R., Kulandaively A.R.,Basic principles of practical chemistry, 2nd edition, New Delhi, sultan chand & sons, (1997)

Mapping of CO's with PO's:

Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	0	3	3	3	0	2	0	2
CO2	3	2	0	3	3	3	0	2	2	2
CO3	3	2	0	2	3	3	0	2	2	2
Total	9	6	0	8	9	9	0	6	4	6
Scaled value	3	2	0	3	3	3	0	2	1	2

Semester	**V**	
Subject Name	**RDBMS LAB**	
Subject Code	**XBES509**	
L –T –P –C **0- 0 –2- 2**	**C-P-A** **1.2-0.8-0**	**L –T –P –H** **0- 0 – 2- 2**

Course Outcome:		**Domain** **C or P or A**
CO1	***Ability*** to implement RDBMS concept for simple problems and ***construct*** flow chart for real time problems.	Cognitive Psychomotor
CO2	***Demonstrate the use of*** various SQL commands And ***Write*** SQL queries	Cognitive Psychomotor
CO3	***Use*** the concept of SQL Tables	Cognitive

COURSE CONTENT

1. Create a table Student-master with the following fields client_no,name, address, city, state, pin code, remarks, blade with suitable data types.
   a) Create another table supplier table from client master. Select all the fields and rename client no with supplier no and name with supplier name. b) Insert data into client master
   c) Insert data into supplier master from client master.
   d) Delete the selected row in the client master.
2. Create a table sales order with s_order_no and product_no as primary key. Set other fields to store client number, delivery address, delivery date, order status.
   a) Add a new column for storing salesman number using ALTER Command. b) Set the_order_no as foreign key as column constraints.
   c) Set the s_order_no as foreign key as table constraints.
   d) Enforce the integrity rules using CHECK.
3. Create a table student_master with the following fields name, regno, dept and year with suitable data types. Use Select command to do the following. a) Select the student's name column.
   b) Eliminate the duplicate entry in table.
   c) Sort the table in alphabetical order.
   d) Select all the Students of a particular department.
4. Create a table sales_order_details with the s_order_no as primary key and with the following fields: product_no, description, qty_ordered, qty_disp,product_rate, profit_percent, sell_price, supplier_name.
   a) Select each row and compute sell_price*.50 and sell_price*1.50 for each row selected.
   b) Select product_no, profit_percent, Sell_price where profit_per is not between 10 and 20 both inclusive.
   c) Select product_no, description, profit_percent, sell_price where profit_percent is not between 20 and 30.
   d) Select the suppliername and product_no where suppliername has 'r' or 'h' as second character.
5. Create a table master_book to contain the information of magazine code, magazine name, publisher. Weekly/biweekly/monthly, price. Write PL/SQL block to perform insert, update, delete operations on the above table.

6. Create a table to contain phone number, user name, address of the phone user. Write a function to search for a address using phone numbers.
7. Create a table stock to contain the item-code, item-name, current stock, date of last purchase. Write a stored procedure to seek for an item using item-code and delete it, if the date of last purchase is before 1 year from the current date. If not, update the current stock.
8. Create a table to store the salary details of the employees in a company. Declare the Cursor to contain employee number, employee name and net salary. Use Cursor to update the employee salaries.
9. Create a table to contain the information about the voters in a particular constituency. Write a proper trigger to update or delete a row in the table.
10. Create a table to store the details of the Aluminous in an institution. Write a PL/SQL block to change address of a particular alumini. Write proper exceptions and appropriate error messages.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO 1**	**PSO2**
CO 1	1	2	1		1	1	**1**	**1**		2	1	1	2	4
CO 2	1		2	1	1	1	**1**	**1**		**1**		2	1	3
CO 3	2	2	3	1	1	2		**1**					2	1
	4	4	6	2	3	4	**2**	**3**		**3**	1	3	5	8

1 - Low, 2 – Medium, 3 – High

Semester	**V**	
Subject Name	**PRACTICUM AND SCHOOL INTERNSHIP - III**	
Subject Code	**XBE510**	
L –T –P –C **0- 0– 2- 8**		**L –T –P –H** **0- 0– 2- 2**
		School Internship

In the III semester the student's teachers will undergo internship in teaching for 3 weeks the student 's teacher will be engaged in the following activities and preparation of records.

a. Observation
b. Case Study
c. Field Visit

Semester	**VI**	
Subject Name	**INDIAN CONSTITUTION AND HUMAN RIGHTS**	
Subject Code	**XBE601**	
L –T –P –C **2- 0– 0- 2**	**C:P:A** **2:0:0**	**L –T –P –H** **2- 0 – 0- 2**

Course Outcome:		**Domain C or P or A**
CO1	Know the importance, preamble and salient features of Indian constitution	Cognitive
CO2	Appreciate the significance of fundamental rights, duties and directive principles of state policy	Cognitive
CO3	Develop an understanding of the strength of the union government	Cognitive
CO4	Know the meaning, significance, the growing advocacy of human rights.	Cognitive

COURSE CONTENT

UNIT I	**INTRODUCTION TO THE CONSTITUTION OF INDIA**	
	Preamble – constitution assembly of India – philosophical foundations of the Indian constitution – fundamental rights – fundamentals duties and the directive principles of the state policy of the Indian constitution – Union Government: structure and functions, State Government: structure and functions – Indian federal system – Parliament – President, Prime Minister – constitutional amendments – constitutional functionaries – assessment of working of the panchayat raj.	
UNIT II	**HUMAN RIGHTS**	
	Meaning, concept – notion and classification of rights: natural, moral and legal rights. Three generations of human rights civil and political rights: economic, social and cultural rights: collective / solidarity rights. Theories of human rights. Rights of the disadvantages groups (SC, ST, OBC, Minorities children and women). Mechanisms for the protection of the rights of disadvantaged groups. Social justice and human rights	

L- 30 hrs T-15 hrs Total -45 hr

TEXT BOOKS

1. Durga Das Basu, “Introduction to the constitution of India”, prentice Hall of India, New Delhi.
2. Jansuez Symonides(ed), 2005. Human Rights, Rawat Publications, Jaipur.
3. Subash C Kashyap, the working of Indian constitution, NBT, New Delhi.

4. Human rights in India: theory and practice. National Book Trust, 2001

Mapping of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO 2
CO1	3	1	2	1	1					1	2	1	2	2
CO2	1	3	2		2	1	1		1	1	1	2	1	1
CO3	2	3	3		1	1	1	1	1	1	1		3	
CO4	2	3	3		1			1	1				3	
	8	10	10	1	4	2	2	2	3	3	4	3	9	3
	2	2.5	2.5	.5	1	.5	.5	.5	.75	.75	1	.75	2.25	.75

1 - Low, 2 – Medium, 3 – High

Semester	**VI**		
Subject Name	**INTRODUCTION TO LATEX**		
Subject Code	**XBE602**		
Prerequisite			
L –T –P –C **0 - 0 –2 - 2**	**C:P:A** **2:0:0**	**L –T –P –H** **0- 0 –2- 2**	

Course Outcome:		**Domain C or P or A**
CO1	Acquired knowledge to create Latex document	Cognitive
CO2	Acquired skill to create the documents with mathematical expressions and equations	Cognitive
CO3	Apply the skill to prepare a structured document	Cognitive

COURSE CONTENT	
UNIT I	
	Introduction to LATEX - TeX and LaTeX - LaTeX Input File – Characters and Control sequences – Creating simple documents using Latex – creating a latex input file - creating ordinary text – documents with section headings – changing

	fonts - symbols and special symbols in text
UNIT II	
	Producing Mathematical formulae – Mathematical mode – characters in mathematics mode – superscripts and subscripts – Greek letters – symbols – standard functions – text embedded in equations – fractions and roots – multiline formulae – matrices and arrays – derivatives, sums and integrals.
UNIT III	
	Features of Latex – producing white space – lists – displayed quotations – pre-formatted text – tables – preamble of input files – defining own control sequences in latex
	L-15hrs T-30 Total- 45 hrs
TEXT BOOKS	
Leslie Lamport 'LaTeX: A Document Preparation System, Second Edition, and Addison- Wisley Professional	

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	1	3	2			1							1	2
CO2	2	2	3	1		1							2	2
CO3	3	1	1	1		2				2		1	1	2
	9	8	7	2	1	5	1	1	1	3	1	1	7	8
	3	2.7	2.3	.7	.3	1.7	.3	.3	.3	1	.3	.3	2.3	2.7

1 - Low, 2 – Medium, 3 – High

Semester	**VI**		
Subject Name	**SECONDARY EDUCATION IN INDIA - STATUS, CHALLENGES AND STRATEGIES**		
Subject Code	**XBE603**		
L –T –P –C **4– 0– 0– 4**	**C: P:A** **4:0:0**	**L –T –P –H** **4- 0 –0 - 4**	
Course Outcome:			**Domain C or P or A**
CO1	Tell the development of education in India		Cognitive

CO2	Compare the various development of educational after independence	Cognitive
CO3	Categories the polices of secondary education	Cognitive
CO4	Justify the statues of secondary education	Cognitive
CO5	Compares the quality of education and its performance	Cognitive

COURSE CONTENT	
UNIT I	Indian education system before independence
	Development of education in India. before Independence Education in ancient India, in medieval India and in British India. Significant development in secondary education during pre – independence period. The charter act of 1813. Macaulay's minutes of (1935) lord William Bentinak's resolution (1835), the respatch of 1854. The hunter commission of 1882. University commission of 1902 and its impact on secondary education. National Education Movement and Natinal Council of Education(1906), Sadler commission of 1917. The Hartog committee (1928), the Sapru committee (1934) the abbot wood report(1936-37) the sergeant report(1944).
UNITII	**Development of Education after Independence**
	Central Advisory Board of Education (CABE) – Development of school education (1947-1964), University Education Commission (1948 – 1949), Mudaliar commission (1952-1953), Kothari commission (1964-1966), Development of School Education (1965 – 1985): National Education Policy (1968), National Education in 1986 and after. Modified policy on Education (1992).
UNITIII	**Universalisation of Primary Education**
	Articles 45, Directive principles of state policy – universal compulsory education – amendments related to education – concurrent list – arguments for and against. Efforts taken to provide universal primary education – SSA – Right to Education act problem of universalisation of primary education. Wastage and stagnation objectives of pre – primary and primary education
UNIT IV	**Status of Secondary Education**
	Present situation of secondary education in India; structure and system of schools. Objectives of secondary and higher secondary education. Statutory Board of education: Central Government – MHRD CABE: NCERT, CBSE,KVS, NOS Navodaya Vidyalaya, CLEFL, State Board, DTERT, DIET, State Text Book Board, ICSE, State Board, Matriculation and Anglo Indian Boards, Present system of secondary Education. Vocationalisation of secondary Education. Teacher Education – NCTE, Problem of Teacher Education, Universalisation of Secondary Education (2004-05).
UNIT V	**Quality Education at Secondary level**

	Concept of quality in education; quality indicators related to planning and organization of learning experience, learning environment (Physical and Academic), problems and challenges to quality improvement through setting standards of performance and monitoring, improving internal efficiency of the school system, teacher recruitment, their working conditions and staff morale. Monitoring Mechanism- Foundation of UGC, NCTE, NCERT, NAAC, DTERT, and DIET.

L=45hrs T- 15 hrs Total=60 hrs

REFERENCES

1. Chopra, R.K.(1993) Status of Teachers in India, NCERT, New Delhi.
2. Govt. of India (1953) Report of Secondary Education Commission, New Delhi.
3. Govt. of India (1966) Indian Education Commission (1964-66) Report. New Delhi.
4. Govt. of India (1986/1992) National Policy of Education, 1992, Modification and their POA's MHRD, Deptt. of Education.
5. Kundu, C.L. (Ed) (1984) Indian year Book on Teacher Education, Sterling Publishers Pvt. Ltd., New Delhi.
6. Malhotra, P.L. (1986) School Education in India : Present status and Future Needs, NCERT, New Delhi.
7. NCERT (1997) Code of Professional Ethics for Teachers.
8. NCTE (1998) Competency Based and Commitment Oriented Teacher Education for Quality School Education, Pre-service and in-service programme, New Delhi.
9. NCTE (1998) Policy Perspectives in Teacher Education, New Delhi Peters, R.S. (1971) Ethics and Education, George Allen Unwin Ltd. London.
10. Singh, R.P. (Ed) Teacher Training in India-Looking Ahead Federation of Management & Educational Institutions, New Delhi.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	0	3	2	0	2	0	3	2	0	3
CO2	0	2	2	0	2	0	3	3	0	2
CO3	0	3	2	0	2	0	2	2	0	2

CO4	0	2	2	0	2	0	2	2	0	3
CO5	0	3	3	0	3	0	3	2	0	3
Total	0	13	11	0	11	0	13	11	0	13
Scaled Value	0	3	3	0	3	0	3	3	0	3

1 - Low, 2 – Medium, 3 – High

Semester	**VI**		
Subject Name	**PEDAGOGY OF MATHEMATICS-II**		
Subject Code	**XBE604A**		
L –T –P –C **3- 0– 0- 3**	**C:P:A** **2.2:0: 0.8**	**L –T –P –H** **3- 0– 0- 3**	
Course Outcome:			**Domain** (C or P or A)
CO1	Understanding of mathematical proof in the context of secondary school mathematics		Cognitive
CO2	Understanding of nature, importance and strategies of problem-solving		Cognitive
CO3	Ability to teach proof of theorem and solution of problem to develop relevant skills.		Affetive
CO4	Ability to evaluate understanding of proof of a theorem and problem-solving skills.		Cogntive
CO5	Ability to construct of appropriate test items.		Cognitive

COURSE CONTENT	
UNIT I	**Teaching of Proof**
	Proof: Developing an intuition about the nature of proof - to make the transition from concrete thinking to more formal reasoning and abstract thinking as they progress from class to class. Kinds of proof - proof by mathematical induction, proof by contradiction, proof by cases, the contrapositive, conjectures, disproof by counter example.
UNIT II	Teaching of Problem Solving
	Definition of a problem, problem solving and teaching problem solving. Importance of teaching problem solving posing a problem, discovering or exploring various options for solving the problem i.e. developing heuristics. Carrying out the plan and generating and extending a good problem.
UNIT III	**Evaluation of Learning in Mathematics**
	Stating measurable objectives of teaching concepts and generalizations. Construction of appropriate test items.

	Diagnosing basic causes for difficulties in learning concepts and generalizations, planning remedial instruction based on the diagnosis
UNIT IV	**Learning Resource in Mathematics**
	Instructional Materials: Meaning, Types and purposes of instructional materials in Mathematics. Plan for preparation and utilization of instructional materials. Preparation of instructional materials. Designing teaching aids in mathematics; psychological basis; Rationale and limitations.
UNIT V	**Pedagogical Analysis of Secondary School Mathematics**
	In order to explain the different pedagogical aspects of teaching mathematics, the following topics in mathematics which are presently taught at secondary school level are included. (As and when there are changes in topics to be taught in Mathematics at school level, the corresponding changes in topics should be made). Arithmetic: Development of number system; Modular Arithmetic, Ratio and proportion, time and work. Algebra: Sets, Relations, Functions and Graphs, Systems of linear equations and their graphical solutions, quadratic equations, Linear inequations and graphical solutions and their applications, Theory of Indices and logarithms, Cyclic factorization, Factor theorem and Remainder Theorem, Matrices, Axioms of Groups and Fields with examples from Number Systems. Geometry: Axioms of Euclidian Geometry, Polygons and Circles, Congruency and similarity of triangles, Polyhedrons and Prisms, Introduction to transformation geometry of two dimensions (straight lines only), Construction of geometrical figures. Trigonometry: Trigonometric ratios, simple identities and elementary problems on heights and distances, solution of simple trigonometric equation. Statistics: Tabular and Graphical representation of Data, Measures of Central Tendency and Variability. Computing: Computer devices, flow charts and algorithms.
	L- 45 hrs T -15 hrs Total – 60 hrs

TEXT BOOKS

REFERENCES

1. Butler and Wren (1965). , The Teaching of Secondary Mathematics, London McGraw Hill Book Company.
2. Cooney, T.J. and Others (1975) , Dynamics of Teaching Secondary School Mathematics, Boston : Houghton Miffilin.
3. Iglewiez, Boris and Stoyle, Judith (1973). An Introduction to Mathematical Reasoning, New York : The MacMillan Co.
4. Kapfer, Miriam B (1972). Behavioural objectives in Curriculum Development: Selected Readings and Bibliography. Englewood Cliffs, NJ: Educational Technology.
5. Mager, Robert (1962). Preparing instructional objectives, Palo Alto, C A : Fearon.
6. NCERT, A textbook of Content-cum-Methodology of Teaching Mathematics, New

Delhi : NCERT.
7. Polya, George (1957) How to solve it, Garden City, New York: Doubleday.
8. Servas, W and T. Varga. Teaching School Mathematics - UNESCO Source Book.
9. State text books in Mathematics of Southern Region from Classes VI to X.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	3	3	1	1	1	2	2	1	0
CO2	2	3	2	1	2	1	2	2	1	0
CO3	2	3	3	1	1	1	2	2	1	0
CO4	2	3	2	1	2	1	1	2	1	1
CO5	2	3	2	1	2	1	1	2	1	1
Total	10	15	12	5	8	5	8	10	5	1
Scale	3	2	0	3	3	3	0	3	2	3

1 - Low , 2 – Medium , 3 – High

Semester	**VI**		
Subject Name	**PEDAGOGY OF PHYSICS-II**		
Subject Code	**XBE604B**		
L –T –P –C	**C:P:A**	**L –T –P –H**	
3- 0 – 0- 3	**2.2:0.8:0**	**3- 0 – 0- 3**	
Course Outcome:			**Domain** (C or P or A)
CO1	identify themes in physical science for which community can be used as a learning resource		Cognitive
CO2	conduct physical science related activities through science clubs, science fairs, science exhibitions during school attachment		Cognitive
CO3	familiarize with different types of curricular projects in physical science, their purpose and themes.		Cognitive

CO4	Become aware of various professional organizations and professional development programs in physical science	Cognitive/ Psychomotor
CO5	Understand the technology of teaching physical science and give them practice in the use of audio visual aids	Cognitive/ Psychomotor

COURSE CONTENT	
UNIT I	**Principles and Development of Science Curriculum**
	Curriculum - Principles of curriculum construction – distinction between curriculum and syllabus – need and importance - Organization of content matter – Critical evaluation of Tamil Nadu higher secondary school Science Curriculum – Curriculum Improvement Projects in India - NCERT and Abroad - CHEM Study, PSSC, CBA, Nuffield (0-level) Physics and Chemistry and their adaptability to Indian conditions.
UNIT II	**Co-Curricular Activities**
	Need for Science Club- Organization of Science Club, Science Exhibitions and Science Fairs, Fieldtrips and Excursions, Science Magazines–Science Related Social Concerns– Identification, analysis and exploration of the possible solutions of some of the science based social issues (Nuclear power, thermal power and hydroelectric power, alternate sources of energy, sustainable development, environmental crisis, drug abuse, AIDS).
UNIT III	**Science Text Book**
	Features of a good Textbook, instructional materials in physical science - Qualities of a good Science textbook - Use of textbooks inside and outside the classroom - Criteria for evaluation of Science textbooks - Critical analysis of the existing Tamil Nadu Science Text Book at the higher secondary level.
UNIT IV	**Managing Classroom**
	Classroom management – factors influencing classroom management-system approach-input-process-output and feedback-aspects in Physical science teaching – class room interaction analysis-class room climate-types of teachers based on leadership styles-teacher dominated pattern, laissez faire pattern and democratically planned pattern-significance.
UNIT V	**Science Laboratory – Design & Management**
	Physical Science Laboratory - Structure and Design - Organization and Maintenance of Science Laboratory – Physical requirements – furniture and their dimensions, equipment, maintenance of various registers, manuals, records and disposal of broken items - Storage of Chemicals - Organization of Practical Work – preparation of instruction sheets and reports – Safety measures. Professional Development of Physical Science Teachers Professional growth of Science Teacher - Academic and Professional qualification - Special qualities – Pre service and In-service Education and Training. Professional competencies of Physical science teachers.
	L- 45 hrs T- 15hrs Total – 60 hrs
TEXT BOOKS	
REFERENCES	
1) National Curriculum Framework 2009, NCERT, New Delhi.	

2) ***Steve Alsop, Keith Kicks (2007)*** Teaching Science: A Handbook for primary and secondary school teacher, Kogan Page, New Delhi.
3) ***Judith Bennett (2003)*** Teaching and Learning Science: A guide to recent research and its applications, Continuum, London.
4) ***Robin Millar(1984)*** Doing Science: Images of science in science education, The Falmer Press, London.
5) NCERT Textbook in Physics for VIII to X Students
6) NCERT Textbook in chemistry for VIII to X Students
7) State Textbook in Science for VIII to X Students
8) ***Sharma,P.C.(2006).***Modern Science Teaching, Dhanpat Rai Publications, New Delhi.
9) ***Nayak, (2003).*** Teaching of Physics, APH Publications, New Delhi.
10) ***Pandey, (2003).*** Major Issues in Science Teaching, Sumit Publications, New Delhi.
11) ***Yadav, M.S. (2003).*** Teaching of Science, Amol Publications.
12) ***Jenkins, E.W.(2000).*** Innovations in Science and Technology Education, Vol. VII,
13) ***Natrajan,C. (Ed.). (1997).*** Activity Based Foundation Course on Science Technology and Society, Homi Bhaba Centre for Science Education, Mumbai
14) ***NCERT, (1997),*** Fifth Survey of Research in Education, NCERT, New Delhi.
15) ***Chauhan, S.S. (1985).*** Innovation in Teaching and Learning Process, Vikas Publishing House.
16) ***Sharma, R.C. (1985).*** Modern Science Teaching, Thanpat Rai and Sons.
17) ***Harms, N., Yager, R. (1981).*** What Research Says to the Science Teacher, Vol. 3, National Science Teachers Association, Washington DC, USA.
18) ***Khana, S.D., Sexena, V.R. Lamba, T.P. and Murthy, V. (1976).*** Technology of Teaching, Doaba House.
19) ***Panneer Selvam,A. (1976).***Teaching of Physical Science (Tamil),Government of Tamil Nadu.
20) ***Brandwein Paul, F. (1955).*** The Gifted as Future Scientist, New York, Earcourt Dcace and World Inc.
21) Nuffield Chemistry, Books of Data, Collection of Experiment, Published for the Nuffield Foundation by Longmans, Penguin Books.
22) Nuffield Physics, Teacher's Guide, Questions Book, Guide to Experiments, Published for the Nuffield Foundation by Longmans, Penguin Books.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	0	2	3	0	0	0	0	2	0
CO2	3	0	3	3	0	0	0	0	2	0
CO3	2	0	3	3	0	0	0	0	2	0
CO4	3	0	2	2	0	0	0	0	2	0

CO5	3	0	2	3	0	0	0	0	2	0
Total	14	0	12	14	0	0	0	0	10	0
Scale	3	0	2	3	0	0	0	0	2	0

Semester	**VI**		
Subject Name	**PEDAGOGY OF CHEMISTRY- II**		
Subject Code	**XBES604C**		
Prerequisite			
L –T –P –C **3-0 – 0- 3**	**C:P:A** **3:0:0**	**L –T –P –H** **3- 0–0- 3**	

Course Outcome:		**Domain** (C or P or A)
CO1	***Understand*** to develop the content for school curriculum	Cognitive
CO2	***Develop*** the method of teaching chemistry	Cognitive
CO3	***Anaylse*** the assessment and evaluation in learning chemistry	Cognitive
CO4	***Develop*** the resources available for teaching chemistry	Cognitive
CO5	***Apply*** the teaching and learning process resources for chemistry subject	Cognitive

COURSE CONTENT		
UNIT I	**CONTENT IN CHEMISTRY (WITH REFERENCE TO 9TH, 10TH, I &II PUC)**	**9 hrs**
	Chemical Reaction: Electronic configuration; meaning and writing electronic configuration; periodic classification of elements (s, p, d, f). Chemical reaction: meaning and types. Electro chemistry: solutions- saturated and unsaturated and colloids. Chemistry of Carbon Hydro carbons; alkanes, alkenes and alkynes- meaning and properties. Unique characteristics of carbon, Allotropic forms of carbon. Industrial organic chemistry- manufacture of ethyl alcohol.	
UNIT II	**METHODS OF TEACHING CHEMISTRY**	
	Teacher-centered methods: Lecture method - Demonstration method - Team-teaching. Learner-centered methods: Laboratory method – Project method - Peer tutoring/teaching by students- Project method- Individual activities - experiential method – Teacher-guided learning- Problem-solving method - Small	

	group/whole-class interactive learning: Student seminar- group discussion - Mixbe-ability grouping. Recent Trends: Constructivist learning - Problem-based learning- Brain-based learning- Collaborative learning- Flipped learning - Blended learning - e-Learning trends - Videoconferencing. (Suggested instructional approaches/methods: i) Teacher talk/ Invited lecture on different methods of teaching Chemistry. ii) Preparation and presentation of a report on different methods of teaching Chemistry.)
UNIT III	**ASSESSMENT IN SCIENCE**
	• Evaluation: Concept, Need and Importance, Scope • Nature of Learning and Assessment: Analysis and Critique of present pattern of Examinations • Techniques of Evaluation for Theory & Practical. • Continuous Comprehensive Evaluation • Diagnostic tests, remedial/enrichment measures & monitoring learner's progress. • Achievement test-its construction & administration. • Assessment through Creative Expression: Essays, Posters, Drama, Poetry, Riddles etc
UNIT IV	**RESOURCES FOR TEACHING CHEMISTRY**
	Print Resources: Newspapers - journals and magazines- science encyclopedias. Audio Resources: Radio talk- audio tapes- DVDs/ CDs. Visual Resources: Pictures - flash cards- charts- posters - photographs- models. ICT Resources: Radio – television- Internet- multimedia- Interactive whiteboard. Community Resources: Science centres Science exhibition/ fair - Fieldtrip – Qualities of a good science textbook - Qualities of a Science teacher. (Suggested instructional approaches/methods: i) Teacher talk/ Invited lecture talk on different resources for teaching Chemistry. ii) Preparation and presentation of a report on different resources for teaching Chemistry.) Tasks and Assignments: i) Prepare and submit an evaluative report on different methods of teaching Chemistry. ii) Prepare and submit a report on Chemistry resource centre.
UNIT V	**TEACHING AND LEARNING RESOURCES**
	Text book-Characteristics of a good text book - Library resources--uses of references, journals, encyclopedias and e-resources in physical science - Improvised apparatus-meaning, importance and procedure. Physical Science laboratory and its importance-designing of physics and chemistry laboratory, meaning designing and uses of multipurpose laboratory. Community Resources-Meaning, uses of Human and Physical resources. Electronic Learning (e-learning) - internet, video (including animation) You-Tube and Teleconferences.
	L- 45 hrs T- 15 hrs Total- 60 hrs
TEXT BOOKS	
Reference Books: ♦ ***Arul Jothi, D.L.Balaji, Rajash Verma***(2009), Computer and Education, Centrum press, New Delhi, (India) ♦ ***V. Natarajan*** (2009), Teaching Methodology in Computer Education (Tamil and English Edition), Santha Publishers, Chennai ♦ ***Bhatia, KK***. Measurement and Evaluation in Education, Ludhiana: Prakash brothers. ♦ ***Sharma, R.A (2003)***. Advances Statistics in Education and Psychology, Meerut, R.	

Lall Book Depot.
Werma E. Gronlund - Measurement and Evaluation in teaching, Collier, Macmillan International Edition.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	0	2	3	0	0	0	0	2	0
CO2	3	0	3	3	0	0	0	0	2	0
CO3	2	0	3	3	0	0	0	0	2	0
CO4	3	0	2	2	0	0	0	0	2	0
CO5	3	0	2	3	0	0	0	0	2	0
Total	14	0	12	14	0	0	0	0	10	0
Scaled Value	3	0	2	3	0	0	0	0	2	0

1 - Low, 2 – Medium, 3 – High

Semester	**VI**	
Subject Name	**PEDAGOGY OF COMPUTER SCIENCE - II**	
Subject Code	**XBES604C**	
Prerequisite	**Environmental Engineering**	
L –T –P –C **3- 0 – 0- 3**	**C:P:A** **2.4:0:0.6**	**L –T –P –H** **3- 0 –0- 3**
Course Outcome:		**Domain** (C or P or A)

CO1	Recognise and identify the importance of planning the computer science curriculum	Cognitive
CO2	Reproduce the contents of XII and XI std CS text book And summarise the content organising methods	Cognitive
CO3	Classify the computer science text books	Cognitive
CO4	Generalise the class room interaction methods	Cognitive
CO5	Demonstrate the skills of teaching computer science	Affective

COURSE CONTENT

UNIT I	**Principles of Curriculum Development in Computer science**	**9 hrs**
	Curriculum – definition, meaning and nature - differentiating curriculum from syllabus - Curriculum development in Computer science – need and importance – barriers – Types of Curriculum development and strategies to be employed – stages of curriculum development in Computer science – Different approaches followed in curriculum development in Computer science- Major reforms in Computer science curriculum	
UNIT II	**Knowledge of Computer science**	
	Knowledge of all the concepts in Computer science standard XI and XII ➢ Company Secretary: As prescribed by CBSE for Classes XI & XII ➢ Partnership: As prescribed by CBSE for Classes XI & XII ➢ Share Market: As prescribed by CBSE for Classes XI & XII ➢ Booking: As prescribed by CBSE for Classes XI & XII Preparation of a module for teaching a unit/lesson on Computer science from the course prescribed by CBSE for Class XI or XII. Preparation of an Achievement test/unit test based on content of Computer science by CBSE at senior secondary level	
UNIT III	**Organization of Content and Learning**	
	Organization of subject matter – unit – topical – concentric-logical and psychological – maxims in teaching – organization of learning experiences – types – Edger Dale's cone of experience – motivation	
UNIT IV	**Evaluation of Computer Science Textbooks**	
	Textbooks – importance and need to textbooks, selection of textbooks – Evaluation of different types of textbooks – CBSE, Matriculation, State Board. Educational evaluation, its need, role in educational process – Computer science room / corner in school: resourcefulness, professional competence and personality of Computer science teachers. Evaluation procedure for appraising learner's performance, uses of evaluation. Behavioural approach to testing instructional objectives in Computer science.	
UNIT V	**Models of Teaching Computer science and Class Room Interaction**	

	Meaning & Definition of teaching models – Function of families of teaching models- Concept attainment model, advanced organizer model, Inductive thinking model- Inquiry training model Classroom interaction analysis (Flanders Interaction Analysis Category System) and its implications in learning Computer science **Programming and algorithms** Introductions to problem solving: problem at analysis, flow, charts, pseudo codes and algorithms, design of structured programming, fundamental algorithms – summation of series, number conversion

L- 45 hrs T- 15 hrs Total- 60 hrs

TEXT BOOKS

- ***Arul Jothi, D.L.Balaji, Rajash Verma***(2009), Computer and Education, Centrum press, New Delhi, (India)
- ***V. Natarajan*** (2009), Teaching Methodology in Computer Education (Tamil and English Edition), Santha Publishers, Chennai
- ***Bhatia, KK***. Measurement and Evaluation in Education, Ludhiana: Prakash brothers.
- ***Sharma, R.A (2003)***. Advances Statistics in Education and Psychology, Meerut, R. Lall Book Depot.
- ***Singh, Y. K.*** (2009). Teaching Practice. New Delhi: APH Publishing Corporation.
- ***Sharma, R. N.*** (2008). Principles and Techniques of Education. Delhi: Surjeet Publications.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	3	3	1	1	1	2	2	1	0
CO2	2	3	2	1	2	1	2	2	1	0
CO3	2	3	3	1	1	1	2	2	1	0
CO4	2	3	2	1	2	1	1	2	1	1
CO5	2	3	2	1	2	1	1	2	1	1
Total	10	15	12	5	8	5	8	10	5	1
Scaled Value	3	2	0	3	3	3	0	3	2	3

1 - Low, 2 – Medium, 3 – High

Semester	**VI**		
Subject Name	**DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS**		
Subject Code	**XBE605**		
L –T –P –C **4- 1 – 0- 5**	**C:P:A** **4:1:0**	**L –T –P –H** **5- 1 –0- 6**	

Course Outcome:		**Domain** (C or P or A)
CO1	be able to solve homogeneous second-order equations.	Cognitive
CO2	know a general method for constructing solutions to homogeneous and non-homogeneous linear constant- coefficient of second-order equations.	Cognitive
CO3	apply the knowledge of differential equations in order to solve engineering problems.	Cognitive
CO4	develop an understanding of the core ideas and concepts of Ordinary Differential Equations.	Cognitive/Psycho motor
CO5	Understand the concept of Laplace transforms and inverse Laplace transforms.	Cognitive/ Psychomotor

COURSE CONTENT		
UNIT I		
	First order, higher degree Differential equations solvable for x, solvable for y, solvable for $\frac{dy}{dx}$, Clairaut's form - Conditions of integrability of Mdx + Ndy = 0 - simple problems	
UNIT II		
	Particular integrals of second order Differential Equations with constant coefficients - Linear equations with variable coefficients - Methods of Variation of Parameters (upto 2^{nd} order eqns only)	
UNIT III		**9 hrs**
	Formation of Partial Differential Equation - General, Particular & Complete integrals - Solution of PDE of the standard forms - Lagrange's method of solving - Charpit's method and a few standard forms.	
UNIT IV		**9 hrs**
	PDE of second order homogeneous equation with constant coefficients - Particular Integrals of F(D, D′) z = f (x ,y), where f(x ,y) is of one of the forms $e^{(ax + by)}$, sin(ax + by), cos (ax + by), $x^r y^s$, and $e^{(ax + by)}$ f(x ,y).	
UNIT V		
	Laplace Transforms - standard formulae - Basic Theorems & simple applications - Inverse Laplace Transform - Use of Laplace Transform in solving ODE with constant coefficients.	
		L- 60 hrs T- 15 Total-75 hrs

TEXT BOOKS
1. M.D. Raisinghania, Ordinary & Partial Differential Equations, S. Chand & Co., 1st edition 2. M.K. Venkataraman, Engineering Mathematics, Volume II, S.V. Publications, 1985, Revised Edition.
REFERENCES
1. S.Narayanan, Differential Equations, S. Viswanathan Publishers, 1996. 2. M.L. Khanna, Differential Calculus, Jaiprakashnath and Co., Meerut - 2004. 3. T.Veerarajan, Engineering Mathematics, Tata McGraw Hill, 1999. 4. B.S Grewal, Higher Engineering Mathematics, Khanna publishers, 36th edition, 2001.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	2	3	3	1	1	1	2	2	1	0
CO2	2	3	2	1	2	1	2	2	1	0
CO3	2	3	3	1	1	1	2	2	1	0
CO4	2	3	2	1	2	1	1	2	1	1
CO5	2	3	2	1	2	1	1	2	1	1
Total	10	15	12	5	8	5	8	10	5	1
Scaled Value	3	2	0	3	3	3	0	3	2	3

1 - Low, 2 – Medium, 3 – High

Semester **Subject Name**	**VI** **ORGANICCHEMISTRY– I**	
L –T –P –C **3- 1– 0- 4**	**C:P:A** **3:0:1**	**L –T –P –H** **4-1 –0-5**
Course Outcome		**Domain** **C or P or A**
CO1	To understand the preparation, properties and uses of carbonyl compounds	Cognitive
CO2	To understand the preparation, properties and uses of carboxylic aids	Cognitive Affective
CO3	To acquaint students with the knowledge of Nitrogen compounds	Cognitive Affective
CO4	To acquaint students with the knowledge of Hetero cyclic compounds	Cognitive
CO5	To acquaint students with the knowledge of Industrial Organic chemistry	Cognitive

COURSE CONTENT	
UNIT I	**CHEMISTRY OF CARBONYL COMPOUND**
	Introduction - nomenclature - preparation of aliphatic carbonyl compounds - physical properties - chemical properties - uses - molecular orbital picture of carbonyl group - nucleophilic addition mechanism at carbonyl group - acidity of alpha hydrogen - general methods of preparation of aromatic carbonyl compounds - physical and chemical properties - uses - effect of aryl group on the reactivity of carbonyl group.
UNIT II	**CHEMISTRY OF CARBOXYLIC ACIDS**
	Nomenclature - general methods of preparation of carboxylic acids - physical properties - structure and acidity - Hammett equation - chemical properties - uses - preparation of dicarboxylic acid - physical and chemical properties - uses - Introduction to derivatives of carboxylic acids - physical and chemical properties - uses - nucleophilic substitution mechanism at acyl carbon - preparation, physical and chemical properties of the compound: acyl chlorides, anhydrides, esters, amides - chemistry of compounds containing active methylene group - Introduction to oils and fats - fatty acids - manufacture of soap - mechanism of cleaning action of soap
UNIT III	**CHEMISTRY OF NITROGEN COMPOUNDS**
	Nitrogen compounds - nomenclature - nitro alkanes - alkyl nitrites - differences - aromatic nitro compounds - preparation and reduction of nitro benzene under different conditions. Amino compounds - effect of substitutents on basicity, reaction of amino compounds (primary, secondary, tertiary and quaternary amine compounds). diazotization, and comparison of aliphatic and aromatic amines - diazonium compounds - preparation and synthetic importance of diazomethane,

	benzene diazonium chloride and diazo acetic ester	
UNIT IV	**CHEMISTRY OF HETEROCYCLIC COMPOUNDS**	
	Heterocyclic compounds - nomenclature - preparation and properties of furan, pyrrole, thiophen -comparison of the basicities of pyrrole, pyridine and piperidine with amines - synthesis and reactions of quinoline, isoquinoline and indole with special reference to Skraup, Fischer Napieraloki and Ficher - indole syntheses – structural elucidation of quinoline and isoquinoline.	
UNIT V	**INDUSTRIAL ORGANIC CHEMISTRY**	
	Dyes - theory of color and constitution - chromophore, auxochrome,classification according to application and structure - preparation and uses of nitro dyes - naphthol yellow, azo dyes - methyl orange, triphenyl methane dyes - malachite green, indigo dyes - Indigotin, anthraquinone dyes - alizarin, phthalein dyes - fluorescein - sulphonic acid and derivatives - preparation and properties of benzene sulphonic acid - saccharin, chloramines – T , sulphonamides (with one specific example) Polymers-definition-types of polymers-mechanism of cationic, anionic and free radical polymerisation –thermo setting polymers – preparation of caprolactam, Nylon 610, polyester, epoxide resin.	
	L - 45 hrs T-15 hrs Total-60 hrs	

TEXT BOOKS:

1. Finar I.L, Organic Chemistry, Vol 1&2, (6th edition) England, Addison Wesley. Longman Ltd. (1996)
2. Morrison R.T., Boyd R.N.,Organic Chemistry, (6th edition) New York, Allyn & Bacon Ltd., (2006)
3. Bahl B.S, Arun Bahl, Advanced Organic Chemistry, (12th edition) New Delhi, Sultan Chand and Co., (1997).
4. Pines S.H.,Organic Chemistry, (4th edition) New Delhi, McGraw - Hill International Book company .(1986)
5. Seyhan N. Ege., Organic Chemistry, New York, Houthton Mifflin Co., (2004)

Mapping of COs with Pos

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	**2**	**0**	3	**3**	**3**	**0**	**3**	**0**	**2**
CO2	3	**2**	**0**	3	**0**	**3**	**0**	**3**	**0**	**2**
CO3	3	**2**	**0**	3	**2**	**3**	**0**	**3**	**0**	**2**
CO4	3	**2**	**0**	2	**0**	**3**	**0**	**3**	**0**	**2**
CO5	3	**2**	**0**	3	**1**	**3**	**0**	**3**	**0**	**2**

Total	15	10	0	14	6	15	0	15	0	10
Scaled Value	**3**	**2**	**0**	**3**	**2**	**3**	**0**	**3**	**0**	**2**

1 - Low, 2 – Medium, 3 – High

Semester	**VI**		
Subject Name	**OPERATING SYSTEMS**		
Subject Code	**XBES607**		
L –T –P –C **3 – 1- 0- 4**	**C: P: A** **3: 0 : 1**	**L –T –P –H** **4 – 1- 0- 5**	
Course Outcome:			**Domain C or P or A**
CO1	Recognise the process management		Cognitive
CO2	Reproduce the process synchronization and identify the deadlock methods		Cognitive Affective
CO3	Describe the concepts of memory management		Cognitive
CO4	Discuss the virtual memory and file system		Cognitive
CO5	Reproduce and Describe the basics of I/O interface concepts		Cognitive Affective
COURSE CONTENT			
UNIT-I			
	Introduction: Views –Goals –Types of system – OS Structure –Components – Services - System Structures – Layered Approach -Virtual Machines - System Design and mplementation. Process Management: Process - Process Scheduling – Cooperating Process –Threads – Inter-process Communication. CPU Scheduling: CPU Schedulers – Scheduling criteria – Scheduling Algorithms		
UNIT –II			
	Process Synchronization: Critical-Section problem - Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Critical Region – Monitors. Deadlock: Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock.		
UNIT-III			
	Memory Management: Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space - Contiguous Allocation – Internal & External Fragmentation. Non Contiguous Allocation: Paging and Segmentation schemes –Implementation – Hardware Protection – Sharing - Fragmentation.		
UNIT –IV			
	Virtual Memory**:** Demand Paging – Page Replacement - Page Replacement Algorithms – Thrashing. – File System: Concepts – Access methods – Directory Structure –Protection Consistency Semantics – File System Structures –		

	Allocation methods – Free Space Management.
UNIT – V	
	I/O Systems: Overview - I/O Hardware – Application I/O Interface – Kernel I/O subsystem – Transforming I/O Requests to Hardware Operations – Performance. Secondary Storage Structures: Protection – Goals- Domain Access matrix – The security problem – Authentication – Threats – Threat Monitoring – Encryption.
	L- 45 hrs T-15 hrs Total – 60 hrs
TEXT BOOKS	
Silberschatz A., Galvin P.B., Gange,. 2002 , Operating System Principles ,Sixth Edition, John Wiley & Sons.	
REFERENCES	
H.M. Deitel, 1990, An Introduction to Operating System,- Second Edition, Addison Wesley	

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	1	1		1				1	
CO2	3	1	1		1				1	
CO3	3		1		1				1	
CO4	3		1						1	
CO5	3		1		1				2	
Total	15	2	5		4				6	
Scaled Value	3	1	1		1				2	

1 - Low, 2- Medium, 3- High

Semester	**VI**	
Subject Name	**PHYSICS PRACTICAL – VI**	
Subject Code	**XBE608**	
L –T –P –C **0 – 0- 2- 2**	**C: P: A** **0: 2 : 0**	**L –T –P –H** **0 – 0-2- 2**

Course Outcome:		**Domain** **C or P or A**
CO1	***Use*** laboratory techniques such as ***accuracy*** of measurements and ***determination*** of modulus of material.	Cognitive Psychomotor
CO2	***Explain*** *and* ***give*** the characteristics of semiconductor devices.	Cognitive Psychomotor
CO3	Gain ***knowledge*** and ***identify*** the various laws of thermal, viscous and surface tension.	Cognitive Psychomotor
CO4	***Manipulate*** the optical, electrical and heat properties with excellent ***application*** knowledge.	Cognitive Affective Psychomotor
CO5	***Use*** *basic* ***knowledge*** *to find resistance material.*	Cognitive Affective Psychomotor

COURSE CONTENTS

1	Operational Amplifier – Differentiator, Integrator.	**2**
2	NAND, NOR Universal gates – Verification.	**2**
3	Half subtractor and full subtractor using basic logic gate IC's.	**2**
4	FET Characteristics and constants determination.	**2**
5	Transistor characteristics – common Emitter	**2**
6	Post Office Box – resistance of the coil.	**2**
7	Half Adder, Full Adder using NAND/NOR gate	**2**
8	Construction Dual power supply 5-0-5 or 9-0-9v	**2**
TOTAL HOURS : 30 Hours		

TextBooks:

1. BSc Practical Physics, C. L. Arora, (S. Chand)
2. An Advanced Course in Practical Physics, D. Chattopadhyay and P. C. Rakshit, (New Central Book Agency)
3. A Text Book of Advanced Practical Physics, S. Ghosh, (New Central Book Agency) 7 Semester 1 - Physics (Honours) Theory Paper.
4. Shukla R. K. and Anchal Srivastava, Practical Physics, New Age International (P) Ltd, Publishers, 2006.
5. Arora C. L., B.Sc Practical Physics, S. Chand and Company Ltd, 2007.

Reference books :
1. Squires G. L., Practical Physics, 4 th Edition, Cambridge University Press, 2001. 2. Halliday D., Resnick R. and Walker J., Fundamentals of Physics, 6th Edition, John Wiley and Sons, 2001. 3. Jenkins F.A. and White H.E., Fundamentals of Optics, 4th Edition, Mc Graw Hill Book Company, 2007. 4. Geeta Sanon, B. Sc., Practical Physics, 1st Edition, S. Chand and Company, 2007. 5. Benenson, Walter, and Horst Stocker, Handbook of Physics, Springer, 2002

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	3	3	2			2	1	1
CO2	1	1	2				1	1
CO3	3	3	2	2	2		1	1
CO4	3	1	2				1	1
CO5	1	1	2		2		2	1
	3	1	2	2	2	2	1	1

1 - Low, 2- Medium, 3- High

Semester	**VI**	
Subject Name	**ORGANIC QUALITATIVE ANALYSIS AND ORGANIC PREPARATION LAB**	
Subject Code	**XBEC609**	
L –T –P –C **0- 0 – 2- 2**	**C:P:A** **1:0.6:0.4**	**L –T –P –H** **0- 0 – 2- 2**

Course Outcome:		**Domain** C or P or A
CO1	***Identify*** the various functional group present in the given organic compound.	Cognitive and Psychomotor
CO2	***Explain*** the structure of functional groups and reaction between the reactants.	Cognitive and Psychomotor
CO3	***Interpret*** the chemical changes in the reaction of organic compounds.	Cognitive and Affective

CONTENTS

Analysis of Simple Organic compounds
(a) characterization of functional groups
(b) confirmation by preparation of solid derivatives / characteristic colour reactions.

Note: Mono –functional compounds are given for analysis. In case of bi-functional compounds, students are required to report any one of the functional groups.
Preparation of Organic Compounds involving the following chemical conversions
1. Oxidation 2. Reduction 3. Hydrolysis 4. Nitration 5. Bromination 6. Diazotization
7. Osazone formation
Determination of boiling /melting points

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	0	0	0	0	0	0	0	2	2
CO2	2	0	0	0	0	0	0	0	1	1
CO3	3	0	0	0	0	0	0	0	2	2
Total	8	0	0	0	0	0	0	0	5	5
Scaled value	3	0	0	0	0	0	0	0	2	2

1- Low Relation, 2-Medium Relation, 3-High Relation

Semester	**VI**	
Subject Name	**OPERATING SYSTEMS LAB**	
Subject Code	**XBES609**	
Prerequisite	**NIL**	
L –T –P –C **0- 0 – 2- 2**	**C:P:A** **2:0:0**	**L –T –P –H** **0- 0 – 2- 2**

Course Outcome:		**Domain** C or P or A
CO1	***Ability*** to write C programmes for simple problems and ***construct*** flow chart for real time problems.	Cognitive Psychomotor
CO2	***Demonstrate the use of*** various C statements. ***Write*** C Programmes with arrays	Cognitive Psychomotor
CO3	***Use*** the concept of pointers to write programmes	Cognitive

CONTENTS

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	0	0	1	0	0	0	0	2	2
CO2	3	0	0	1	0	0	0	0	1	1

CO3	3	0	0	1	0	0	0	0	2	2
Total	9	0	0	3	0	0	0	0	5	5
Scaled value	2	0	0	1	0	0	0	0	1	1

1- Low Relation, 2-Medium Relation, 3-High Relation

Semester	**VI**		
Subject Name	**PRACTICUM AND SCHOOL INTERNSHIP - IV**		
Subject Code	**XBE610**		
L –T –P –C **0- 0 – 2- 8**	**C:P:A** **8:0:0**	**L –T –P –H** **0- 0 – 2- 2**	

School Internship

In the VI semester the student's teachers will undergo internship in teaching for 3 weeks the student's teacher will be engaged in the following activities and preparation of records.

a. Action Research
b. School Dairy
c. Physical Education

Semester	**VII**		
Subject Name	**ALGEBRA**		
Subject Code	**XBE702**		
L –T –P –C **3 - 1 – 0 - 4**	**C:P:A** **4:0:0**	**L –T –P –H** **4 – 1 –0- 5**	

Course Outcome:		**Domain/Level C or P or A**
CO1	Identify and describe fundamental algebraic structures such as groups, rings and fields.	Cognitive
CO2	Identify algebraic substructures such as Normal subgroups and Quotient groups	Cognitive
CO3	identify and describe relations between algebraic structures, such as homeomorphisms and group actions	Cognitive
CO4	Understand the concept and basic structure of vector spaces, explain the concept of dimension, and apply the dimension	Cognitive

	theorem (for the sum of two subspaces).	
CO5	Elucidate the null space, row space and column space of a matrix, apply the rank-nullity theorem.	Cognitive

COURSE CONTENT		
UNIT I		**9+3 hrs**
	Groups - Subgroups - Cyclic groups - Order of an element - Costs and Lagrange's Theorem.	
UNIT II		**9 +3hrs**
	Normal subgroups and Quotient groups - Finite groups & Cayley Theorem - Isomorphism & Homomorphism.	
UNIT III		**9+3 hrs**
	Rings & Fields - definition & examples - Elementary properties of Rings - Types of Rings -Characteristics of Rings - Subrings – Ideals - Quotient rings - Maximal & Prime Ideals – Homomorphism of Rings - Isomorphism of Rings.	
UNIT IV		**9+3 hrs**
	Vector Spaces - definition & examples - Subspaces - Linear Transformation - Span of a set - Linear independence.	
UNIT V		**9+3 hrs**
	Basis & Dimension - Rank & Nullity - Matrix of a Linear Transformation.	
	L=45 hrs T= 15 hrs Total = 60 hrs	

TEXT BOOKS

[1] N.Arumugam & A.Thangapandi Isaac, Modern Algebra, New Gamma Publishing House - June 1997.

[2] T.K. Manicavachagam Pillai, T. Natarajan, K.S. Ganapathy, Algebra, Vol. I, S.Viswanathan Pvt. Limited, Chennai, 2004.

REFERENCES

[1] M.L.Santiago, Modern Algebra, Arul Publications, Madras, 1988.

[2] M.L.Khanna, Modern Algebra, Tata McGraw Hill, 2003.

[3] Schaum's Outlines, Modern Abstract Algebra, Tata McGraw- Hill Company Limited, New Delhi.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO 1	3					1				1	2
CO 2	3					1				1	2

CO 3	3					1				1	2
CO 4	3					1				1	2
CO 5	3					1				1	2
	15					5				5	10
	3					1				1	2

1 - Low, 2 – Medium, 3 – High

Semester	**VII**		
Subject Name	**REAL ANALYSIS**		
Subject Code	**XBE703**		
L –T –P –C **3 - 1 – 0 - 4**		**C:P:A** **4:0:0**	**L –T –P –H** **4 – 1 –0-5**

Course Outcome:		**Domain/Level** **C or P or A**
CO1	Understand the Order completeness property	Cognitive
CO2	Understand the concept of continuity and be familiar with the statements and some proofs of the standard results about continuous real functions.	Cognitive
CO3	Understand the concept of the differentiability of a real valued function.	Cognitive
CO4	Expand the power series	Cognitive
CO_5	Apply the Riemann integration and fundamental theorem of calculus.	Cognitive

COURSE CONTENT		
UNIT I		**9+3 hrs**
	Real Number system – Field axioms – Order relation in R. Absolute value of a real number & its properties – Supremum & Infimum of set – Order completeness property – countable & uncountable sets.	
UNIT II		**9 +3hrs**
	Continuous functions – Limit of a Function – Algebra of Limits – Continuity of a function – Types of discontinuities – Elementary properties of continuous functions – Uniform continuity of a function.	
UNIT III		
	Differentiability of a function – Derivability & Continuity – Algebra of derivatives – Inverse Function Theorem – Daurboux's Theorem on derivatives.	

UNIT IV		**9+3 hrs**
	Rolle's Theorem – Mean Value Theorems on derivatives – Taylor's Theorem with remainder – Power series expansion.	
UNIT V		
	Riemann integration – definition – Daurboux's theorem – conditions for integrability – Integrability of continuous & monotonic functions – Integral functions – Properties of Integrable functions - Continuity & derivability of integral functions –The First Mean Value Theorem and the Fundamental Theorem of Calculus.	
	L=45 hrs T= 15 hrs Total = 60 hrs	

TEXT BOOKS

[1] M.K,Singhal & Asha Rani Singhal , A First Course in Real Analysis, R.Chand & Co., June 1997 Edition

[2] Shanthi Narayan, Elements of Real analysis, S. Chand & Co., 1995

REFERENCES

[1] Gold Berge, Richar R, Methods of Real Analysis, First edition, Oxford & IBHP Publishing Co., New Delhi,1970.

[2] H.L.Royden, Real Analysis, Third Edition, Prentice –Hall of India, New Delhi, 2005.

[3]. B.S.Vatsa, Introduction to Real Analysis, CBS Publishers, 2002.

[4]. M.L.Khanna, L.S.Varshney, Real Analysis, Jai Prakash Nath & Co, Meerut, 15th edition,1997.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**
CO 1	3	2		1	1		1	1	1
CO 2	3	2		1			1	1	1
CO 3	3	2		1			1	1	1
CO 4	3	2		1	1		1	1	1
CO 5	3	2		1	1		1	1	1
	15	10	0	5	3	0	5	5	5
	3	2		1	.7		1	1	

1 - Low, 2 – Medium, 3 – High

Semester	**VII**		
Subject Name	**PHYSICAL CHEMISTRY - I**		
Subject Code	**XBEC706**		
L –T –P –C **3- 1 – 0 - 4**	**C:P:A** **3:0.5:0.5**	**L –T –P –H** **4– 1 – 0- 5**	

Course Outcome:		**Domain/Level** **C or P or A**
CO1	***Recall*** the definition and first law of thermodynamic constants and terminology.	Cognitive
CO2	***Summarize and Discuss*** the second law of thermodynamic and related conditions for spontaneity	Cognitive Affective
CO3	***Discuss*** the significance of third law of thermodynamics	Cognitive
CO4	***Interpret*** the types of solution, concentration terms and ***identify*** the properties of solutions.	Cognitive Psychomotor
CO5	***Describe*** the significance of phase rule	Cognitive

COURSE CONTENT

UNIT I	**TERMODYNAMICS - I**	**9+3 hrs**
	System and surrounding – isolated, closed and open systems - state of the system - Intensive and extensive variables. Thermodynamic processes - reversible and irreversible, isothermal and adiabatic processes - state and path functions - exact and inexact differentials. Work of expansion at constant pressure and free expansion. First law of thermodynamics - statement - definition of internal energy (E), enthalpy (H) and heat capactiiy. Relation between Cp and Cv. calculation of w, q, dE and dH for expansion of ideal and real gases under isothermal and adiabatic conditions of reversible and irreversible processes. Definition of Joule - Thomson coefficient ($\mu_{J.J}$) - calculation of ($\mu_{.J.J}$) for ideal and real gases - Inversion temperature. Thermo chemistry - relation between enthalpy of reaction at constant volume (q_v) and at constant pressure (q_p) - temperature dependence of heat of reaction - Kirchoffs equation -bond energy and its calculation from thermo-chemical data - Integral and differential heats of solution and dilution.	
UNIT II	**THERMODYNAMICS-II**	
	Second law of thermo dynamics - need for the law - different statements of the law - Carnot's cycle and efficiency of heat engine - Carnot's theorem - thermodynamic scale of temperature - concept of entropy - definition and physical significance of entropy - entropy as a function of P, V and T - entropy changes during phase changes - entropy of mixing - entropy criterion for spontaneous and equilibrium processes in isolated system - Gibb's free energy (G) and Helmholtz free energy (A) - variation of A and G with P, V and T- Gibb's - Helmholtz equation and its applications - thermodynamic equation of	

	state - Maxwell's relations - ΔA and ΔG as criteria for spontaneity and equilibrium - advantage of ΔG over entropy change.	
UNIT III	**THERMODYNAMICS - III**	
	Equilibrium constant and free energy change - thermodynamic derivation of law of mass action - equilibrium constants in terms of pressure and concentration - NH_3, PCl_5, $CaCO_3$-thermodynamic interpretation of Lechatelier's principle (Concentration, temperature, pressure and addition of inert gases.) systems variable composition - partial molar quantities - chemical potential - variation of chemical potential with T, P and X (mole fraction) - Gibb's Duhem equation. van't Hoff's reaction isotherm - van't Hoff's isochore - Clapeyron equation and Clausius – Clapeyron equation-applications-third law of thermodynamics –Nernst heat theorem- statement of III law and concept of residual entropy - evaluation of absolute entropy from heat capacity data. Exception to III law (ortho and para hydrogen, CO, N_2O and ice).	
UNIT IV	**SOLUTIONS**	
	Ideal and non-ideal soultions, methods of expressing concentrations of solutions - mass percentage, volume percentage, normality, molarity, molality, mole fraction. concept of activity and activity coefficients - completely miscible liquid systems - benzene and toluene. Raoult's law and Henry's law. deviation from Raoult's law and Henry's law. Duhem - Margules equation, theory of fractional distillation. azeotropes - HCl - water and ethanol - water systems - partially miscible liquid systems - phenol - water, triethanolamine - water and nicotine - water systems-lower and upper CSTs - effect of impurities on CST - completely immiscible liquids - principle and applications of steam distillation. Nernst distribution law – derivation- applications –determination of formula of a complex ($KI + I_2 = KI_3$) - solvent extraction- principle and derivation of a general formula of the amount unextracted - dilute solutions: colligative properties, relative lowering of vapour pressure, osmosis, law of osmotic pressure, thermodynamic derivation of elevation of boiling point and depression in freezing point. determination of molecular masses using the above properties. Abnormal molecular masses, molecular dissociation - degree of dissociation - molecular association.	
UNIT V	**PHASE RULE**	
	Definition of terms in the phase rule - derivation and application to one component systems - water and sulphur - super cooling, sublimation - two component systems - solid liquid equilibria, simple eutectic (lead-silver, Bi-Cd), desilverisation of lead - compound formation with congruent melting point. (Mg-Zn) and incongruent melting point (Na-K). solid solutions - (Ag-Au) - fractional crystallisation. Freezing mixtures - FeCl3 - H2O systems, CuSO4-H2O system.	
	L=45 hrs T= 15 hrs Total = 60 hrs	

TEXT BOOKS

1. Puri B.R., Sharma L.R., Pathania M.S.,Principles Of Physical Chemistry, (23rd edition), New Delhi, Shoban Lal, Nagin Chand & Co., (1993)

REFERENCES

1. Maron and Prutton, Physical Chemistry, London, Mac Millan.
2. Atkins P.W., Physical Chemistry, (5th edition) Oxford Uiversity Press. (1994)
   Castellan G.V., Physical Chemistry, New Delhi, Orient Longmans.
3. Castellan G.V., Physical Chemistry, New Delhi, Orient Longmans.

E-REFERENCES

1. https://www.khanacademy.org/science/biology/energy-and-enzymes/the-laws-of-thermodynamics/v/first-law-of-thermodynamics-introduction
2. http://nptel.ac.in/courses/112105123/
3. http://nptel.ac.in/courses/103105127/36
4. https://www.youtube.com/watch?v=HjeQOKomAQc
5. http://nptel.ac.in/courses/113104068/4

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	**2**	**0**	3	**3**	**3**	**0**	**3**	**0**	**2**
CO2	3	**2**	**0**	3	**0**	**3**	**0**	**3**	**0**	**2**
CO3	3	**2**	**0**	3	**2**	**3**	**0**	**3**	**0**	**2**
CO4	3	**2**	**0**	2	**0**	**3**	**0**	**3**	**0**	**2**
CO5	3	**2**	**0**	3	**1**	**3**	**0**	**3**	**0**	**2**
Total	15	10	0	14	6	15	0	15	0	10
Scaled value	**3**	**2**	**0**	**3**	**2**	**3**	**0**	**3**	**0**	**2**

1 - Low, 2 – Medium, 3 – High

Semester	**VII**		
Subject Name	**COMPUTER NETWORKS**		
Subject Code	**XBES706**		
L –T –P –C **3 - 1 – 0 - 4**		**C:P:A** **3:0:1**	**L –T –P –H** **4–1 –0- 5**

Course Outcome:		**Domain/Level** **C or P or A**
CO1	Recognise the OSI Models	Cognitive
CO2	Describe the concepts of IPV4 and IPV6 Reproduce the LAN Architecture	Cognitive Affective
CO3	Discuss the TCP concepts	Cognitive
CO4	Reproduce and Describe the basics of DNS	Cognitive
CO5	Recognise the OSI Models	Cognitive Affective

COURSE CONTENT

UNIT I	**INTRODUCTION**	**9+3 hrs**
	Network Models - OSI Model - TCP/IP Protocol Suite - Addressing - Transmission Media - Error Detection and Correction - Block Coding.	
UNIT II	**NETWORK FUNDAMENTALS**	**9 +3hrs**
	. LAN Technology- LAN Architecture - BUS/Tree - Ring – Star - Ethernet- Token Rings - Wireless - Data Link Control - Framing - Flow and Error Control	
UNIT III	**NETWORK LAYER**	**9+3 hrs**
	Switching - Circuit, Message, Packet - Network Layer - IPV4, IPV6 Addresses - Internetworking- Format - IPV4, IPV6 – ICMP, Routing – Flooding, Distance Vector Routing, Link State Routing	
UNIT IV	**TRANSPORT LAYER**	**9+3 hrs**
	End–to-End Delivery - User Data gram Protocol (UDP) – TCP - Congestion Control -TCP, Frame Relay	
UNIT V	**PRESENTATION LAYER AND APPLICATIONS**	**9+3 hrs**
	Introduction - SNMP, SNMPV1-Architecture - Domain Name Service - Email - SMTP - HTTP.	
	L=60 hrs T= 15 hrs Total = 75 hrs	

TEXT BOOKS

1. Behrouz A.Forouzan, ”Data Communication and Networking”, 4th Edition, Tata McGraw-Hill Publishing Company, 2006.

REFERENCES

1. William Stallings, “Data and Computer Communications”, 8th Edition, PHI, 2007.
2. James F. Kurose and Keith W. Ross, “Computer Networking - A Top Down Approach

featuring the Internet", 1st Edition, Addison Wesley Publishing Company, 2001.
3. Andrew S. Tanenbaum, "Computer Networks", Tata McGraw Hill, 4rd Edition, 2004.
4. Larry L.Peterson & Bruce S. Davie, "Computer Networks - A systems Approach", 4th Edition, Harcourt Asia/Morgan Kaufmanns, 2004.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO 1	3	2		3	3	3	0	3	0	2
CO 2	3	2		3	3	3	0	3	0	2
CO 3	3	2		3	3	3	0	3	3	2
CO 4	3	2		3	3	3	0	3	3	2
CO 5	3	2		3	3	3	0	3	3	2
Total	15	10	0	15	15	15	0	15	9	10
	3	2	0	3	3	3	0	3	2	2

1 - Low, 2 – Medium, 3 – High

Semester	**VII**		
Subject Name	**ORGANIC CHEMISTRY-II**		
Subject Code	**XBEC707**		
L –T –P –C **3- 1 – 0 - 4**		**C:P:A** **3:0.5:0.5**	**L –T –P –H** **4 – 1 –0- 5**

Course Outcome:		**Domain/Level C or P or A**
CO1	To develop an understanding the chemistry of carbohydrates.	Cognitive
CO2	To develop an understanding the chemistry of proteins and vitamins.	Cognitive Affective
CO3	To understand the chemistry of alkaloids & terpenes	Cognitive
CO4	To acquaint students with mechanism of molecular rearrangements.	Cognitive Psychomotor
CO_5	To appreciate the application of UV, VIS, IR and NMR spectroscopy in explaining the structure of organic molecules	Cognitive

COURSE CONTENT

UNIT I	**CHEMISTRY OF CARBOHYDRATES**	**9+3 hrs**
	Carbohydrate - classification, properties of mono saccharide (glucose and fructose), structure and configuration of mono saccharide, interconversion, ascending and descending series, muta rotation, epimerization- cyclic structure - determination of size of sugar rings - disaccharide - sucrose, maltose - structure elucidation - polysaccharide - starch and cellulose (elementary treatment).	
UNIT II	**CHEMISTRY OF PROTEINS AND VITAMINS**	**9 +3hrs**
	Amino acids - classification, general methods of preparation and reactions of amino acids, zwitter ion - isoelectric points, action of heat on α,β and γ amino acids. Peptides and proteins - Peptide linkage - polypeptide - classification of proteins - synthesis of peptides - Merrifield synthesis - primary structure - end group analysis - Dansyl chloride, Edman method - secondary structure - tertiary structure - denaturation - colour reactions of proteins - nucleic acids - elementary treatment of DNA and RNA . Vitamins (structural elucidation not needed) - classification, biological importance of vitamins A, B_1, B_2, B_6, B_{12} and C.	
UNIT III	**CHEMISTRY OF ALKALOIDS AND TERPENOIDS**	
	Chemistry of natural products - alkaloids - isolation, classification, general methods of elucidating structure - structural elucidation and synthesis of coniine, piperine, nicotine and ephedrine. terpenes - classification - isoprene, special isoprene rule, general methods of structural elucidation - structural elucidation and synthesis of citral, limonene, menthol, thymol and camphor.	
UNIT IV	**MOLECULAR REARRANGEMENTS**	**9+3 hrs**
	Molecular rearrangements - types of rearrangement (nucleophilic and electrophilic) – mechanism with evidence for the following re-arrangements: pinacol - pinacolone, benzil - benzilic acid, benzidine, Claisen, Fries, Hofmann, and Beckmann,- photochemical reactions of ketones – Cope reaction.	

UNIT V	ORGANIC SPECTROSCOPY	
	UV - VIS spectroscopy - types of electronic transitions - solvent effects on λ max - Woodward - Fieser rules - calculation of λmax : dienes and α, β unsaturated carbonyls. IR spectroscopy - number and types of fundamental vibrations - modes of vibrations and their energies, position of IR absorption frequencies for functional groups like aldehyde, ketone, alcohol, acid and amide- factors affecting the frequency absorption - conjugation, inductive effect and hydrogen bonding. NMR spectroscopy - principle - equivalent and non equivalent protons - shielded and deshielded protons, anisotropy, chemical shift - TMS, delta scales, integral, splitting of signals - spin -spin coupling, NMR spectrum of EtOH, n - propyl bromide and isopropyl bromide. (Basic instrumentation of UV-Visible, IR and NMR also to be discussed). Mass spectroscopy – Principles and fragmentation patterns.	
	L=60 hrs T= 15 hrs Total = 75 hrs	

REFERENCES

1. Finar I.L., Organic Chemistry, Vol 1&2, (6th edition) England, addison Wesley Longman Ltd. (1996).
2. Morrison R.T., Boyd R.N.,Organic Chemistry, (4th edition) New York, Allyn & Bacon Ltd., (1976)
3. Bahl B.S, Arun Bahl,Advanced Organic Chemistry, (12th edition) New Delhi, Sultam Chand and Co., (1986)
4. Pine S.H.,Organic Chemistry, (4th edition) New Delhi, McGraw - Hill International Book Company (1986)
5. Seyhan N. Ege, Organic Chemistry, New York, Houghton Mifflin Co., (2004) William Kemp, Organic Spectroscopy, 3rd edition, ELBS.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	**2**	**0**	3	**3**	**3**	**0**	**3**	**0**	**2**
CO2	3	**2**	**0**	3	**0**	**3**	**0**	**3**	**0**	**2**
CO3	3	**2**	**0**	3	**2**	**3**	**0**	**3**	**0**	**2**
CO4	3	**2**	**0**	2	**0**	**3**	**0**	**3**	**0**	**2**
CO5	3	**2**	**0**	3	**1**	**3**	**0**	**3**	**0**	**2**
Total	15	10	0	14	6	15	0	15	0	10
Scaled value	**3**	**2**	**0**	**3**	**2**	**3**	**0**	**3**	**0**	**2**

1 - Low, 2 – Medium, 3 – High

Semester	**VII**		
Subject Name	**WEB TECHNOLOGY**		
Subject Code	**XBES707**		
L –T –P –C **3- 1 – 0 -4**		**C:P:A** **3:0:1**	**L –T –P –H** **4 – 1 –0- 5**

Course Outcome:		**Domain/Level C or P or A**
CO1	Recognise the VB Sript and HTML concept	Cognitive
CO2	Reproduce the java script fundamentals	Cognitive Affective
CO3	Describe the concepts of Objects in HTML	Cognitive
CO4	Discuss the basics of ASP.Net	Cognitive
CO5	Reproduce and Describe concept of IP address security	Cognitive Affective

COURSE CONTENT

UNIT I		**9+3 hrs**
	Introduction to` VBScript - Adding VBScript Code to an HTML Page - VB Script Basics - VBScript Data Types - VBScript Variables - VBScript Constants - VBScript Operators – mathematical- comparison-logical - Using Conditional Statements - Looping Through Code - VBScript Procedures – type casting variables - math functions –date functions – string functions –other functions - VBScript Coding Conventions - Dictionary Object in VB Script	
UNIT II		**9 +3hrs**
	Introduction to Javascript – Advantages of Javascript – Javascript syntax - Data type –Variable - Array – Operator & Expression – Looping – control structures - Constructor Function – user defined function Dialog Box	
UNIT III		**9+3 hrs**
	Javascript document object model – Introduction – Object in HTML – Event Handling – Window object – Document object – Browser object – Form object – Navigator object – Screen object – Build in object – User defined object – Cookies	
UNIT IV		**9+3 hrs**
	ASP.NET Language Structure – Page Structure – Page event, Properties & Compiler Directives. HTML server controls – Anchor, Tables, Forms, and Files. Basic Web server Controls – Lable, Text box, Button, Image Links, Check & radio Button, Hyperlink, Data List	
UNIT V		**9+3 hrs**
	Request and Response Objects, Cookies, Working with Data – OLEDB connection class, command class, transaction class, data adaptor class, data set class. Advanced issues – email, Application issues, working with IIS and page Directives, error handling. Security – Authentication, IP Address, Secure by SSL & Client Certificates	
	L=60 hrs T= 15 hrs Total =75 hrs	

TEXT BOOKS

1. I.Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.
2. A.Russell Jones, Mastering Active Server Pages 3, BPB Publications

REFERENCES

1. Hathleen Kalata, Internet Programming with VBScript and JavaScript, Thomson Learning
2. Mike McGrath, XML Harness the Power of XML in easy steps, Dreamtech Publications
3. T.A. Powell, 2002,Complete Reference HTML , TMH.
4. J.Jaworski, 1999, Mastering Javascript, BPB Publications.
5. Powell, Thomas; Schneider, Fritz, JavaScript: The Complete Reference, 2nd edition 2004, TMH.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO 1	3	2		3	3	3	0	3	0	2
CO 2	3	2		3	3	3	0	3	0	2
CO 3	3	2		3	3	3	0	3	3	2
CO 4	3	2		3	3	3	0	3	3	2
CO 5	3	2		3	3	3	0	3	3	2
Total	15	10	0	15	15	15	0	15	9	10
Course	3	2	0	3	3	3	0	3	2	2

1 - Low, 2 – Medium, 3 – High

Semester	**VII**	
Subject Name	**PHYSICS PRACTICAL - VII**	
Subject Code	**XBE708**	
L –T –P –C **0 - 0 – 2 - 2**	**C:P:A** **1:0.8:0.2**	**L –T –P –H** **0– 0 –2- 2**

Course Outcome:		**Domain/Level** **C or P or A**
CO1	***Use this*** laboratory techniques, To know the logic measurements and ***determination*** of subtraction of real number.	Cognitive Psychomotor
CO2	***Explain*** *and* ***give*** the characteristics of oscillator and amplifier.	Cognitive Psychomotor
CO3	Gain ***knowledge*** and ***identify*** the various oscillator and multivibrator.	Cognitive Psychomotor
CO4	***Manipulate*** the optical, electrical and heat properties with excellent ***application*** knowledge.	Cognitive Affective Psychomotor
CO5	***Use*** *basic* ***knowledge*** *to construct voltage doublers and tripler*	Cognitive Affective Psychomotor

List of Experiments		**Hours**
1	Half Subtractor and Full Subtractor using NAND/NOR gates.	**2**
2	RC Coupled Transistor Amplifier – Band width.	**2**
3	UJT relaxation oscillator	**2**
4	Emitter Follower.	**2**
5	Astable Multivibrator.	**2**
6	Voltage Doublers and Tripler	**2**
7	FET Amplifier – Band width.	**2**
8	Feedback Amplifier – Transistor	**2**
	L=30 hrs T= 0 hrs Total = 30 hrs	

TEXT BOOKS

1. BSc Practical Physics, C. L. Arora, (S. Chand)

2. An Advanced Course in Practical Physics, D. Chattopadhyay and P. C. Rakshit, (New Central Book Agency)

3. A Text Book of Advanced Practical Physics, S. Ghosh, (New Central Book Agency) 7 Semester 1 - Physics (Honours) Theory Paper.

4. Shukla R. K. and Anchal Srivastava, Practical Physics, New Age International (P) Ltd, Publishers, 2006.

5. Arora C. L., B.Sc Practical Physics, S. Chand and Company Ltd, 2007

REFERENCES

1. Squires G. L., Practical Physics, 4 th Edition, Cambridge University Press, 2001.

2. Halliday D., Resnick R. and Walker J., Fundamentals of Physics, 6th Edition, John Wiley and Sons, 2001.

3. Jenkins F.A. and White H.E., Fundamentals of Optics, 4th Edition, Mc Graw Hill Book Company, 2007.

4. Geeta Sanon, B. Sc., Practical Physics, 1st Edition, S. Chand and Company, 2007.

5. Benenson, Walter, and Horst Stocker, Handbook of Physics, Springer, 2002

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO_1	3	3	2			2	1	1
CO_2	1	1	2				1	1
CO_3	3	3	2	2	2		1	1
CO_4	3	1	2				1	1
CO5	1	1	2		2		2	1
Scaled to 1, 2, 3	3	1	2	2	2	2	1	1

1 - Low, 2 – Medium, 3 – High

Semester	**VII**		
Subject Name	**PHYSICAL CHEMISTRY LAB – I**		
Subject Code	**XBEC709**		
L –T –P –C **0 - 0 – 2 - 2**	**C:P:A** **1.2:0.80**	**L –T –P –H** **0– 0 –2-2**	

Course Outcome:		**Domain/Level** **C or P or A**
CO1	**Recall** various physical parameters of chemical reactions and **identify** its significances.	Cognitive Psychomotor
CO2	***Understand and Analyze*** the various physical constants and ***explain*** the effects of such constant on the properties of molecules/compounds.	Cognitive Psychomotor
CO3	***Interpret*** the impacts of changes in the values of the constants.	Cognitive Psychomotor

COURSE CONTENT

1. Critical Solution Temperature of phenol-water system
2. Effect of impurity on Critical solution Temperature of phenol-water system
3. Transition Temperature of a salt hydrate
4. Molecular weight determination by Rast Method
5. Phase Diagram (Simple eutectic system)

P=30 hrs T=0 hrs Total = 30 hrs

TEXT BOOKS

Pandey, O.P , Baipai. D.N and Giri.S , Practical Chemistry, Chand & Company Ltd. 2002.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**
CO1	3	3	2			2	1	1
CO2	1	1	2				1	1
CO3	3	3	2	2	2		1	1
	7	7	6	2	2	2	3	3
	2	2	2	1	1	1	1	

1 - Low, 2 – Medium, 3 – High

Semester	**VII**		
Subject Name	**WEB TECHNOLOGY LAB**		
Subject Code	**XBES709**		
L –T –P –C **0 - 0– 2 - 2**		**C:P:A** **1.2:0.8:0**	**L –T –P –H** **0 – 0 –2- 2**

Course Outcome:		**Domain/Level** **C or P or A**
CO1	Analyze a web page and identify its elements and attributes using html tags.	Cognitive Psychomotor
CO2	Build dynamic web pages using JavaScript (client side programming)	Cognitive Psychomotor
CO3	Students are able to develop a dynamic webpage by the use of java script.	Cognitive

COURSE CONTENT

1. Create a simple page introducing yourself how old you are, what you do, what you like and dislike. Modify the introduction to include a bullet list of what you do and put list the 5 things you like most and dislike as numbered lists. Create another page about your favorite hobby and link it to (and from) your main page. Center something, and put a quote on one of your pages
2. Put an existing image on a web page. Create a table, use a heading and at least one use of row span/col. span. Color a page and some text within the page. Link to another site
3. Create a new file called index. html.
Put the normal HTML document structure tags in the file.
Give it a title.
At the bottom of the page (i.e. the last thing between the body tags) put the following:
A horizontal rule.
A Link to your e-mail Address (With your name between the tag) ; remember to put the link to your E- Mail address within address tags.
A line break.
The date. (I have this same structure at the bottom of this page).
Above this block (which is called the footer), put a title in heading tags.
Add some text describing yourself (you can split this into multiple headings and Paragraphs if you wish).
4. Write a script to create an array of 10 elements and display its contents.
5. Write a function in Java script that takes a string and looks at it character by character.
6. Create a simple calculator using form fields. Have two fields for number entry & one field for the result. Allow the user to be able to use plus, minus, multiply and divide.
7. Create a document and add a link to it. When the user moves the mouse over the link, it should load the linked document on it's own. (User is not required to click on the link).
8. Create a document, which opens a new window without a toolbar, address bar or a status bar that unloads itself after one minute.
9. Create a document that accepts the user's name in a text field form and displays the sanie the next time when the user visits the site informing him that he has accessed the sitefor the second time, and so on.
10. Create a Web form for an online library. This form must be able to accept the Membership Id

of the person borrowing a book, the name and ID of the book and the name of the book's author. On submitting the form, the user (the person borrowing the book) must be thanked and informed of the date when the book is to be returned. You can enhance the look of the page by using various ASPNET controls.
P=30 hrs T= 0 hrs Total = 30 hrs

REFERENCES

1.Donald Hearn and M. Pauline Baker, "Computer Graphics C Version" Second Edition, Pearson Education, 2006.

2..Balagurusamy E ., 2006, *Programming in ANSI C* , 3rd ed, Tata McGraw-Hill.

3. Ashok N.Kamthane , 2006, *Programming with ANSI and Turbo C* , Pearson Education.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	0	0	1	0	0	0	0	2	2
CO2	3	0	0	1	0	0	0	0	1	1
CO3	3	0	0	1	0	0	0	0	2	2
Total	9	0	0	3	0	0	0	0	5	5
Scaled value	2	0	0	1	0	0	0	0	1	1

Semester	**VII**	
Subject Name	**PRACTICUM AND SCHOOL INTERNSHIP - V**	
Subject Code	**XBE710**	
L –T –P –C **0 - 0 – 2-22**	**C:P:A** **10:6:6**	**L –T –P –H** **0 – 0 –2- 2**

Course Outcome: At the end of the Internship in Teaching the Student Teachers will be able to		**Domain/Level** **C or P or A**
CO1	develop competencies and skill for effective classroom teaching;	Cognitive /Psychomotor /Affective
CO2	observe teacher educators;	Cognitive /Psychomotor /Affective
CO3	evaluate student's learning;	Cognitive /Psychomotor /Affective
CO4	undertake case study and action research;	Cognitive /Psychomotor /Affective
CO5	learn class room management;	Cognitive /Psychomotor /Affective

COURSE CONTENT

School Internship

In the VII semester the student's teachers will undergo internship in teaching for 3 weeks the student's teacher will be engaged in the following activities and preparation of records.

a. Lesson Plan (Opt – I & Opl II)
b. Mini Teaching (Opt – I & Opl II)
c. Test and Measurement (Opt – I & Opl II)
d. Preparation of AV aids (Opt – I & Opl II)
e. Psychology record

	L=0 hrs P= hrs Total = 40 days

Semester	**VIII**		
Subject Name	**STATISTICS AND OPERATIONS RESEARCH**		
Subject Code	**XBE801**		
L –T –P –C **3 - 1 – 0 - 4**	**C:P:A** **4:0:0**	**L –T –P –H** **3– 1 –0- 4**	

Course Outcome:		**Domain/Level C or P or A**
CO_1	Understand the concepts of probability distributions and distribution functions.	Cognitive
CO_2	Understand the concept of Binomial, Poisson and normal distribution	Cognitive
CO_3	Applying simplex method.	Cognitive
CO_4	Examine the degeneracy in transportation and assignment problem	Cognitive
CO_5	Applying the PERT/CPM for project scheduling.	Cognitive

COURSE CONTENT		
UNIT I		**9+3 hrs**
	Random variables – Distribution functions – Discrete & continuous random variables – Probability mass & density functions – Joint probability distribution functions.	
UNIT II		**9 +3hrs**
	Theoretical Discrete & continuous distributions – Binomial, Poisson, Normal distributions – Moment generating functions of these distributions – additive properties of these distributions – Recurrence relations for the moments about origin and mean for the Binomial, Poisson and Normal distributions – relation between Binomial, Poisson, Normal distributions.	
UNIT III		**9+3 hrs**
	Introduction to Operations Research – Elementary treatment of Linear Programming – Simplex method for <, = , > constraints.	
UNIT IV		**9+3 hrs**
	Application to Transportation problem – Transportation algorithm – Degeneracy algorithm - Degeneracy in Transportation problem, unbalanced transportation problem – Assignment algorithm - unbalanced Assignment Problem.	
UNIT V		**9+3 hrs**
	PERT, CPM network – Critical & Sub Critical jobs – Determining the critical path – Network calculation of PERT networks – Probability of PERT.	
	L=45 hrs T= 15 hrs Total = 60 hrs	

TEXT BOOKS
[1] Gupta.S.C.& Kapoor, V.K, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi – 1994 Edition [2] Kanti Swaroop, Gupta. P.K & Manmohan, Operations Research, Sultan Chand & Co. Sixth Edition.
REFERENCES
[1] T. Veerarajan, Probability Statistics and Random Processes, Tata McGraw-Hill publishing company Ltd, 1st edition. [2] Handy A.Taha, Operations Research (7th Edn.), Prentice Hall of India, 2002. [3] Schaum's Outlines, Probability & Statistics, Tata Mcgraw- Hill Company Limited, New Delhi.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3					1				1	2	
CO 2	3					1				1	2	
CO 3	3					1				1	2	
CO 4	3					1				1	2	
CO 5	3					1				1	2	
Total	15					5				5	10	
Scaled Value	3					1				1	2	

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**		
Subject Name	**COMPLEX ANALYSIS**		
Subject Code	**XBE802**		
L –T –P –C **3 - 1 – 0 - 4**		**C:P:A** **4:0:0**	**L –T –P –H** **3 – 1 –0- 4**

Course Outcome:		**Domain/Level** **C or P or A**
CO1	Understand, interpret and use the basic concepts: complex number, analytic function, harmonic functions.	Cognitive
CO2	Understand the significance of bilinear transformation	Cognitive
CO3	Evaluate integrals along a path in the complex plane and understand the statement of Cauchy's Theorem and Cauchy's integral formula	Cognitive
CO4	Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues.	Cognitive
CO_5	Use the Cauchy Residue Theorem to evaluate integrals.	Cognitive

COURSE CONTENT

UNIT I	**Analytic Functions**	**9+3 hrs**
	Functions of a Complex variable – Limits - Theorems on Limits – Continuous functions – Differentiability – Cauchy - Riemann equations – Analytic functions – Harmonic functions.	
UNIT II	**Bilinear Transformations**	**9 +3hrs**
	Elementary transformations - Bilinear transformations – Cross ratio – fixed points of Bilinear Transformation – Some special bilinear transformations.	
UNIT III	**Complex Integration**	**9+3 hrs**
	Complex integration - definite integral – Cauchy's Theorem – Cauchy's integral formula – Higher derivatives.	
UNIT IV	**Series Expansions**	**9+3 hrs**
	Series expansions - Taylor's series – Laurant's Series – Zeroes of analytic functions – Singularities.	
UNIT V	**Calculus of Residues**	**9+3 hrs**
	Residues – Cauchy's Residue Theorem – Evaluation of definite integral	
	L=45 hrs T= 15 hrs Total = 60 hrs	

TEXT BOOKS
[1] P.Duraipanelian, Kayalal Pachaiyappa, Complex Analysis, Muhil Publishers, Revised Edition 2009. [2] T.K.Manickavachaagam Pillai, Complex Analysis, S.Viswanathan Publishers Pvt Ltc, 1994.
REFERENCES
[1] P.P Gupta – Kedarnath & Ramnath, Complex Variables, Meerut -Delhi [2] J.N. Sharma, Functions of a Complex variable, Krishna Prakasan Media (P) Ltd, 13th Edition, 1996-97. [3]. P.Kandasamy, K.Thilagavathy, K. Gunavathy, Engineering Mathematics, Volume- III, Edition 2009, S.Chand & Company Ltd., New Delhi. [4] Schaum's Outlines, Complex Variables, Tata Mcgraw- Hill Company Limited, New Delhi.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO 1	3					1				1	2	
CO 2	3					1				1	2	
CO 3	3					1				1	2	
CO 4	3					1				1	2	
CO 5	3					1				1	2	
Total	15					5				5	10	
Scaled Value	3					1				1	2	

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**		
Subject Name	**PHYSICAL CHEMISTRY-II**		
Subject Code	**XBEC805**		
L –T –P –C **3 - 1 - 0 - 4**		**C : P : A** **3.2 : 0.4 : 0.4**	**L –T –P –H** **3 - 1 – 0- 4**

Course Outcome:		**Domain C or P or A**
CO1	***Recall*** and relate the role of electrolytes in electrical methods and its applications	Cognitive
CO2	***Summarize and Discuss*** the working principles of various electrochemical cells and its applications	Cognitive Affective
CO3	***Illustrate*** the principle of photochemistry and symmetry operation of molecules through group theory	Cognitive
CO4	***Apply*** *the* fundamental principles of spectroscopy and ***Identify*** the selection rules of IR and UV spectroscopy techniques.	Cognitive Psychomotor
CO5	***Recall*** the principles and related physical constant of NMR and Rama spectroscopy.	Cognitive

COURSE CONTENT

UNIT-I	**ELECTRICAL CONDUCTANCE**
	Electrical transport and conductance in metal and in electrolytic solution.- specific conductance and equivalent conductance. Measurement of equivalent conductance. using Kohlraush's bridge. Arrhenius theory of electrolytic dissociation and its limitation. weak and strong electrolyte according to Arrhenius theory. Ostwald's dilution law - applications and limitation.variation of equivalent conductance with concentration- migration of ion- ionic mobility. Kohlrausch's law and its applications. The elementary treatment of the Debye – Huckel- Onsager equation for strong electrolytes. Evidence for ionic atmosphere. The conductance at high fields (Wein effect) and high frequencies (Debye - Falkenhagen effect). Transport number & Hittorfs rule. Determination by Hittorf's method and moving boundary method application of conductance measurements - determination of strong electrolytes and acids. Determination of Ka of acids. Determination of solubility product of a sparingly soluble salt. Common ion effect. Conduct metric titrations.

UNIT –II	**ELECTROCHEMICAL CELLS**
	Electrolytic & galvanic cells - reversible and irreversible cells. conventional representation of electrochemical cells. Electromotive force of a cell and its measurement- computation of E.M.F- calculation of thermodynamic quantities of cell reactions (ΔG. ΔH, ΔS and K)- application of Gibbs Helmholtz equation. concentration and E.M.F- Nernst equation, Types of reversible electrodes - gas/metal ion - metal/metal ion; metal/insoluble salt/ anion and redox electrodes. electrode reactions - Nernst equation – derivation of cell. E.M.F and single electrode potential- standard hydrogen electrode - reference electrodes - standard electrode potentials - sign convention - electrochemical series and its significance. Concentration cell with and without transport- liquid junction potential. Application of EMF of concentration cells. Valency of ion- solubility product and activity co-efficient. Potentiometric titrations. Determination of pH using hydrogen and quinhydrone electrodes- Corrosion - general and electrochemical theory - passivity - prevention of corrosion.
UNIT-III	**PHOTOCHEMISTRY AND GROUP THEORY**
	Consequences of light absorption - Jablonski diagram- radiative and non - radiative transitions. laws of photo chemistry - Lambert – Beer, Grothus - Draper and Stark - Einstein.quantum efficiency. photo chemical reactions - rate law - kinetics of H_2-Cl_2 , H_2-Br_2, and H_2-I_2 reactions. Comparison between thermal and photochemical reactions. Photo sensitization and quenching. Group theory: symmetry elements and symmetry operation-group postulates and types of groups-Abelian and non Abelian- symmetry operation of H_2O molecule-illustration of group postulates using symmetry operations ofH_2Omolecule construction of multiplication table for the operation of H_2O molecule-point group-definition –elements (symmetry operations) of the following point groups: Cn (C_2, C_3) Sn (S_1, S_2) , C_{1V} (C_{2V}, C_{3V}) and C_{2R} . group theory and optical activity
UNIT -IV	**SPECTROSCOPY I**
	Electromagnetic spectrum - The regions of various types of spectra. Microwave spectroscopy: Rotational spectra of diatomic molecules treated as rigid rotator, condition for a molecule to be active in microwave region, rotational constants (B), and selection rules for rotational transition. Frequency of spectral lines, calculation of inter - nuclear distance in diatomic molecules. Infrared spectroscopy : Vibrations of diatomic molecules - harmonic and anharmonic oscillators, zero point energy, dissociation energy and force constant, condition for molecule to be active in the IR region, selection rules for vibrational transition, fundamental bands, overtones and hot bands,diatomic vibrating rotator - P,Q,R branches. Determination of force constant. UV visible spectroscopy : conditions - theory of electronic spectroscopy

	- types of electronic transitions - Franck - Condon principle – pre dissociation - applications.	
UNIT V	**SPECTROSCOPYII**	
	Raman spectroscopy: Rayleigh scattering and Raman scattering. Stokes and antistokes lines in Raman spectra, Raman frequency, quantum theory of Raman Effect, condition for a molecule to be Raman active. Comparison of Raman and IR spectra- structural determination from Raman and IR spectroscopy, rule of mutual exclusion. **NMR spectroscopy :** Nuclear spin and conditions for a molecule to give rise to NMR spectrum- theory of NMR spectra, number of NMR signals, equivalent and non - equivalent protons, position of NMR signals, shielding, de-shielding, chemical shift, δ and τ scales. Peak area and number of protons. Splitting of NMR signals - spin - spin coupling.	
	L=45 hrs T= 15 hrs Total = 60 hrs	

TEXT BOOKS

1. Puri B.R., Sharma L.R., Pathania M.S.,Principles Of Physical Chemistry, (23rd edition), New Delhi, Shoban Lal, Nagin Chand & Co., (1993)
2. Maron S.H. and Lando J.B.,Fundamentals of Physical Chemistry, Macmillan.
3. Glasstone S. and Lewis D.,Elements of physical Chemistry, macmillan
4. Khterpal S.C. Pradeeps,Physical Chemistry, Volume I & II, Pradeep publications Jalandhur, (2004).
5. Jain D.V.S and Jainhar S.P.,Physical chemistry, Principles and problems, Tata Mc Graw Hill, New Delhi, (1988).

7.

REFERENCE BOOKS

1. Maron and Prutton, Physical Chemistry, London, Mac Millan.
2. Atkins P.W., Physical Chemistry, (5th edition) Oxford Uiversity Press. (1994)

Castellan G.V., Physical Chemistry, New Delhi, Orient Longmans.

E-REFERENCES

1. https://nptel.ac.in/courses/102103044/3
2. https://nptel.ac.in/courses/102103044/4
3. https://nptel.ac.in/courses/102103044/10

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	0	3	3	3	0	3	0	2
CO2	3	2	0	3	0	3	0	3	0	2
CO3	3	2	0	3	2	3	0	3	0	2
CO4	3	2	0	2	0	3	0	3	0	2
CO5	3	2	0	3	1	3	0	3	0	2
Total	15	10	0	14	6	15	0	15	0	10
Scaled value	3	2	0	3	2	3	0	3	0	2

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**	
Subject Name	**SOFTWARE ENGINEERING**	
Subject Code	**XBES805**	
L –T –P –C **3- 1 – 0 - 4**	**C:P:A** **3.2:0:0.8**	**L –T –P –H** **3- 1 – 0 - 4**

Course Outcome:		**Domain**
CO1	Recognise and identify different process models	Cognitive
CO2	Generalize the software project management	Cognitive Affective
CO3	Classify the design models	Cognitive
CO4	Discuss the various s/w testing methods	Cognitive
CO5	Reproduce and Describe the S/W quality measure concepts	Cognitive Affective

COURSE CONTENT	
UNIT-I	
	A Generic View of Process - Process Models: The Waterfall Model – Incremental Model – Evolutionary Model – Specialized Model – The Unified Process – Agile Process – Agile Models.
UNIT –II	
	Project Management - Project Planning – Resources – Project Estimation - Software Project Scheduling- Risk Management - System Engineering — Requirements Engineering – Building the Analysis Models: Data Modeling Concepts

UNIT-III		
	Design Concepts – Design Models – Pattern Based Design – Architectural Design – Component Level Design – User Interface – Analysis and Design	
UNIT -IV		
	Software Testing – Strategies – Conventional Software - Object Oriented Software – Validation Testing – System Testing – Debugging - Testing Tactics – Testing Fundamentals – While Box Testing – Basis Path Testing – Control Structure Testing – Black Box Testing.	
UNIT -V		
	Software Configuration And Management – Features – SCM Process – Software Quality Concepts – Quality Assurance – Software Review–Technical Reviews – Formal Approach To Software Quality Assurance – Statistical Software Quality Assurance - Reliability – Quality Standards.	
	L=45 hrs T= 15 hrs Total = 60 hrs	

TEXT BOOKS

1. Roger Pressman.S., "Software Engineering: A Practitioner's Approach", Sixth Edition, Mcgraw Hill, 2008.
2. Jalote Pankaj, "An Integrated Approach to Software Engineering", Third Edition, Narosa Book Distributors Pvt Ltd, 2005.

REFERENCES

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1. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli, "Fundamentals of Software Engineering", Prentice Hall Of India, 1991.
2. Sommerville, "Software Engineering", Eighth Edition, Pearson Education, 2006

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO 1	3	2		3	3	3	0	3	0	2
CO 2	3	2		3	3	3	0	3	0	2
CO 3	3	2		3	3	3	0	3	3	2
CO 4	3	2		3	3	3	0	3	3	2
CO 5	3	2		3	3	3	0	3	3	2
Total	15	10	0	15	15	15	0	15	9	10
Scaled Value	3	2	0	3	3	3	0	3	2	2

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**		
Subject Name	**ANALYTICAL CHEMISTRY**		
Subject Code	**XBEC806**		
L –T –P –C **3 - 1 - 0 - 4**		**C : P : A** **3.2 : 0.4 : 0.4**	**L –T –P –H** **3 - 1 – 0- 4**

Course Outcome:		**Domain C or P or A**
CO1	To develop an understanding the basics of analytical chemistry	Cognitive
CO2	To understand the principles of quantitative analysis	Cognitive Affective
CO3	To acquire skills in gravimetric techniques	Cognitive
CO4	To understand the principles of colorimetry and spectrophotometry	Cognitive Psychomotor
CO5	To under the principles of chromatography techniques	Cognitive

COURSE CONTENT	
UNIT-I	**INTRODUCTIONTOANALYTICALCHEMISTRY**
	Types of analytical methods : Importance of analytical methods in qualitative and quantitative analysis : chemical and instrumental methods - advantages and limitations of chemical and instrumental methods. **Laboratory Hygiene and safety :** Storage and handling of corrosive, flammable, explosive, toxic, carcinogenic and poisonous chemicals. Simple first aid procedures for accidents involving acids, alkalies, bromine, burns and cut by glass. Threshold vapour concentration - safe limits. Waste disposal and fee me disposal. Evaluation of analytical data: Idea of significant figures - its importance. Accuracy - methods of expressing accuracy. error analysis –types of errors-minimizing errors. Precision – methods of expressing precision - mean, median, mean deviation, standard deviation and confidence limit. Method of least squares - problems involving straight line graphs.
UNIT –II	**QUANTITATIVEANALYSIS**
	Estimations of commercial samples - determination of percentage purity of samples – pyrolusite, Iron ore, washing soda and Bleaching power - estimation of glucose and phenol. gravimetric analysis - principle - theories of precipitation - solubility product and precipitation – conditions of precipitations-types of precipitants-specific and selective precipitants- organic and inorganic precipitants - types of precipitation - purity of precipitates – co precipitation - post precipitation - precipitation from homogeneous solution - use of sequestering agents
UNIT-III	**THERMOANDELECTROANALYTICALTECHNIQUES**
	Thermo analytical methods : Principle of thermo gravimetry, differential thermal analysis, differential scanning calorimetry - Instrumentation for TGA, DTA and DSC - Characteristics of TGA and DTA curves - factors affecting TGA and DTA curves. applications - TGA of calcium oxalate monohydrate DTA of calcium acetate

	monohydrate - determination of purity of pharmaceuticals by DSC. Electro analytical techniques - electro gravimetry -theory of electro gravimetric analysis - determination of copper (by constant current procedure) - electrolytic separation of metals : Principle - separation of copper and nickel, coulometry : principle of coulometric analysis - coulometry at controlled potential - apparatus and technique - separation of nickel and cobalt
UNIT -IV	**SPECTRO ANALYTICAL TECHNIQUES**
	Colorimetry and spectrophotometry - Beer – Lambert's law - principle of colorimetric analysis - visual colorimetry - standard series method - balancing method -estimation of NI^{+2} and Fe^{+3} colorimetrically - photoelectric photometer method - spectro photometric determination of chromium and manganese in alloy steel. Infra red spectroscopy (Instrumentation only)-block diagram- source - monochromator-cell-detectors and recorders-sampling techniques-NMR spectroscopy (instrumentation only)
UNIT V	**CHROMATOGRAPHY TECHNIQUES**
	Column chromatography - principle, types of adsorbents, preparation of the column, elution, recovery of substances and applications. thin layer chromatography - principle, choice of adsorbent and solvent, preparation of chromatoplates, Rf-values, factors affecting the Rf-values, Significance of Rf-values. Paper chromatography - principle, solvents used, development of chromatogram, ascending, descending and radial paper chromatography. paper electrophoresis - separation of amino acids and other applications. Ion - exchange chromatography - principle - types of resins -requirements of a good resin -action of resins - experimental techniques - separation of Na-K, Ca-Mg, Co-Ni and chloride - bromide mixture. analysis of milk and apple juice - gas chromatography - principle - experimental techniques - instrumentation and applications. High Pressure Liquid Chromatography (HPLC)-principle –experimental techniques - instrumentation and advantages.
	L=45 hrs T= 15 hrs Total = 60 hrs

TEXT BOOKS

REFERENCE BOOKS

1. Douglas A. Skoog and Donald M. West, F.J. Holler, Fundamentals of Analytical Chemistry, 7th edition, Harcourt College Publishers.
2. Mendham J., Denney R.C., Barnes J.D.,Thomas M.,Vogel's Text book of Quantitative Chemical analysis 6th edition Pearson education.
3. Sharma, B.K., Instrumental Methods of Chemical Analysis, Coel Publishing House, Merrut, (1997)
4. Gopalan. R., Subramaniam P.S. and Rengarajan K., Elements of Analytical Chemistry, Sultan Chand and Sons.
5. Usharani S.,Analytical Chemistry, Macmillian.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	0	3	3	3	0	3	0	2
CO2	3	2	0	3	0	3	0	3	0	2
CO3	3	2	0	3	2	3	0	3	0	2
CO4	3	2	0	2	0	3	0	3	0	2
CO5	3	2	0	3	1	3	0	3	0	2
Total	15	10	0	14	6	15	0	15	0	10
Scaled Value	3	2	0	3	2	3	0	3	0	2

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**	
Subject Name	**DATA MINING**	
Subject Code	**XBES806**	
L –T –P –C **3- 1 – 0 - 4**	**C:P:A** **3.2:0:0.8**	**L –T –P –H** **3- 1 – 0 - 4**

Course Outcome:		**Domain**
CO1	Recognise the basics of data mining concepts	Cognitive
CO2	Outline about the data processing	Cognitive Affective
CO3	Describe the concepts data ware house architecture	Cognitive
CO4	Discuss the data mining methods	Cognitive
CO5	Reproduce and Describe the data mining applications	Cognitive Affective

COURSE CONTENT	
UNIT-I	
	Introduction - What is Data mining , Data mining – important, Data mining - various kind of data - Data mining Functionalities – Various kinds of Patterns, Pattern Interesting Classification of Data mining Systems, Data mining Task Primitives, Integration of Data Mining System, Major issues in Data Mining
UNIT –II	
	Data Processing - Process the Data Descriptive Data Summarization – Measuring Central Tendency, Dispersion of Data Graphic Displays of –Basic Descriptive, Data Summaries Data Cleaning, Data Integration and Transformation data Reduction
UNIT-III	
	Data Warehouse OLAP Technology An overview - Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation
UNIT -IV	
	Mining – Frequent Patterns Associations Correlations - Basic Concepts Road Map Efficient Scalable Frequent item set Mining methods, Mining – Various Kinds of Association rules
UNIT V	
	Applications Trends - Data mining Applications Data mining – System Products Research Prototype Additional Themes on Data Mining Social impact of Data mining Trends in Data mining
	L=45 hrs T= 15 hrs Total = 60 hrs

TEXT BOOKS

1.Jiawei Han and Micheline Kamber, ‘ Data Mining (Concepts and Techniques)’ Morgan Kaufmann Publishers, Second Ed (An imprint of Elsevier)

REFERENCES

1. Karguta, Joshi, Sivakumar & Yesha , 'Data Mining (Next Generation Challenges and Future Directions)', Printice Hall of India (2007)
2. Ian H. Witten & Eibe Frank , 'Data Mining (Practical Machine Learning Tools and Techniques' Morgan Kaufmann Publishers (An imprint of Elsevier] (II Edition)
3. Alex Benson, Stephen V. Smith, 'Data Warehousing , Data mining & OLAP', Tata McGraw – Hill, 2004

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2		3	3	3	0	3	0	2
CO2	3	2		3	3	3	0	3	0	2
CO3	3	2		3	3	3	0	3	3	2
CO4	3	2		3	3	3	0	3	3	2
CO5	3	2		3	3	3	0	3	3	2
Total	15	10	0	15	15	15	0	15	9	10
Scaled Value	3	2	0	3	3	3	0	3	2	2

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**	
Subject Name	**PHYSICAL CHEMISTRY LAB – II**	
Subject Code	**XBEC808**	
L –T –P –C **0 - 0 – 2 - 2**	**C:P:A** **1.2:0.8:0**	**L –T –P –H** **0– 0 –2-2**

Course Outcome:		**Domain/Level** **C or P or A**
CO1	**Recall** various laws related to rate and electrolysis and **identify** its significances.	Cognitive Psychomotor
CO2	***Understand and Analyze*** the various chemical reaction both electrical and nonelectrical methods.	Cognitive Psychomotor Affective
CO3	***Interpret*** the values and verify the laws/estimate the amount of a given compound.	Cognitive Psychomotor

COURSE CONTENT

1. Kinetics of Ester Hydrolysis
2. Partition Co-efficient of iodine between water and carbon tetrachloride.
3. Conductometric Acid-Base Titrations
4. Potentiometic Redox Titration
5. Determination of cell content Equivalent conductance of a strong electrolyte and Ostwald's dilution law
6. Oswald's dilution verification.

	P=30 hrs T=0 hrs Total = 30 hrs

TEXT BOOKS

Pandey, O.P , Baipai. D.N and Giri.S , Practical Chemistry, Chand & Company Ltd. 2002.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	3	2	0	3	3	3	0	2	0	2
CO2	3	2	0	3	3	3	0	2	2	2
CO3	3	2	0	2	3	3	0	2	2	2
Total	9	6	0	8	9	9	0	6	4	6
Scaled value	3	2	0	3	3	3	0	2	1	2

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**	
Subject Name	**SOFTWARE DEVELOPMENT LAB (Mini Project)**	
Subject Code	**XBES808**	
L –T –P –C **0 - 0– 2 - 2**	**C:P:A** **1.2:0.8:0**	**L –T –P –H** **0 – 0 –2- 2**
	P=30 hrs T= 0 hrs Total = 30 hrs	

Mini Project

Semester	**VIII**	
Subject Name	**GUIDANCE AND COUNSELLING IN SCHOOL**	
Subject Code	**XBE809C**	
L –T –P –C **2-0 – 0 - 2**	**C:P:A** **1.5:0.5:0**	**L –T –P –H** **2- 0– 0 - 2**
Course Outcome:		**Domain**
CO_1	Outline the basis and concepts of Counselling	Cognitive
CO_2	Describes the various testing methods and achievement	Cognitive
CO_3	Identifies the significance of guidance in schools	Psychomotor
CO_4	Comprehends the various resources for guidance and counseling in schools.	Cognitive
COURSE CONTENT		
UNIT-I	**INTRODUCTION TO GUIDANCE AND COUNSELING**	
	Meaning, nature, scope and function of guidance, principles of guidance, need of guidance at various stages of life. Types of guidance, procedure of guidance, group guidance techniques – class – talks, career – talks, career – conference, group discussion, field visits, career exhibition, A-V techniques. Concept of counseling, theories of counseling: theory of self (Rogers), types of counseling: Directive, non-Directive and eclectic. Process of Counselling (initial disclosure, in-depth exploration and commitment to action). Skills in counselling (listening, questioning responding and communicating) role of teacher as a counselor and professional ethics associated with it.	
UNIT –II	**TESTING AND NON TESTING DEVICES IN GUIDANCE**	

	Testing devices in guidance – meaning, definition, measurement, uses of psychological test: intelligence tests – aptitude test – personality inventories – attitude scale – achievement tests – creativity test – mental health. Non testing devices in guidance: observation – cumulative record, anecdotal record, case study, autobiography, rating scale, sociometry etc.
UNIT-III	**GUIDANCE SERVICES IN SCHOOL**
	Guidance services at different school levels – meaning, significance, types – organization of guidance services in schools – role of guidance personnel – career and occupational information – sources, gathering, filling, dissemination – career corner – career conference.
UNIT -IV	**DEVELOPING RESOURCES IN SCHOOLS FOR GUIDANCE**
	Human resources: role of teacher, teacher – counselor, career master, councellor, medical officer, psychologist and social worker. Physical and material resources: career corner, career literatures including charts and posters, psychological test, material and their uses. Group counselling and group guidance: Meaning, definition, objectives, problem, significance – techniques, uses and requirements.
	L=30 T 0 hrs Total – 30 hrs

REFERENCES

1. Chauhan, S. S.(2008). Principles and techniques of guidance. UP: Vikas Publishing Hou Pvt. Ltd.
2. Sharma, R. N. (2008). Vocational guidance & counseling. Delhi: Surjeet Publications.
3. Jones, A. J. (2008). Principles of guidance.(5 ed). Delhi: Surjeet Publications.
4. Crow, L. D., & Crow, A. (2008). An introduction to guidance. Delhi: Surjeet Publications.
5. Sharma, R. A. (2008). Career information in career guidance. Meerut: R.Lall Books Depot.
6. Meenakshisundaram, A. (2006). Experimental psychology. Dindigul: Kavyamala Publishers.
7. Meenakshisundaram, A. (2005). Guidance and counseling. Dindigul: Kavyamala Publishers.
8. Qureshi, H. (2004). Educational guidance. New Delhi: Anmol Publications Pvt.Ltd.
9. Bhatnagar, R. P., & Seema, R. (2003). Guidance and counselling in education and psychology. Meerut: R.Lal Book Depot.

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO 1	2	3	3	1	1	1	2	2	1	0
CO 2	2	3	2	1	2	1	2	2	1	0
CO 3	2	3	3	1	1	1	2	2	1	0
CO 4	2	3	2	1	2	1	1	2	1	1
CO 5	2	3	2	1	2	1	1	2	1	1
Total	10	15	12	5	8	5	8	10	5	1
Course	3	2	0	3	3	3	0	3	2	3

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**	
Subject Name	**DISCRETE MATHEMATICS**	
Subject Code	**XBE810A**	
L –T –P –C **3- 0 – 0 - 3**	**C:P:A** **3:0:0**	**L –T –P –H** **3- 0 – 0 - 3**

Course Outcome:		**Domain**
CO1	Perform operations on discrete structures such as sets, functions, relations, and Lattices.	Cognitive
CO2	Analyze and verify operations associated with sets and Functions	Cognitive
CO3	Construct the Principal conjunctive and disjunctive normal forms	Cognitive
CO4	demonstrate the ability to solve problems using counting techniques and combinatorics	Cognitive
CO5	Create and analyze graphs and trees.	Cognitive

COURSE CONTENT	
UNIT-I	
	Relations on sets – Types of relations and their properties – Relational matrix and the graph of a relation – Partitions – Equivalence relations – Partial ordering Poset – Hasse diagram- Lattices – Modular lattice – Distributive lattice (Definition only) – Example.
UNIT –II	
	Relationship between sets – Operations on sets – Power set – ordered pairs and Cartes Relationship between sets – Operations on sets – Power set – ordered pairs and Cartesian product. Function - Classification and types of functions – Properties of functions – Composition of functions – Inverse functions – Permutation functions.ian product. Function - Classification and types of functions – Properties of functions – Composition of functions – Inverse functions – Permutation functions.
UNIT-III	
	Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions - Contrapositive – Logical equivalences and implications – DeMorgan's Laws – Normal forms – Principal conjunctive and disjunctive normal forms.
UNIT -IV	
	Basic counting – Counting arguments – Pigeonhole principle – Permutations and combinations – Recursions and recurrence relations – Generating function
UNIT -V	
	Graph Theory – Graphs – Types of graphs – connectedness – Euler graphs – Hamiltonian graphs – Trees - undirected graphs – Directed graphs – Spanning trees – Planar graph.(Definition, example, & Simple theory only)
	L=45hrs Total – 45 hrs

TEXT BOOKS:

1. Trembly J.P and Manohar R, "Discrete Mathematical structures with Applications to Computer Science; Tata McGraw – Hill Pub.Co.Ltd., New Delhi, 2003.

2. Kenneth H.Rosen, "Discrete Mathematics and its Applications – 5th edition, Tata McGraw – Hill Pub.Co.Ltd., New Delhi, 2003.

REFERENCES:

[1]. Ralph P.Grimaldi, "Discrete and combinatorial Mathematics 4th edition, Pearson Education, Asia.

[2]. Narasingh Deo"Graph theory with Application to Engineering and Computer Science". Prentice Hall of India, New Delhi 2007.

[3] Schaum's Outlines, Discrete Mathematics, Tata McGraw- Hill Company Limited, New Delhi.

Mapping of CO's with PO's:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**
CO1	2	3	3	1	1	1	2	2	1	0
CO2	2	3	2	1	2	1	2	2	1	0
CO3	2	3	3	1	1	1	2	2	1	0
CO4	2	3	2	1	2	1	1	2	1	1
CO5	2	3	2	1	2	1	1	2	1	1
Total	10	15	12	5	8	5	8	10	5	1
Scaled Value	3	2	0	3	3	3	0	3	2	3

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**		
Subject Name	**FOOD CHEMISTRY**		
Subject Code	**XBE810D**		
L –T –P –C **3- 0 – 0 - 3**	**C:P:A** **2.2:0.4:0.4**	**L –T –P –H** **3- 0 – 0 - 3**	

Course Outcome:		**Domain**
CO1	Relate the structure and estimation of standard values of edible oils	Cognitive
CO2	Discuss the basic impact of beverages towards society	Cognitive Affective
CO3	Summarize the types and nature of food additives	Cognitive
CO4	Identify the causes of food toxicity	Cognitive Psychomotor
CO5	Recall the consequences of Food adulteration	Cognitive

COURSE CONTENT

UNIT-I	**EDIBLE OILS**
	Beverages – Soft drinks – soda – fruit juices – alcoholic beverages examples. Carbonation – addiction to alcohol – cirrhosis of liver and social problems.
UNIT –II	**FOOD ADDITIVES**
	Food additives –artificial sweetners – saccharin – cyclomate and aspartate. Food flavours –esters, aldehydes and heterocyclic compounds. Food colours – restriction of the use spurious colours – Emulsifying agents – preservatives learning agents. Baking powder yeast – taste makers – MSG vinegar.
UNIT-III	**FOOD POISON**
	Food poisons – natural poisons (alkaloids – nephrotoxing) – pesticides. (DDT, BHC, Malathion) – Chemical poisons – first aid for poison consumed victims.
UNIT -IV	**FOOD ADULTERATION**
	Sources of food, types, advantages and disadvantages. Food adulteration – contamination of Wheat, Rice, Alial, Milk, Butter etc. with clay stones, water and toxic chemicals – Common adulterants. - ghee adulterants and their detection. Detection of adulted food by simple analytic techniques
	L=45 hrs Total – 45 hrs

TEXT BOOKS

1. Swaminathan M., Food Science and Experimental foods, Ganesh and Company.
2. Jayashree Ghosh, Fundamental concepts of appliced chemistry, S. Chand & Co. Publishers.

REFERENCES

1. Thanlamma Jacob, text books of applied chemistry for home science and allied science, Macmillan.

E-REFERENCES

1. https://nptel.ac.in/courses/103103029/34
2. https://www.youtube.com/watch?v=pqjGtjHtcaA&list=PLCSXF3g34YxXcmWnThd5s _sRIOT4zGsPF&index=1

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	0	3	3	3	0	3	0	2
CO2	3	2	0	3	0	3	0	3	0	2
CO3	3	2	0	3	2	3	0	3	0	2
CO4	3	2	0	2	0	3	0	3	0	2
CO5	3	2	0	3	1	3	0	3	0	2
Total	15	10	0	14	6	15	0	15	0	10
Scaled value	3	2	0	3	2	3	0	3	0	2

1 - Low, 2 – Medium, 3 – High

Semester	**VIII**	
Subject Name	**UNDERSTANDING PHP**	
Subject Code	**XBE810G**	
L –T –P –C **3- 0 – 0 - 3**	**C:P:A** **2.5:0:0.5**	**L –T –P –H** **3- 0 – 0 - 3**

Course Outcome:		**Domain**
CO1	Acquire the concepts and basic knowledge of PHP.	Cognitive
CO2	Understand the decision and loops on PHP	Cognitive
CO3	Understand the functions and concepts of PHP.	Cognitive
CO4	Acquire the knowledge of array functions	Cognitive
CO5	Understanding the file and directory in PHP	Cognitive

COURSE CONTENT		
UNIT-I		
	Introduction to PHP - Evaluation of Php, Basic Syntax , Defining variable and constant, Php Data type , Operator and Expression , Handling Html Form With Php, Capturing Form Data, Dealing with Multi-value filed, and Generating File uploaded form redirecting a form after submission	
UNIT –II		
	Decisions and loop - Making Decisions, Doing Repetitive task with looping, Mixing Decisions and looping with Html	
UNIT-III		
	Function - What is a function, Define a function, Call by value and Call by reference Recursive function, String- Creating and accessing String, Searching & Replacing String Formatting String, String Related Library function	
UNIT -IV		
	Array - Anatomy of an Array, Creating index based and Associative array, Accessing array Element, Looping with Index based array, Looping with associative array using each and for each, Some useful Library function,	
UNIT -V		
	Working with file and Directories - Understanding file& directory, Opening and closing a file, Coping, renaming and deleting a file, Working with directories, Building a text editor, File Uploading & Downloading	
	L=45 hrs Total – 45 hrs	

TEXT BOOKS

1. Steven Holzen, " The Complete Reference PHP", TBH Publishers, 2007
2. Andi Gutmens, Seather Bakken & Derick, " PHP 5 Power Programming", Prentice Hall, 2004 .

Mapping of CO's with PO's:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	2	0	3	3	3	0	3	0	2
CO2	3	2	0	3	0	3	0	3	0	2
CO3	3	2	0	3	2	3	0	3	0	2
CO4	3	2	0	2	0	3	0	3	0	2
CO5	3	2	0	3	1	3	0	3	0	2
Total	15	10	0	14	6	15	0	15	0	10
Scaled value	3	2	0	3	2	3	0	3	0	2

1 - Low, 2 – Medium, 3 – High

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED101	CC:01 CHILDHOOD & GROWING UP	3	1	0	4
C:A:P		L	T	P	Hrs
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Classify the different aspects of a child's physical, social, moral and emotional development	Cog.	Understanding
CO2	List out the developmental process of children with diverse abilities in social, cultural and political context & sensitivity towards children's developmental	Cog.	Remembering
CO3	Describe the different social educational cultural political realities at the core of the exploration by understanding childhood.	Cog	Remembering
CO4	Explain the significant events that media highlights during childhood stage provide hands on experiences to interact with children and training methods to understand the various aspects of developments in children	Cog.	Understanding

Unit	Content	
UNIT I	**Perspectives in Development**	19

Concept, Meaning, scope and Function and Educational Psychology: Introduction to development: concept and introduction to perspectives in development, humanistic psychology and developmental theory.

Enduring themes in the study of development: development as multidimensional and plural; Development as continuing through the life span; ways in which development is continuous/discontinuous? ; Socio-cultural contexts influencing development.

Gathering data about children from different contexts: naturalistic observations; interviews; reflective journals about children; anecdotal records and narratives; clinical methods with reference to Piaget.

Method: Longitudinal, Cross Sectional, Sequential, Cohort methods: Biographical, Case study and Observational method.

UNIT II	**Stages of Human Development**	19

Child as a developing individual; a psycho-social entity; stages of development

Developmental characteristics of a child and an adolescent: physical, cognitive, social, emotional, moral and language; their interrelationships.

Developmental tasks of childhood and adolescence and their implications.

Factors influencing development such as heredity& environment, media, nutrition, child-rearing practices, siblings and peers.

Commonalities and diversities within the notion of childhood and how multiple childhoods are constructed with particular reference to the Indian context-Living in an urban Slum, Growing girl, and Growing up in dalit household.

UNIT III	**Social and Emotional Development**	18

Basic understanding of emotions, Gender socialization occurs

Personality development: Freud; psycho-social development-Erikson; influence of early childhood experiences on later personality.

Social theories and gender development: meaning of gender roles - influences - stereotypes, gender in the playground - Development of emotions: functions of emotions.

UNIT IV	**Contexts of Socialization**	**19**

Concept of socialization: family and child relationships; parenting, child rearing practices
Schooling: peer influences, school culture, relationships with teachers, teacher expectations and school achievement; being out of school, overage learner
Relationships with peers: friendships and gender; competition and cooperation, competition and conflict; aggression and bullying from early childhood to adolescence.
Social, economic and cultural differences in socialization: implications for inclusion.

		Lecture	**Tutorial**	**Total**
		45	**30**	**75**

Essential Readings

1. Cole, M., Cole, S. R. and Lightfoot, C. (2004). The Development of Children. New York: Worth Publishers. Chapter 1: The study of Human Development.
2. Newman, B. M. and Newman, P.H. (2007). Theories of Human Development. London: Lawrence Erlbaum Associates, publishers. Chapter 1: Introduction.
3. Papalia, D. E. and Olds, S. W. (2003). Human Development. New York: McGraw Hill Higher Education. Chapter 1: The Study of Human Development, Chapter 2: Theory and Research, Chapter 4: Physical Development During the First Three Years, Chapter 7: Physical Development in Early Childhood, Chapter 9: Physical Development in Middle Childhood.
4. Saraswathi, T.S. (Ed.) (1999). Culture, Socialization and Human Development: Theory, Research and Applications in India. Sage publications. Chapter 4: Theoretical Frameworks in Cross-cultural Psychology, Chapter 6: Individualism in a Collective Culture: A Case of Co-existence of Opposites.
5. Vasanta, D. (2004). Childhood, Work and Schooling: Some Reflections. Contemporary Education Dialogue, Vol. 2(1), 5-29. 6. Mukunda, K. V. (2009). What Did You Ask in School Today? A Handbook on Child Learning. Noida: Harper Collins. Chapter 4: Child Development, 79-96.
6. Readings for Discussion 1. Aries, P. (1965). Centuries of Childhood-A social history of the family life. Random House Inc. Chapter 1: The Ages of Life, Chapter 2: The Discovery of Childhood, and Conclusion - The two concepts of childhood. 2. Harris, M. and Butterworth, G. (2002). Developmental Psychology: a student's handbook. New York: Taylor & Francis. Chapter 1: A Brief History of Developmental Psychology.

Advanced readings

1. Kakkar, S. (1978). Indian Childhood: Cultural Ideas, And Social Reality. New Delhi: Oxford.
2. Nambissan, G. (2010). Exclusion and Discrimination in Schools: Experiences of Dalit Children; Working paper series Volume 01, Number 01, Indian Institute of Dalit Studies and UNICEF.
3. Kakkar S. (1991). The Inner World: A Psycho-analytic study of childhood and society in India. Delhi: Oxford University Press.
4. Sandra, L. Bem (1987). Gender Schema Theory and its Implications for Child Development: raising gender a schematic children in a gender schematic society, in M.R. Walsh, (ed). The Psychology of Women. Harvard University Press Cambridge, 206-226.
5. Weiner, M. (1991). The State and the Child in India: Child Labour and Education Policy in Comparative Perspective. Princeton: Princeton University Press.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED102	CC:02 EDUCATION IN INDIA- STATUS, PROBLEMS AND ISSUES	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the concept of education followed in earlier period	Cog.	Remembering
CO2	Classify the historical background of Indian Education with special reference to secondary education.	Cog.	Understanding
CO3	Examine the objectives and system of secondary education	Cog.,	Analyzing
CO4	Recognize the aims and objectives of various educational systems.	Cog.,	Remembering

UNIT I	Concept of Education	19

Indian and Western. Aims - Functions of Education.
Education as an instrument of Social Control, Social Change,
Preservation of Cultural Heritage and Values.
School and the society, Culture and Education, School as a Social System. Agencies of Education –Formal and Non-formal.

UNIT II	Salient Features of Ancient Indian Education	18

Vedic, Buddhist, Islamic - Tradition in Education. Major landmarks of British System of Education in Colonial India particularly from the viewpoint of Aims, Structure, Curricula and Methods of Education - Efforts towards evolving a national system of Education.

UNIT III	Secondary Education	19

General Aims and Objectives of Secondary Education and Structure. Education during Post Independence Period - Pre independence - Secondary Education commission 1952-53, Education Commission 1964-66, New Education Policy 1986 with Programme of Action 1992, Different streams of Secondary Education 1) C.B.S.E. 2) I.C.S.E. and 3) KSEEB with respect to curriculum.4) Examination System etc.,
Secondary School Teacher – Qualifications, Competences, Job Profile, Professional Code of Ethical conduct. Role of Secondary School teacher in Emerging India.

UNIT IV	Teacher Education and Secondary School Curriculum	19

Aims and Objectives of Teacher Education in India - Role and Responsibilities of NCTE NCERT, DSERT, CTE, IASE - Professional organization in the field of Teacher education - NCF-2005 - Programmes for enhancing efficiency and productivity of school teachers- In-service training – orientation and content enrichment programmes.

		Lecture	Tutorial	Total
		45	30	75

Assignments: (Any two of the following.)

- Prepare and execute a plan for making at least two children and one adult literate from the community.
- Plan and organize a field trip/excursion to a nearby area of educational important and submit a report.
- Visit to block or district and divisional educational offices and study their educational management pattern and submit the report. Prepare one project for institutional planning.
- Critically Study the working of the one of the parent teacher association in any two secondary schools.
- A critical survey of co-curricular activities in secondary schools.

Reference:

- Anand C. L. et al., (1993) Teacher and Education in the emerging Indian society NCERT New Delhi.
- Coombs Philips H (1985) The World Crisis in Education. New York. Oxford University Press, New York
- Delors, Jaeques (1996) Learning the Treasure within Report to UNESCO of the Internal Commission on Education for Twenty First Century UNESCO.
- Dewey I (1952) Experience in Education, Collier Macmillan.
- Dewey S (1956) Democracy in Education New York: Macmillan.
- Gandhi M. K. (1956) Basic Education, Ahmedabad Nalijiban.
- Government of India (1952) Report of the Secondary Education Commission, New Delhi:- Ministry of Education.
- Government of India (1966) Report of Education Commission Ministry of Education, New Delhi.
- Government of India MHRD (1986) (Revised 1992) National Policy of Education. New Delhi.
- Government of India (1992) Report of Core Group on Value Orientation of Education Planning Commission.
- Kneller G. F. (1978) Foundation of Education. New York: Johri Willy and Sons.
- Kneller George (1978) Introduction to Philosophy of Education, New York: John Willey and Sons INC
- Mani R S. (1964) Educational Ideas and Ideals of Gandhi and Tagore, New Book Society, New Delhi.
- Mathur S.S. (1988) A Sociological Approach to Indian Education, Agra. Vindo Prakashan.
- Mookherjee K.K. (1972) Some Great Educators of the World. Fas Gupta & Ce Put Ltd. Calcutta.
- Mukherjee S. N. (1966) History of Education in India, Baroda. Acharya Book Depot.
- Naik J. P. and Syed N (1974) A Student's History of Education in India, New Delhi. Macmillan Co.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED103	CC:03 LANGUAGE ACROSS THE CURRICULUM – PART 1	3	1	0	4
C:A:P		L	T	P	H
2:0:1		4	1	0	5

Course outcome		Domain	Level
CO1	Describe the text and its literary elements	Cog.	Und
CO2	Recreate the activities to understand the text in a better way	Psy	Manipulation
CO3	Adopt the structure and integrate the task of writing	Psy	Articulation

UNIT I	ENGAGING WITH NARRATIVE AND DESCRIPTIVE ACCOUNTS	20

The selected texts could include stories or chapters from fiction, dramatic incidents, vivid descriptive accounts, or even well-produced comic strip stories.

Suggested Activities

Reading for comprehending and visualizing the account (individual plus group reading and discussion/explanation).

Re-telling the account – in one's own words/from different points of view (taking turns in a smaller group)

Narrating/describing a related account from one's life experience (in front of a smaller group) Discussion of characters and situations – sharing interpretations and points of view (in a smaller group)

Writing based on the text, e.g. summary of a scene, extrapolation of story, converting a situation into a dialogue, etc. (individual task).

UNIT II	ENGAGING WITH POPULAR SUBJECT-BASED EXPOSITORY WRITING	20

The selected texts could include articles, biographical writing, or extracts from popular non-fiction writing, with themes that are drawn from the subject areas of the student teachers (various sciences, mathematics, history, geography, literature/language pieces) For this Unit, the student-teachers should work in groups divided according to their subjects, within which different texts could be read by different pairs of student-teachers.

Suggested Activities

- Reading to extract overall meaning, information, subject knowledge (guided reading in pairs and simple note making)
- Identifying major concepts and ideas involved and making notes on these in some schematic form – flow diagram, tree diagram, mind map, etc. (guided working in pairs)
- Explaining the gist of the text/topic to others (in the larger subject group)
- Attending the writing style, subject-specific vocabulary and 'perspective' or 'reference frame' in which different topics are presented—this will vary across subjects and texts, and requires some interpretative skills for 'placing' the context of each text (group discussion and sharing)
- Writing a review or a summary of the text, with comments and opinions (individual task)

UNIT III	ENGAGING WITH JOURNALISTIC WRITING	20

The selected texts would include newspaper or magazine articles on topics of contemporary interest. Student-teachers can be grouped randomly for this Unit.

Suggested Activities

- Using reading strategies, such as scanning, skimming and reading for extracting information – as appropriate for initial reading of articles (guided individual task)
- Analysis of structure of the article, identifying sub-headings, key words, sequencing of ideas, use of concrete details, illustrations and/or statistical representations, etc. (guided working in pairs) Critical reading for attending 'framing' of the article, point(s) of view presented, possible biases or slants (small group discussion)
- Researching and writing articles on topics of local interest (working to produce a local interest magazine).

		Lecture	Tutorial	Total
		60	**-**	**60**

References:

1. Bose, R. B. N. & Sterling, T. S.: Elements of English Rhetoric and Prosody; Chakraborty, Chatterjee Co. Ltd. Calcutta, Latest Edition.
2. Bright, J. A. & McGregor, G. P.; Teaching English as a Second Language, ELBS & Longman, London, 1978.
3. Brumfit, C. J. & Johnson, K.; The Communicative Approach to Language Teaching, OUP, Oxford, 1979. 4. Heaton, J. B. : Language Testing, Modern English Publication Ltd., Great Britain, 1982.
4. Hornby, A. S. : Oxford Advanced Learner's Dictionary of Current English, OUP, Oxford, Latest Edition.
5. Johnson, J.; The Communicative Approach to Language Teaching, OUP, Oxford, 1979.
6. Johnson, K. : Communicative Syllabus Design and Methodology, Pergamum Press, Oxford, 1982.
7. Jones, D. : English Pronouncing Dictionary, ELBS, London, Latest Edition.
8. Kemp, et al.; Designing Effective Instruction, Macmillan College Publishing Company, 1994.
9. Krashen, S.; Second Language, Acquisition and Second Langu., Learning, Pergamum Press, New York, 1979.

Suggested Reading:

1. Agnihotri, R.K., Khanna, AL, 1994(Eds). Second Language Acquisition: Socio-Cultural and Linguistic Aspects of English in India(RALI), New Delhi, Sage Publication
2. Baruah, T.C. 1984, The English Teachers Handbook, New Delhi, Sterling Publishers.
3. Bansal, R.K. and Harrison, J.B., 1972: Spoken English in India, Madras, Orient Longman
4. Brown, J.D. 1996: Testing in Language Programmes, Upper Saddle River, NJ, Prentice HallRegents
5. Chomsky, N. 1986. Knowledge of Language, New York ,Praeger
6. Crystal David, 1997. Globalization of English, Cambridge; Cambridge University Press
7. Ellis, R. 1992, The Study of Second Acquisition, Oxford, Oxford University Press
8. Khulchandani, L.M. 1988: Language in a plural society, Delhi, MotiramBanarasidas and Shimla
9. Lewis.M. 1993, The Lexical Approach: The State of ELT and a way Forward, Hove: LanguageTeaching Publications.
10. Lock, G. 1996. Functional English Grammar, Cambridge: Cambridge University Press
11. Mohanty, Bilingualism in a Multilingual Society: Psycho Social and Pedagogical Implication,Mysore:CIIL
12. Nagaraj, Geeta:2001 : English Language Teaching, Orient Longman Limited, Kolkata
13. NCERT, 2000, Continuous and Comprehensive Evaluation, New Delhi
14. NCERT, 2005. National Curriculum Framework, 2005, New Delhi
15. Nuna, D. 1991, Language Teaching Methodology, London Prentice Hall
16. Richards, J.C, and Rodgers, T.S. 1986, Approaches and Methods in Language Teaching, Universityof Hawaii, Maroo: Cambridge University Press
17. Vygotsky, L.S. (1978), Mind in Society, Harvard University Press: Cambridge.
18. Widdowson, H.G. 1992, Aspects of Language Teaching, Oxford University Press.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED104	CC: 04 CURRICULUM DEVELOPMENT & SCHOOL	4	0	0	4
C:A:P		L	T	P	H
3:0:1		4	1	0	5

Course outcome		Domain	Level
CO1	Define the meaning and contexts of curriculum	Cog.	Remembering
CO2	Interpret the basics of curriculum	Cog.	Understanding
CO3	Describe the different steps of framing curriculum	Cog.,	remembering
CO4	Adopt the structure and integrate the task of writing	Psy	Articulation

UNIT I	Introduction to Curriculum	15

Curriculum – Meaning and Nature, types of Curriculum, Syllabus and Text books –their interrelationship. Issues and problems of existing curriculum.

UNIT II	Curriculum Construction	15

Curriculum Construction, Curriculum Development and Curriculum Designing: Concepts and differences. Determinants and motives of Curriculum Development. Different Curriculum Models-open university, Open School, etc.

UNIT III	Design of Curriculum	15

Steps of Designing different Curriculum. Selection, Gradation and Organization of Curriculum. Development and Implementation of Curriculum. Enrichment of Curriculum.

UNIT IV	Practical	15

Evaluation of B.Ed. Curriculum
Designing a Curriculum in a given condition Reviewing of Syllabus/Books

		Lecture	Tutorial	Total
		60	-	60

REFERENCES

1. Ashcroft, Kate and Palacio, David: The Primary Teacher's Guide to the New National Curriculum. London: Flamer Press, 1995.
2. Doll, Ronald C.: Curriculum Improvement – Decision Making and Process. London; Allyn and Bacon, 1996.
3. Eccles tone, Kathryn: How to Assess the Vocational Curriculum. London: Kogan Page Ltd. 1996.
4. Hendricks, Joanne: Total Learning Developmental Curriculum for the Young Child. New York: Maxwell McMillan International, 1994.
5. Hooper, R.: The Curriculum Context, Design and Development. The Chaucer Press Ltd., Great Britain, 1977. Kaushik, S.L.: Shikshakram Vikas. Rajasthan Granth Academy. Jaipur, 1977.
6. Kelly, A.V.: The Curriculum – Theory and Practices. Harper and Row Publishers, London, 1982.
7. Kerr, J.E. (Ed.): Changing the Curriculum. University of London Press Ltd., London, 1970.
8. Lawton, D.: Class, Culture and the Curriculum. Rouletdge and Kegan Paul Ltd., London, 1975. Lowy, A. (Ed.): Handbook of Curriculum Evaluation. International Institute for Educational Planning, New York, 1977.
9. Lowy, A.: The International Encyclopaedia of Curriculum. New York: Pergamum Press, 1991.

10. Mamidi, M.R. and Ravishankar: Curriculum Development and Educational Technology, Sterling Publishers Pvt. Ltd., New Delhi, 1983.
11. Nichols, S.H. and Nichols, A.: Developing Curriculum. George Allen and Unwin, Boston, London, 1976.
12. Oriosky, D.E. and Smith, B.D.: Curriculum Development – Issues and Insights. Rand McNally College Publishing Company, USA, 1976.
13. Prasad, Janardan & Kaushik, V.K. Advanced Curriculum Construction. New Delhi: Kanishka Publishers, 1997.
14. Richmond, K.W.: The School Curriculum. Methuen and Co. Ltd., London. 1973.
15. Saylor, J.G. and Alexander, W.H.: Curriculum, Planning for Modern Schools. London: Holt, Rinehart and Winston, Inc., 1966.
16. Wiles, Jon. & Bondi, Joseph C.: Curriculum Development –A Guide to Practice. London: Charles E. Merrill Publishing Co., 1984.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED105	EPC:01 READING AND REFLECTING ON TEXTS	0	0	4	4
C:A:P		L	T	P	H
2:1:0		0	0	4	4

Course outcome		Domain	Level
CO1	Read and listen to the text and understand	Affective	Receiving
CO2	Analyzing the reading strategies with structural constructions of a skills	Cog.	Analyzing
CO3	Interpreting the different types of narrative techniques	Cog.,	Understanding

Unit	Content	Hrs
UNIT I	Reading Skills	20

Creating environment for reading – reading clubs, class libraries - Reading aloud and silent reading - Scaffolding: concept and activities - Reading different texts types like stories, poems, riddles, jokes, and instructions for games.

UNIT II	Reading with comprehension	20

Reading for global and local comprehension - Inferences, analysis and extrapolation - Reading strategies including word-attack strategies - Discourse analysis - Using reading as a tool for reference skills i.e. use of dictionary, encyclopedia and internet - Using ideas of

critical literacy to analyses chapters from textbooks. Acquisition of Reading Skills.

UNIT III	Types of text	20

Narrative text - Expository - Autobiographical Narratives - Field Notes - Ethnographies - Addressing different types of skills and strategies.

Mode of Transaction

1. Participating in tasks and activities to improve proficiency in the receptive and productive skills of English.
2. Text analysis of school textbooks to improve skills in critical literacy.
3. Reflecting on one‟ s own learning to make connections with pedagogy

		Lecture	Tutorial	Total
		60	**-**	**60**

Essential Readings

1. Lightbown, P. M & Spada, N. (1999). How Languages are Learned Oxford: Oxford University Press
2. Maley, A. & Duff, A. (1991). Drama techniques in language learning: A resource book of communication activities for language teachers (2nd ed.). Cambridge: Cambridge University Press.
3. Morgan, J. & Rinvolucri, M. (1983). Once upon a time: Using stories in the language classroom. Cambridge:. Cambridge University Press.
4. Wright, A. (1989). Pictures for Language Learning. Cambridge: Cambridge University Press.

Advanced Readings

1. Parrot M. (1993). Tasks for language teachers Cambridge: Cambridge University Press
2. Richards, J. & Lockhart, C. (1994). Reflective Teaching in Second Language Classrooms. Cambridge: Cambridge University Press
3. Slatterly, M. & Willis, J. (2001). English for primary teachers: A handbook of activities & classroom language. Oxford: Oxford University Press

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED201	CC:01 LEARNING & TEACHING	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Theorizing the perspective of learning	Cog.	Understanding
CO2	Applying the various learning perspectives according to the situations	Cog.	Applying
CO3	Classifying the constructivist perspectives which facilitates the learning environments	Cog.	Understanding
CO4	Analyzing the values of individual difference in intelligence	Cog.	analyzing

UNIT I	THEORETICAL PERSPECTIVES ON LEARNING	18

Implicit knowledge and beliefs about learning - demystifying misconceptions -Perspectives on human learning: Behaviorist (conditioning paradigm in brief), cognitivist, information-processing view of Skinner, Piaget, Rogers, Vygotsky, humanist, social-constructivist. Concepts and principles of each perspective and their applicability in different learning situations.

UNIT II	ROLE OF LEARNER IN LEARNING	18

Role of learner in school learning situations, primary secondary, higher secondary - Role of teacher in teaching-learning situations: a) transmitter of knowledge, b) model, c) facilitator, d) negotiator, e) co-learner. The focus is on building understanding of different psychological perspectives of learning and helping student teachers to learn to apply them in different learning situations. Distinctions between learning as 'construction of knowledge' and learning as 'transmission and reception of knowledge'.

UNIT III	LEARNING IN 'CONSTRUCTIVIST' PERSPECTIVE	19

Social-constructivist perspective also Bruner and Ausubel's perspective applications of Vygotky's ideas in teaching.

Understanding processes that facilitate 'construction of knowledge': (i) Experiential learning and reflection (ii) Social mediation (iii) Cognitive negotiability (iv) Situated learning and cognitive apprenticeship (v) Meta-cognition.

Creating facilitative learning environments, teachers' attitudes, expectations – enhancing motivation, positive emotions, self-efficacy, collaborative and self regulated learning.

UNIT IV	INDIVIDUAL DIFFERENCES AMONG LEARNERS	19

Dimensions of differences in psychological attributes—cognitive abilities, interest, aptitude, creativity, personality, values.

Understanding learners from multiple intelligences perspective with a focus on Gardner's theory of multiple intelligences. Implications for teaching-learning in the light of changing concept of intelligence, including emotional intelligence. - Differences in learners based on predominant 'learning styles'. Differences in learners based on socio-cultural contexts: Impact of home languages of learners' and language of instruction, impact of differential 'cultural capital' of learners.

Understanding differences based on a range of cognitive abilities— learning difficulties, slow learners and dyslexics, intellectual deficiency, intellectual giftedness. Implications for catering to individual variations in view of 'difference' rather than 'deficit' perspective. Understanding the differential learning needs of the learners with regard to abilities, learning styles, language, socio-cultural differences/disadvantage, learning difficulties, and their implications for classroom practices and teaching.

		Lecture	**Tutorial**	**Total**
		45	**30**	**75**

References

- Aggarwal, J.C. Essential of Educational Psychology, Vikas Publishers, Delhi, 1998
- Aggarwal, J.C. Essential of Educational Psychology, Vikas Publishing House, New Delhi, 1994.
- Bhargava, Mahesh, Introduction of Exceptional Children, Sterling Publishers, New Delhi, 1994.
- Bhatia, H.R., A Text Book of Educational Psychology, Delhi: McMillan Co., New Delhi, 1977
- Bhatia, K.K. Educational Psychology and Techniques for Teaching, Kalyani Publishers, Ludhiana, 1994.
- Chauhan, S.S. Advanced Educational Psychology, Vikas Publishing New Delhi, 1996
- Dandapani, S., Advanced Educational Psychology. New Delhi. Anmol Publications Pvt. Ltd., 2000
- DeCecco, John P., Psychology of Learning and Instruction, Prentice Hall, New Delhi, 1987.
- Drescoll, Mercy P.M Psychology of Learning for Instruction, Allyn and Bacons, USA, 1993
- Eshwar, H.S. and Nataraj P., Shaikshanika Manovijnana, Parichaya: Bhaga I and II, Institute of Kannada Studies, Union of Mysore, Mysore, 1985
- Gagne, R.M. Conditions of Learning and Theory of Instruction, 4th Edition, Holt Rinehart and Winston, New York, 1977
- Ghangadharappa, N.R. Shaikshanika Manovijnana, Rekha Pradhsna, Davengere, 1996
- Goleman, Daniel, Emotional Intelligence. New York: Bantam, 1995
- Govinda Rao., A.V. Shikshandalli Manovijnana, Vidyanidhi Pradshana, Gadaga, 1996
- Kar, Chintamani, Exceptional Children, Sterling Publishers, New Delhi, 1992
- Kundu, C.L. and Tutoo, D.N., Educational Psychology, Sterling Publishers, New

Delhi, 1980.
- Kundu, V.L and Totoo, D.N., Educational Psychology, Sterling Publishers, New Delhi.
- Lingren, H.C., Educational Psychology in the Classroom, 6th Ed., Oxford University
- Press, New Delhi, 1980
- Mangal, S.K. Advanced Educational Psychology, Prentice Hall of India. Pvt. Ltd., 1999
- Mathur, S.S., Educational Psychology, 9th Ed., Vinod Pustak Mandir, Agra, 1981
- Raul, Lizy T., (1998) Educational Psychology, CMC Mary Matha, Kerala.
- Sharma, R.N. Educational Psychology and Guidance, Vikas Publishers, New Delhi, 1998
- Shivashankara H.V. and Basakumar P., Shaikshanika Manovijnana, Hanji Prakashana Davangere, 1977
- Skinner, C.E. (Ed) Educational Psychology, 4th Ed., Prentice Hall of India Pvt., Ltd., New Delhi, 1996
- Walia, J.S. Foundation of Educational Psychology, Paul Publishers, Jalandhar, 2001.
- Walia, J.S. Foundations of Educational Psychology, Paul Publishers Jalandhar, Punjab, 1999
- Yelon, S.L. and Weinstein, G.W., A Teacher's World: Psychology in the Classroom, McGraw Hill Co., Tokyo, 1977.

COURSE CODE	**SUBJECT NAME**	**Category**			
		L	**T**	**P**	**CREDITS**
BED202T	**PC:01(Part:01)**	**3**	**1**	**0**	**4**
C:A:P	**தமிழ் கற்பித்தல்முறை - I**	**L**	**T**	**P**	**Hrs**
3:0:0		**3**	**2**	**0**	**5**

Course outcome		**Domain**	**Level**
CO1	கலைத்திட்டத்தில் தாய்மொழியும் அறிதல்	Cog.	அறிதல்
CO2	துணைக் கருவிகளின் பங்குகளை விளக்குதல்	Cog.	விளக்குதல்
CO3	புளும் கற்பித்தல் கோட்பாடுகள்இ நுண்ணிலைக் கற்பித்தலை விளக்குதல்	Cog.,	விளக்குதல்
CO4	செய்யுள்,உரைநடை, இலக்கணம் பாடங்களைக் கற்பித்தல் பற்றி அறிதல்	Cog.,	அறிதல்
CO5	இலக்கணம் கற்பித்தலும் இமொழிபெயர்ப்பும் அறிதல்	Cog	அறிதல்
Unit	**Content**		**Hrs**

UNIT I	கலைத்திட்டத்தில் தாய்மொழியும்,தமிழும	15

தாய்மொழிகற்பித்தலின் நோக்கம் - திருத்தமாகப் பேச,படிக்க,கேட்க,எழுதப் பயிற்சியளித்தல்- அழுத்தந்திருத்தமாகப் பேசுதல் - இலக்கணவழுவின்றிப் பேசுதல் மரபுமொழிகள் - பழமொழிகள்- தொடக்கநிலைப் பேச்சாற்றல் -படிக்கக் கற்பித்தலின் நோக்கம் - படிக்கக் கற்பிக்கும் முறைகள்- எழுத்துமுறைப் படிப்பு - சொல்முறைப்படிப்பு- படிப்பில் ஆர்வத்தைத் தூண்டல் - வாய்விட்டுப் படித்தல் முறைகள் - நன்மை,தீமைகள்- நூல்களைப் பயன்படுத்துதல் - ஆழ்ந்தபடிப்பு - அகன்றபடிப்பின் நோக்கங்கள் - நிறை-குறைகள்.கேட்டல் பழக்கத்தினைவளர்த்தல்- வானொலிகேட்டல் -கேட்டலுக்கும் பயிற்றுலுக்குமுள்ளவேறுபாடுகள் - கேட்டல் திறனைவளர்த்தலுக்கானநோக்கங்கள்- எழுதுவதற்குப்பயிற்சிஅளித்தல் - எழுதுகருவிகளைப் பிடிக்கும் முறை - நல்லகையெழுத்தின் நல்லியல்புகள் -தெளிவு,அளவு,அழகு,விரைவு, இடைவெளிஎழுத்துப்பயிற்சிமுறைகள் -வரியொற்றிஎழுதுதல் - பார்த்துஎழுதுதல் - சொல்வதைஎழுதுதல் - பிழையின்றிஎழுதப் பயிற்சியளித்தல் - பிழைகளைக்களையும் வழிமுறைகள்.

UNIT II	மொழிக் கற்பித்தலின் நுட்பக் கூறுகளும்,துணைக் கருவிகளின் பயன்களும்	15

தாய்மொழிகற்பித்தலில் துணைக் கருவிகளின் பங்கு - வானொலி–ஒளிப்பதிவு நாடா - ஒலிப்பதிவுநாடா - தொலைக்காட்சிப் பெட்டி–வரைபடங்கள் - மாதிரிகள் - மின்அட்டை - செய்திப் பலகை - பிம்பம் வீழ்த்தும் கருவி–தமிழில் மொழியியல் அமைப்பு - மக்கள் வாழ்க்கையில் தகவல் தொடர்பின் பங்கு - சமூகவியல் பின்னணியில் மொழி - உளவியல் அடிப்படையில் மொழிகற்றல் - மொழியின் சமூகப் பணிகள்.

UNIT III	கற்பித்தல் திறன்களும் செய்யுள் கற்பித்தலும்	15

புளும் கற்பித்தல் கோட்பாடுகள் - நுண்ணிலைக் கற்பித்தல் வரலாறு -நுண்ணிலைக் கற்பித்தல் படிநிலைகள் - நுண்ணிலைக் கற்பித்தல் சுழற்சி–நுண்ணிலைக் கற்பித்தலின் நன்மைகள் - தொடங்குதல் திறன் - விளக்குதல்திறன் - முடித்தல் திறன் - கிளர்வினாத்திறன் - பல்வகைத் தூண்டல்களைப் பயன்படுத்துதல் திறன் - வலுவூட்டிகளைப் பயன்படுத்தும் திறன் - கரும்பலகைகளைப் பயன்படுத்தும் திறன் - செய்யுள் கற்பித்தலின் நோக்கங்கள் - செய்யுள் கற்பிக்கும் முறை - செய்யுள் பாடத்தைத் தொடங்கும் முறைகள்செய்யுள் நலம் பாராட்டல்.

UNIT IV	உரைநடைகற்பித்தலும்இமொழியாசிரியரின் பண்பும்	15

உரைநடை கற்பித்தலின் பொதுநோக்கம் - உரைநடைகளை கற்பிக்கமேற்கொள்ளும் வழிமுறைகள் -மொழியாசிரியரின் பண்புநலன்கள் - மொழிப்பற்று - இலக்கியப்புலமை-எடுத்துக் கூறும் ஆற்றல் - குரலில் ஏற்றத்தாழ்வுஅமைத்துப் பேசும் திறன் - திறமையாகஎழுதுத்திறன் - உளநூல் வல்லுநர் - கலையார்வமிக்கவர்-பருவமறிந்துபயிற்றும்பண்பு-பயிற்றலின் அடிப்படையில்விதிகளைஅறிந்தவராதல் - மாணாக்கருக்குநல்லமுன்மாதிரியாக இருத்தல்.

UNIT V	இலக்கணம் கற்பித்தலும் இமொழிபெயர்ப்பும்	15

இலக்கணம் கற்பித்தலின் நோக்கங்களும் பயிற்றுமுறைகளும்- விதிவருமுறை– விதிவிளக்குமுறை - விளையாட்டுமுறையில் இலக்கணம் கற்பித்தல்- நடைமுறை இலக்கணம்- தாய்மொழியினின்றுபிறமொழிகளில் மொழிபெயர்ப்பு– பிறமொழிகளினின்றுதாய்மொழியில் மொழிபெயர்ப்பு - மொழிபெயர்ப்பில் எழும் சிக்கல்கள் - மொழிபெயர்ப்பின் வகைகள்-மொழியும் பிறகலைகளும் -தேர்வின் வகைகள் குறையறி,முன்னறி அடைவுச் சோதனை-

கூட்டுச்சராசரிஇடைநிலை,சராசரி,முகடு,சிதறல்,திட்டவிலக்கம்,கால்மானவிலக்கம் தரத்தொடர்பு - வரைபடம்.

		Lecture	Tutorial	Total
		45	31	75

பார்வை நூல்கள்

1. கலைச்செல்வி .வெ (2009) தமிழ்ப்பயிற்றல் நுட்பங்கள் ஈரோடு: சஞ்சீவ் வெளியீடு.

2. கணபதி .விஇ ஜெயராமன் .பூ (2009) நற்றமிழ் கற்பிக்கும் முறைகள்,சென்னை: சாந்தாபப்ளிஷர்ஸ்

3. கோகிலாதங்கசாமி (2002) குழந்தைமையக்கல்வியும் தமிழ் கற்பித்தலும்.

4. செந்தூர் பாண்டியன் . செ (1983) திட்டமிட்டதைக் கற்றல் - ஓர் அறிமுகம் , புதுக்கோட்டை : மீனாட்சிபதிப்பகம்.

5. தண்டபாணி .சு (2013) தமிழ் கற்பித்தல்,மதுரை : மீனாபதிப்பகம்.

6. தில்லைநாயகம் .வெ(1978) இந்திய நூலக இயக்கம் , திருநெல்வேலிகழகவெளியீடு.

7. எட்வின் ஜெபா. ஆர், (2013) கல்வியியல் கவின் தமிழ்,கல்லுக் கூட்டம்: ரெத்தினாபதிப்பகம்.

8. மீனாட்சிசுந்தரம் அ. விஜயலட்சுமி.வா (2009) தமிழ் கற்பித்தல்,சின்னாளப்பட்டி: காவ்யாமாலாபப்ளிஷர்ஸ்

9. வேணுகோபால்.இ.பா,சாந்தகுமாரி.க (2009) பொதுத்தமிழ் கற்பித்தல்,சென்னை: சாரதாபதிப்பகம்.

10. பொன்னப்பன் .பா (1992) தமிழ்ப் பாடம் சொல்லும் முறைசென்னை,தமிழ்நாட்டுபாடநூல் கழகம்.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED202E	PC:01(Part:01) TEACHING OF ENGLISH - I	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the nature and structure of language	Cog.	Remembering
CO2	Analysis the status of second language in India	Cog.	Analyze
CO3	Apply the various skills in language and its methods	Cog.,	Applying

CO4	Interpret the various approaches and types of methods in teaching English language	Cog.,	Understanding

Unit	Content	Hrs
UNIT I	**Nature of English Language**	**19**

Language: meaning, nature and its roles. Difference between home language and school language and role of home language/Mother tongue in learning the school language.

Structure of English Language – Phonological, morphological, syntactic, semantic and graphic (a Brief explanation of the concept)

UNIT II	**Second Language in India**	**19**

Status of English as a second language in India; as per Articles 343-351, 350A and NPE-1986. Basic linguistic principles, objectives, methods: Translation, Bilingual, Direct, Structural, Situational and Communicative approaches; Presentation skills; Dramatization, Extempore, Role playing, Story-telling, Situational conversations etc.

UNIT III	**Language skills and methods of reading**	**18**

Developing Language Skills i.e. listening & speaking; brief introduction about the sounds of English, Phonetics and teaching of pronunciation. Mechanics &Methods of Reading; Letter and non-letter methods, silent & loud reading, intensive & extensive reading and reading for comprehension.

UNIT IV	**Instructional design of teaching English language**	**18**

Use of dictionary & thesaurus as resources in teaching and learning the language. Grammar its different types and methods of teaching Grammar; Inductive & deductive.

		Lecture	Tutorial	Total
		45	**31**	**75**

Activities (Any one of the following)

(i) Discussion on the problems of English language at elementary level.

(ii) Identification of spelling errors at the elementary level and remedial measure.

(iii) Identification of pronunciation errors at the elementary level and remedial measures.

BOOKS RECOMMENDED

1. Hood, Philip and Tobutt, Kristina (2015). Teaching Language in the Primary School. Sage.

2. Gordon, J. (2014). (2015). Teaching English in the Secondary Schools. Sage.

3. Gurrey, P. (1954). The teaching of written English. London: Longmans Green and Co.

4. Regional Institute of English, Chandigarh (1972). Teacing English. Regional Institute of English, Chandigarh.

5. Bhatia, Achla &Kaur, Ravjeet (2011). Modern Teaching of English. Patiala: Twenty First

Century Publications. 6. Bhatia, K.K.Teaching and Learning English as a Foreign Language.

7. Chapman, L.R.H.Teaching English to Beginners, Longmans, London.

8. Deepika & Singh, Surjit (2010).Techniques of Teaching English. Patiala: Twenty First Century Publications.

9. Fisby, A.W. (1970).Teaching English: Notes and Comments in English Overseas, E.L.B.S., London.

10. N.C.E.R.T. (1970).English for Today Book I & II at Home and School.

11. Raman, M. (2004).English Language Teaching.Atlantic Publishers, New Delhi.

12. Sachdeva, M.S.(2013). Teaching of English. Patiala: Twenty First Century Publications.

13. Seely, John.Oxford Guide to Writing and Speaking Teaching of English.

14. Singh, Y. K. (2005). Teaching of English.APH Publication Corporation, New Delhi.

15. Notes for Teachers in Training – Regional Institute English Chandigarh, O.U.P.

16. Venkateswaran, S.Principles of Teaching English.

17. Venugopal, K.R. Methods of Teaching English, Neel Kamal Publishers

COURSE CODE	**SUBJECT NAME**	**Category**			
		L	**T**	**P**	**C**
BED202P	**PC:01(Part:01)**	**3**	**1**	**0**	**4**
C:A:P	**TEACHING OF PHYSICAL SCIENCE - I**	**L**	**T**	**P**	**H**
3:0:0		**3**	**2**	**0**	**5**

Course outcome		**Domain**	**Level**
CO1	Define the concept and nature of physical science	Cog.	Remembering
CO2	Summaries the objectives and curriculum of physical science	Cog.	Understanding
CO3	Assess the importance and qualities of text book	Cog.,	Evaluating
CO4	Describe the various teaching aids used for physical science	Cog.,	Remembering

Unit	**Content**	**Hrs**
UNIT I	**Nature and Impact of Physical Science**	**19**

Aims and objectives of teaching of Physical Sciences, Reasons for inclusion of Physical Sciences in school curriculum, Inculcation of scientific attitude and scientific method.

Scientific attitude – meaning definition and importance.

UNIT II	**Curriculum**	**19**

Present position of science teaching in schools, need and concept of creativity in Physical Science. (iii) Physical Science Curriculum: Principles and organization of Physical Science curriculum in schools, A critical analysis of existing curriculum at various stages of school level. Objectives of teaching physical science at secondary level – instructional objectives of teaching physical science.

UNIT III	**Science Text Book**	**18**

Science text book: Meaning, importance and qualities. Critical analysis of Science text book of a state board or NCERT

UNIT IV	**Teaching Aids**	**18**

Learning Experiences and Teaching aids: Concept, Importance, Edgar Dale‟s Cone of Learning Experiences, Usage and Classification of Teaching Aids, Integrating ICT in Biological Science teaching, improvised apparatus.

		Lecture	**Tutorial**	**Total**
		45	**31**	**75**

Activities (Any one of the following)

(i) Writing instructional objectives in behavioural form for any five topics.

(ii) Developing a low-cost teaching aid in Science.

(iii) Pedagogical analysis of any one topic.

BOOKS RECOMMENDED

1. Anderson, Hans:Readings in Science Education for Secondary School

2. Bhandu, N.: Teaching of Science

3. Dass, L.C.:Teaching of Science (6th ed.)

4. Gupta, S.K.:Teaching Physical Science in Secondary Schools

5. Kesis and Ogburn,:Modern Science Teaching

6. 7. Kohli, V.K.: How to Teach Science

8. Kumar, Amrit:Teaching of Physical Science, Anmol.

9. Mann, S.S.:How to Teach Science

10. Richardson, J.S.:Method and Material for Teachingand Caboon, G.P. General and Physical Science, McGraw Hill Book Co. Inc., New York.

11. Sharma, R.C.: Modern Science Teaching

12. Mohan, Radha:Innovative Physical Science Teaching Method, P.H.I., New Delhi

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED202B	PC:01 (Part:01)	3	1	0	4
C:A:P	TEACHING OF BIOLOGICAL SCIENCE - I	L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the nature and scope of biological Science	Cog.	Remembering
CO2	Design the curriculum and various approaches in constructing curriculum	Cog.	Understanding
CO3	Summaries the review of biological text book	Cog.,	Understanding
CO4	Describe the various methods of teaching aids using for teaching biological science subject	Cog.,	Remembering

UNIT I	Nature and Scope of Biological Science	19

Biological Science: Meaning, Nature, Concept, Scope of Biological Science in Human Life, relationship with other subjects; Place of Biological Science in the school curriculum, General aims of teaching Biological sciences at various stages of school; Bloom's Taxonomy of educational objectives.

UNIT II	Design of Curriculum	18

Curriculum: Meaning, Principles, Various approaches to science curriculum construction, Recent trends in science curriculum, Science education in national curriculum framework 2005, A critical analysis of existing curriculum at various stages of school level.

UNIT III	Review of Text Book	19

Biological Science textbook: Need and importance, Qualities of a good text book, A critical

analysis of science textbook of NCERT and state board.

UNIT IV	Teaching Aids	18

Learning Experiences and Teaching aids: Concept, Importance, Edgar Dale‟s Cone of Learning Experiences, Usage and Classification of Teaching Aids, Integrating ICT in Biological Science teaching, improvised apparatus. Biological Science Laboratory: Planning, Purchase and Maintenance of apparatus, Maintaining Records and Safety Procedures.

		Lecture	Tutorial	Total
		45	**30**	**75**

Activities (Any one of the following)

(i) Writing instructional objectives in behavioural form for any five topics.

(ii) Developing a low-cost teaching aid in Science

(iii) Pedagogical analysis of any one topic.

BOOKS RECOMMENDED

1. Collete, Alfred T. and Eugene L. Chiappeta(1994) , Science Instruction in the Middle & Secondary Schools, Macmillan, NewYork .

2. Jerry Wellington(1996) Teaching Science in Secondary Classes, Routledge, USA.

3. Kohli, V.K.(2005) How to Teach Science, Shri Krishna Publication, Ambala.

4. Mohan, Radha (2004), Innovative Science Teaching for Physical science Teachers, Prentice Hall of India, New Delhi. 20

5. Ramakrishna, A. (2012), Methodology of Teaching Lifescience, Pearson Publications.

6. Sharma, Promila(2009), Teaching of Biological Science, APH Publishing House, New Delhi.

7. Siddiqi &Siddiqi(2002) Teaching of Science Today and Tomorrow, Doaba House, New Delhi.

8. Soni, Anju (2009), Teaching of Biology, Tandon Publications, Ludhiana.

9. Sundarajan, S (1995) Teaching Science in Middle School: A Resource Book. Orient Longman, Hyderabad.

10. Tony Turner & Wendy Dimareo(1998), Learning to Teach Science in Secondary School, Routledge Publication, USA.

11. UNESCO(1966) Source Book for Science Teaching; UNESCO: Paris.

12. UNESCO(1987), New Trends in Biology Teaching, Volume V.

13. Vaidya N.(1999) Science Teaching for the 21st Century, Deep and Deep Publishers, New Delhi.

14. Venkataiah S. (2000) Science Education, Anmol Publications Pvt.Ltd., New Delhi.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED202M	PC:01(Part:01) TEACHING OF MATHEMATICS - I	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Describe the nature and scope of mathematics	Cog.	Remembering
CO2	Explain the historical Development of mathematics	Cog.	Understanding
CO3	Explain the aims and objectives of teaching mathematics	Cog.	Understanding
CO4	Compare the pedagogical analysis of teaching mathematics	Cog.	Analyzing

UNIT I	Nature and Scope of Mathematics	19

Nature of Mathematics: Meaning, nature, importance and value of mathematics; Axioms, postulates, assumptions and hypothesis in mathematics – Relation with school subject - Relation with other Discipline – Engineering, Agriculture, Medicine.

UNIT II	Historical Development of Mathematics	18

Historical development of notations and hypothesis in mathematics; Contribution to mathematics (Ramanujam, Aryabhatta, Bhaskaracharya, Euclid, Pythagoras).

UNIT III	Aims and objective of Teaching Mathematics	19

Objectives: Aims and objectives of teaching mathematics in elementary and secondary schools; Bloom's taxonomy of educational objectives and writing objectives in behavioural terms.

UNIT IV	Pedagogical Analysis	18

Pedagogical Analysis: meaning and need and procedure for continuing pedagogical analysis. Classification of content, objective, evaluation, etc.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i) Teaching aid from the 3-dimentional aspects
(ii) Creative way of teaching of mathematics at elementary level
(iii) Preparing a question bank for mathematics

BOOKS RECOMMENDED

1. Taylor, Helen and Harris, Andrew: Learning and Teaching Mathematics.
2. Hansen, et al:Children‟s Errors in Mathematics.
3. Witt, Marcus:Primary Mathematics for Trainee Teachers.
4. Chambers, P:Teaching mathematics in the secondary school.
5. Butler and Wren:The Meaning of Secondary School Mathematics
6. Chadha, B.N.: The Teaching of Mathematics
7. Gakhar, S.C. and:Teaching of Mathematics
8. Singh, Raminder 9. Kumar and: Teaching of Mathematics
11. Mangal, S.K. : Teaching of Mathematics

12. N.C.E.R.T. Text Books (6th Class to 10th Class)
13. Sidhu, K.S.: The Teaching of Mathematics
14. Travers, et al: Mathematics Teaching

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED202CO	PC:01(Part:01) TEACHING OF COMPUTER SCIENCE -I	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the objectives of teaching computer science	Cog.	Remembering
CO2	Review the disciplinary contents accordingly to the trends.	Cog.	Evaluating
CO3	Assess the text book review in computer science	Cog.	Evaluating
CO4	Describe the professional growth of teachers in teaching computer Science	Cog.	Understanding

UNIT I	Objectives of Computer Science	19

Computer Science: concept, objectives & importance, applications of computer with special reference to education & society; Bloom‟s taxonomy of educational objectives.

UNIT II	Curriculum Designing and recent trends	18

Curriculum: concept, design& principles of curriculum; integration of computer education with other subjects Content – Selection – principles – up datedness – inter disciplinary treatment – content organization: topical, logical, psychological, spiral, and concentric approaches - Dalton plan

UNIT III	Computer Science Text Book	18

Computer Science text book: meaning, types, importance and qualities of Reference book – hand book, Computer Science,.

UNIT IV	Professional growth of teachers	19

Computer Science Teacher: qualifications and qualities, professional growth and role in teaching learning process.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i) Critical analysis of computer science curriculum at school level for ay class.
(ii) Analysis and interpretation of results and role of computers.
(iii) Use of any one educational software in teaching.

BOOKS RECOMMENDED

1. Abbott, C. (2001). ICT: Changing Education. UK: Psychology Press.
2. Khan, N. (2004).Educational Technology. New Delhi: Rajat Publications.
3. Mambi, Adam J. (2010). ICT Law Book: A Source Book for Information and Communication Technologies. Tanzania: Mkukina Nyota Publishers Ltd.
4. Mangal, S.K., & Mangal, Uma (2010).Essentials of Educational Technology. New Delhi: PHI Learning Pvt. Ltd.

5. Mehra, V. (2004).Educational Technology. New Delhi: S.S. Publishers.
6. Sharma, R.A. (2006). Technological Foundations of Education. Meerut: R. Lall Book Depot.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED202C	PC:01(Part:01) TEACHING OF COMMERCE - I	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the nature and objectives of teaching commerce	Cog.	Remembering
CO2	Describe the professional growth of teachers of commerce	Cog.	Understanding
CO3	Analyzing the review of text book in computer science	Cog.	Analyzing
CO4	Analyzing the methods of teaching computer science	Cog.	Analyzing

UNIT I	Nature and objectives of teaching of commerce	19

Commerce: meaning, nature, objectives, importance, scope; relationship with other subjects; curriculum: meaning, principles, process and approaches to curriculum development and its evaluation.

UNIT II	Professional growth of Teachers	18

Critical appraisal of +2 business studies and accountancy curriculum. Teacher: qualities, professional growth of commerce teachers and role of co-curricular activities in commerce.

UNIT III	Review of Text Book	19

Commerce text book: meaning, types, importance and qualities; evaluation and selection of text books, resources for supplementing teaching and learning.

UNIT IV	Methods of Teaching aids	18

Teaching aids: Importance, types, projected and non-projected aids, selection and integration in teaching-learning process, practice set and worksheets and co- curriculum activities

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)
(i)Role on Multi National Corporation (MNC)
(ii) Evaluate Budget of the current year
(iii) Preparation of a low-cost teaching aid

BOOKS RECOMMENDED
1. Gupta, Rainu: Teaching of Commerce.
2. Ghosh,D.K: Financing of Education. (Vol.I to III).
3. Douglas, Palmford and Anderson: Teaching Business Subjects, Prentice Hall.
4. Musselman and Hann: Teaching Book-keeping and Accounting, McGraw Hill.
5. Tonne, Lopham and Freeman: Methods of Teaching Business Subjects, McGraw Hill.
6. Tonne, Herbert, A.: Principles of Business Education, McGraw Hill.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED202EC	PC:01(Part:01) TEACHING OF ECONOMICS -I	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the nature and scope of teaching economics	Cog.	Remembering
CO2	Classify the approaches and curriculum development of teaching economics	Cog.	Understanding
CO3	Describe the uses of economics text book.	Cog.,	Remembering
CO4	Evaluate the qualities of professional growth of teachers	Cog.,	Evaluating

UNIT I	Nature and scope of teaching economics	19

Economics: meaning, nature, objectives, importance, scope; relationship with other subjects; curriculum: meaning, principles

UNIT II	Approaches and curriculum development	19

Approaches to curriculum design – topical, correlational, integrated discipline, problem solving, and conceptual design. Trend analysis in economic growth, economic development, sustainable development and quality of life.

UNIT III	Review of text book	18

Economics text book: meaning, types, importance, qualities and critical appraisal of text books in Economics from the stand point of curriculum design and syllabus frame, treatment and organization of subject matter

UNIT IV	Professional growth of teachers	18

Teacher: qualities, professional growth and role. Organizing activities: economics club, seminar, and competition, wall magazine, using community resource and organizing field trips.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i) Define and evaluate the term GNP

(ii) Role of economics in life (Case study of any one family)

(iii) Evaluate income and expenditure of any one secondary school

BOOKS RECOMMENDED

1. Dhillon, Satinder: Teaching of Economics.
2. Kanwar, B.S. : Teaching of Economics.
3. Mittal, R.L.: Arth Shastar Da Adhiapan (Pbi. Univ.)
4. Mukherjee, Sandhya: Teaching of Economics.
5. Rai, B.C.: Teaching of Economics.

6. Sidhu, H.S.: Teaching of Economics
7. Siddiqui, M.H.: Teaching of Economics.
8. Yadav, Amita:Teaching of Economics

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED202G	PC:01(Part:01) TEACHING OF GEOGRAPHY - I	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the nature and objectives of teaching geography	Cog.	Remembering
CO2	Describe the approaches of curriculum	Cog.	Understanding
CO3	Explain the review of text book in teaching geography	Cog.	Analyzing
CO4	Describe the qualities of geography teachers	Cog.	Understanding

UNIT I	Nature and objectives of Geography	18
Geography: meaning, nature, objectives, importance, scope; relationship with other subjects; curriculum: meaning, principles, role and importance of the geography teacher		
UNIT II	**Approaches of curriculum**	**18**
Approaches to curriculum design: topical, integrated discipline, conceptual design curriculum		
UNIT III	**Text Book Review**	**18**
Geography text book: meaning, types, importance and qualities		
UNIT IV	**Teachers qualities**	**19**
Geography teacher: qualities, professional growth and role, formation and management of geography lab		

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i) Development and change in urban areas

(ii) Geographical changes in the context of population migration

(iii) Evaluate geographical aspects of any school

BOOKS RECOMMENDED

1. Arora, K.L.: Teaching of Geography.
2. Braiult, E.W.H. and Share, D.W.: Geography in & out of School:(Suggestions for teaching in second schools), London.
3. Dhand Harry: Dictionary of Geography Technique in Teaching, Ashish Publishing.
4. Gopsil, Gitt: The Teaching of Geography, Macmillan & Co., London.
5. Grave, N.J.: Geography in Education, Reinenman.
6. Grave, N.J.: Geography in Education, Reindnman Education Books, New Delhi.
7. Grieve, J.N.: Geography in School.
8. Kaul, A.K.: Teaching or Geography.
9. Macnee, E.A.: The Teaching of Geography, Cambridge University Press, 1951.
10. Rao, M.S.: Teaching of Geography, Anmol Publications Pvt. Ltd., New Delhi.
11. Shaida, B.D. & Sharma, J.C.: Teaching of Geography

12. Thrall, Zoe: Teaching of Geography

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED202H	PC:01(Part:01) TEACHING OF HISTORY -I	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Explain the modern concepts of history and its exposition	Cog.	Understanding
CO2	Summaries the development and role of teachers in history	Cog.	Analyzing
CO3	Explain the importance and qualities of text book.	Cog.	Remembering
CO4	Apply the approaches in curriculum design	Cog.	Applying

UNIT I	Nature and scope of teaching history	19

History: meaning, nature, objectives, importance, scope; relationship with other subjects; modern concept of history, exploration, criticism synthesis and exposition. Curriculum: meaning, principles – Man as social animal and as a citizen.

UNIT II	Development and role of teacher	18

Role of the history teacher for use and development of history, developer of international understanding, techniques for teaching history, questioning narration, illustration, drill, dramatization, seminar, panel discussion, conference and workshops etc.; their uses and applications.

UNIT III	Text book review	18

History text book: meaning, types, importance and qualities; classification of instructional objectives of teaching history in operational terms

UNIT IV	Approaches of curriculum design	19

Approaches to curriculum design- social, political and cultural considerations and issues related to the curriculum of history, trend analysis in history. Define lesson plan, need for lesson planning, different formats of lesson plan and writing a lesson plan.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i)Write down the brief history of any govt. school.

(ii) Evaluate one chapter of history of any class.

(iii) Visit any one historical place and write down its historical importance.

BOOKS RECOMMENDED

1. Burnston, W.H.: Principles of History Teaching.
2. Car, E.H.: What is History?
3. Chaubhe, K.P.: Audio-visual Aids in Teaching of Indian History.
4. Ghata, V.D.: The Teaching of History.
5. Ghosh, K.D.: Creative Teaching in History.
6. Hill, C.P.: Suggestion for Teaching of History, UNESCO.

7. N.C.E.R.T.: Effective Teaching of History in India.
8. Prakash, Budh:A New Approach to History.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	CREDITS
BED203T	PC:02(Part :02)	3	1	0	4
C:A:P	சிறப்பு தமிழ் கற்பித்தல்முறை - II	L	T	P	Hrs
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	மொழியின் தோற்றமும் வளர்ச்சியும் பற்றி அறிதல்	ஊழப.	அறிதல்
CO2	மொழியியல் கோட்டுபாடுகளை புறிதல்	ஊழப.	புறிதல்
CO3	முத்தமிழின் வளர்ச்சி நிலைஇபிற்கால வளர்ச்சி நிலை நாடகத்தின் தோற்றமும் அறிதல்	ஊழப.இ	அறிதல்
CO4	எழுத்துக்களின் பிறப்புஇ வகைகளை விளக்குதல்	ஊழப.இ	விளக்குதல்
CO5	இலக்கியத் திறனாய்வு கொள்கைகளை அறிதல்	ஊழப	அறிதல்

Unit	Content	Hrs
UNIT I	**தமிழ்மொழியின் தோற்றம், வளர்ச்சி**	15

மொழி - மொழியின் பண்புகள் - மொழித் தோற்றக் கொள்கைகள் - மொழியின் வளர்ச்சி - தமிழ்மொழியின் வரலாறு - எழுத்துச் சீர்திருத்தம் - கிளைமொழிக் கொள்கைகள் - பேச்சுமொழி - எழுத்து மொழி - தமிழ்மொழியின் தனித்தன்மைகள். கலைத்திட்டம் - கலைத்திட்டம் உருவாக்குதலில் சில அடிப்படைக் கொள்கைகள் - கலைத்திட்ட மாற்றம் - தேசியக் கல்விக் கொள்கை - கல்வியின் நோக்கம் - பள்ளிக் கலைத்திட்டம் - பள்ளிக் கலைத்திட்டத்தில் தாய்மொழியின் பங்கு.

UNIT II	**மொழியியல் கோட்டுபாடுகள**	15

ஒலி மொழியாதல் - எழுத்துக்களின் பிறப்பு - தமிழ் ஒலிகளின் பிறப்பு – நன்னூலார் கொள்கைகள் - மொழியியலார் கொள்கை - மொழியின் அமைப்பு - ஒலியனியல் - உருபனியல் - தொடரியல் ஒலியை ஆராயும் முறைகள் - ஒலியன்களைக் காணும் கோட்பாடுகள் - உயிரொலிகள், மெய்யொலிகள். மொழிக் கல்வியின் இன்றியமையாமை - மொழியும் சமூகமும் - மொழிவளர்ச்சியில் சூழ்நிலையின் பங்கு - மொழி கற்றலுக்கான உளவியல் கொள்கைகள்.

UNIT III	**முத்தமிழின் வளர்ச்சி நிலை**	15

இலக்கிய வகை - கவிதை (யாப்பியல் நூல்) - கவிதை - மேனாட்டார் தமிழறிஞர்கள் விளக்கம் - மரபு கவிதை - புதுக்கவிதை - இசைத்தமிழ் - தொல்காப்பியத்தில் இசைத் தமிழ் கூறுகள் -

சிலப்பதிகாரம் - தேவாரப்பாடல்களில் இசைத்தமிழ்க் கூறுகள் - பிற்கால வளர்ச்சி நிலை நாடகத்தின் தோற்றமும் வளர்ச்சியும் - சங்க காலம் முதல் இக்காலம் வரை - நாடக வகைகள் - செய்யுளை நாடகமாக்கிக் கற்பித்தல் உத்தி. பண்டைக்கால இலக்கியம் - தொல்காப்பியம் - எட்டுத்தொகை - பத்துப்பாட்டு -காப்பியங்கள் - வழிபாட்டுப் பாடல்கள் - சிற்றிலக்கியம் - நீதி இலக்கியங்கள். பண்டைக்காலச் சங்கங்கள் - முச்சங்கம் - பௌத்த சமண அமைப்புகள சைவ மடங்கள் அரசுசார் அமைப்புகள் - தனியார் அமைப்பு.

UNIT IV	**இலக்கண அறிவு**	**15**

முதலெழுத்துக்கள் - சார்பெழுத்துக்கள் - எழுத்துக்களின் பிறப்பு – சொல்லிலக்கண வகைகள் - வேற்றுமை - ஆகுபெயர் - புணர்ச்சி பொருளிலக்கணம் - அகம் - புறம் - யாப்பு - அசை - சீர் - தளை – அடி – தொடை - பாவகை - பொருள்கோள் - அணி இலக்கணம்.

UNIT V	**இலக்கியத் திறனாய்வுக் கொள்கைகள**	**15**

திறனாய்வின் தோற்றம் - இன்றைய திறனாய்வின் நிலை - திறனாய்வு வகைகள் - இலக்கிய ஆய்வு நெறிமுறைகள் - புதினம், சிறுகதை, சிறுவர் இலக்கியம், நாட்டுபுற இலக்கியம், பயண இலக்கியம். தமிழ் இதழிகள் - அச்சு ஊடகங்களும் பிறதொடர்பு ஊடகங்களும் - மின்னணு ஊடகங்கள் கணினி வழித்தமிழ்க்கல்வி - இணையதளம் - மின்னணு அஞ்சல் - இணையமும் கல்வியும்.

		Lecture	**Tutorial**	**Total**
		45	**30**	**75**

பார்வை நூல்கள்

1. அறவாணன். க.ப (1998) கவிதையின் உயிர், உள்ளம் , உடல் , சென்னை : பாரிநிலையம்.

2. அடைக்கலசாமி (1997) இலக்கிய வரலாறு, சென்னை : பால்நிலாப் பதிப்பகம்.

3. கணபதி. வி (1999) நற்றமிழ் கற்பிக்கும் முறைகள் , பகுதி 2 சென்னை -14, சாந்தா பதிப்பகம்.

4. கோகிலா தங்கசாமி (2000) குழந்தை மையக்கல்வியும் , தமிழ்கற்பித்தலும், காந்தி கிராம்: அனிச்சம் சிறப்பு வெளியீடு

5. சுயம்பு. பெ, தமிழ் இலக்கிய வரலாறு (2008) திசையன்விளை : பாரதி பதிப்பகம்.

6. தீனதயாள். பூ (2010) தமிழ் கற்பித்தலில் புதுமைகள் சேலம் : ஸ்ரீகிருஷ்ணா பப்ளிகேஷன்ஸ்

7. வஜ்ரவேலு சு. தமிழ் கற்றலும் கற்பித்தலும், சென்னை : 11, தி.நகர்.

8. வேணுகோபால் இ.ப, சாந்தகுமாரி .க (2013) தமிழ் கற்பித்தலில் புதுமைகள், சென்னை: சாரதா பதிப்பகம்

9. வேணுகோபால் இ.பா (1991) பைந்தமிழ் கற்பிக்கும் முறைகள், வேலூர் : சகுந்தலா பதிப்பகம்.

10. இரத்தின சபாபதி, மக்கள் தொடர்பும் மாண்புறு கல்வியும், சென்னை சாந்தா பதிப்பகம்.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED203E	PC:02(Part :02) TEACHING OF ENGLISH – II	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the various types and way of teaching vocabulary	Cog.	**Remembering**
CO2	Analyze the various styles in teaching composition	Cog.	**Analyze**
CO3	Interpret the various method and materials use for teaching English	Cog.,	**Understanding**
CO4	Understanding the lesson plan preparation for teaching prose etc.	Cog.,	**Understanding**
CO5		Cog	

UNIT I	**Vocabulary**	**19**

Vocabulary its types and various ways of teaching and expansion of vocabulary, developing the writing skills: Choice of script, dictation and spellings. Formal and informal writings such as poetry, short story, diary, notices articles reports, advertisements etc.

UNIT II	**Teaching Composition**	**18**

Teaching Composition; Types and procedure. Poetry and prose; Its meaning, style of writing & recitation/reading w.r.t. rhyme scheme and language used.

UNIT III	**Use of Technology in English**	**19**

Teaching-learning materials and Audio-Visual aids: meaning, importance and its types with special reference to preparation of charts, models, PPT, use of print media such as magazines, newspapers and ICT, Concept of language lab.

UNIT IV	**Lesson Planning**	**18**

Lesson Planning: Importance, preparation of lesson plans for teaching Prose, Poetry, Grammar and Composition, Concept of CCE & Evaluation, meaning and importance of tests and examination, different types of tests; oral, written, self-evaluation and group evaluation. Some ways and means for testing different skills of English language

		Lecture	**Tutorial**	**Total**
		45	**30**	**75**

Activities (Any one of the following)

(i) Analysis of advertisement in regional newspaper on the basis of language.

(ii) Preparation of transparencies

(iii) Preparation of educational media software

BOOKS RECOMMENDED

1. Bhatia, Achla &Kaur, Ravjeet (2011). Modern Teaching of English. Patiala: Twenty First Century Publications.
2. Bhatia, K.K.Teaching and Learning English as a Foreign Language.
3. Chapman, L.R.H.Teaching English to Beginners, Longmans, London.
4. Deepika & Singh, Surjit (2010).Techniques of Teaching English. Patiala: Twenty First Century Publications.
5. Fisby, A.W. (1970). Teaching English: Notes and Comments in English Overseas, E.L.B.S., London.
6. N.C.E.R.T. (1970).English for Today Book I & II at Home and School.
7. Raman, M. (2004).English Language Teaching.Atlantic Publishers, New Delhi.
8. Sachdeva, M.S.(2013). Teaching of English. Patiala: Twenty First Century Publications.
9. Seely, John.Oxford Guide to Writing and Speaking Teaching of English.
10. Singh, Y. K. (2005). Teaching of English.APH Publication Corporation, New Delhi.
11. Notes for Teachers in Training – Regional Institute English Chandigarh, O.U.P.
12. Venkateswaran, S.Principles of Teaching English.
13. Venugopal, K.R. Methods of Teaching English, Neel Kamal Publishers.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED203P	PC:02(Part :02) TEACHING OF PHYSICAL SCIENCE - II	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the concept of maintenance of physical science laboratory	Cog.	Remembering
CO2	Summaries the cocurriculur activities and approaches in teaching physical science	Cog.	Understanding
CO3	Asses the different teaching methods in physical science	Cog.,	Evaluating
CO4	Assess the evaluation system of question paper setting	Cog.,	Evaluating

UNIT I	Maintenance of Physical Science Laboratory	18

Physical Science Laboratory: Planning, Purchase and Maintenance of apparatus, Maintenance of stock and store registers, Maintaining Records and Safety Procedures.

UNIT II	Cocurriculur Activities	19

Co-curricular and non-formal Approaches: field trips, school gardening, Science clubs, visit to science museums, science fairs, excursions, quiz, seminars. Science library, note books, reference books, science journals.

UNIT III	Methods of Physical Science	19

Methods of teaching Physical Science with special reference to: Lecture method, Lecture-cum-demonstration method, Heuristic method, Problem solving method and Unit Planning. Lesson planning in Physical Science: concept, objectives, importance and steps.

UNIT IV	Evaluation			18
Concept of evaluation, qualities of a good test, tools of evaluation, various types of questions and construction of an achievement test in Physical Science.				
		Lecture	**Tutorial**	**Total**
		45	**30**	**75**
Activities (Any one of the following) (i) Practicing at least two experiments to be conducted /demonstrated in secondary classes. **(ii)** Writing two lesson plans. **(iii)** Construction of an achievement test.				
BOOKS RECOMMENDED 1. Anderson, Hans:Readings in Science Education for Secondary School 2. Bhandu, N.:Teaching of Science 3. Dass, L.C.:Teaching of Science (6th ed.) 4. Gupta, S.K.:Teaching Physical Science in Secondary Schools 5. Kesis and Ogburn, Hoffmann:Modern Science Teaching 6. Kohli, V.K.:How to Teach Science 7. Kumar, Amrit:Teaching of Physical Science, Anmol. 8. Mann, S.S.:How to Teach Science 9. Richardson, J.S. and Caboon, G.P.: Method and Material for TeachingGeneral and Physical Science, McGraw Hill Book Co. Inc., New York. 10. Sharma, R.C.:Modern Science Teaching 11. Mohan, Radha:Innovative Physical Science Teaching Method, P.H.I., New Delhi.				

COURSE CODE	**SUBJECT NAME**	**Category**			
		L	**T**	**P**	**C**
BED203B	**PC:02(Part :02)** **TEACHING OF BIOLOGICAL SCIENCE - II**	**3**	**1**	**0**	**4**
C:A:P		**L**	**T**	**P**	**H**
3:0:0		**3**	**2**	**0**	**5**

Course outcome		**Domain**	**Level**
CO1	Assess the different types of approaches and methods of teaching Biological Science	Cog.	Evaluating
CO2	Develop the lesson plan, unit plan in biological science	Cog.	Understanding
CO3	Describe the professional development of biological teachers.	Cog.,	Remembering
CO4	Assess the different assessment and evaluation system in teaching biological science	Cog.,	Evaluating

UNIT I	**Approaches and methods of Teaching Biological Science**	**19**
Approaches and Methods of Teaching Biological Sciences: Lecture, lecture-cum demonstration, laboratory, heuristic, project, problem solving, inductive and deductive method. Constructivist approach to Biological Science teaching.		
UNIT II	**Concept of Lesson Plan**	**19**

Unit Plan: Characteristics, steps in Unit Plan, Lesson Planning: concept, objectives, importance and steps. Co-curricular and non-formal Approaches: field trips, school gardening, biology clubs, visit to science museums, science fairs, excursions, science library, quiz, seminars.

UNIT III	**Professional Development of Teachers**	**18**

Professional development of Biological Science teacher: meaning, need, professional development at individual and government level.

UNIT IV	**Assessment and Evaluation**	**19**

Evaluation in Biological Science: concept, importance, analysis and critique of present pattern of examination at school level, Continuous and comprehensive evaluation (CCE), various types of tests: essay, objective and short answer type, qualities of a good test; Construction of an achievement test

		Lecture	**Tutorial**	**Total**
		45	**30**	**75**

Activities (Any one of the following)

(i) Practicing atleast two experiments to be conducted /demonstrated in secondary classes.

(ii) Writing two lesson plans.

(iii) Construction of an achievement test.

BOOKS RECOMMENDED

1. Collete, Alfred T. and Eugene L. Chiappeta (1994), Science Instruction in the Middle & Secondary Schools, Macmillan, NewYork .
2. Jerry Wellington (1996) Teaching Science in Secondary Classes, Routledge, USA.
3. Kohli, V.K. () How to Teach Science, Shri Krishna Publication, Ambla.
4. Mohan, Radha (2004), Innovative Science Teaching for Physical science Teachers, Prentice Hall of India, New Delhi.
5. Ramakrishna, A. (2012), Methodology of Teaching Lifescience, Pearson Publications.
6. Sharma, Promila(2009), Teaching of Biological Science, APH Publishing House, New Delhi.
7. Siddiqi &Siddiqi(2002) Teaching of Science Today and Tomorrow, Doaba House, New Delhi.
8. Soni, Anju (2009), Teaching of Biology, Tandon Publications, Ludhiana.
9. Sundarajan, S (1995) Teaching Science in Middle School: A Resource Book. Orient Longman, Hyderabad. 10. Tony Turner & Wendy Dimareo (1998),Learning to Teach Science in Secondary School, Routledge Publication, USA.
11. UNESCO (1966) Source Book for Science Teaching; UNESCO: Paris.
12. UNESCO (1987), New Trends in Biology Teaching, Volume V.
13. Vaidya N. (1999) Science Teaching for the 21st Century, Deep and Deep Publishers, New Delhi.
14. Venkataiah S. (2000) Science Education, Anmol Publications Pvt.Ltd., New Delhi.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED203M	PC:02(Part :02) TEACHING OF MATHEMATICS - II	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Describe the strategies in teaching mathematics	Cog.	Remembering
CO2	Assess the methods of teaching mathematics	Cog.	Evaluating
CO3	Analyze the instructional design and lesson plan	Cog.,	Analyzing
CO4	Assess the evaluation and remedial measure in teaching mathematics	Cog.,	Evaluating

UNIT I	Strategies in teaching Mathematics	18

Strategies for Learning and Teaching Mathematics: Concept formation and concept attainment: concept attainment model and Constructivism and zone of proximal development for learning and teaching of concepts

UNIT II	Methods of Teaching mathematics	19

Methods of Teaching: Lecture, discussion, demonstration, inductive-deductive, analytic-synthetic, problem-solving and project; Techniques of Teaching Mathematics: Oral work, written work, drill-work, brain- storming and computer assisted instruction (CAI).

UNIT III	Lesson Planning	19

Lesson planning – Importance and basic steps. Planning lesson of arithmetic, algebra and geometry; Unit Planning : Format of A unit plan; Assessment and Evaluation for Mathematics Learning: Error analysis, diagnostic tests, identification of hard spots and remedial measures; Tools and techniques for formative and summative assessments of learner achievement in mathematics;

UNIT IV	Assessment and Evaluation	18

Preparation of diagnostic and achievement test; Remedial measures in teaching of mathematics; Teaching different branches: Arithmetic, algebra, geometry, trigonometry, statistics.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i) Preparation of case study of slow or gifted learner in mathematics

(ii) Construction of achievement test

(iii) Preparation of enrichment program for gifted children in mathematics

BOOKS RECOMMENDED

1. Taylor, et al: Learning and Teaching Mathematics
2. Hansen, et al: Children's Errors in Mathematics
3. Witt, Marcus: Primary Mathematics for Trainee Teachers.
4. Chambers, P.:Teaching mathematics in the secondary school

5. Butler and Wren: The Meaning of Secondary School Mathematics
6. Chadha, B.N.: The Teaching of Mathematics
7. Gakhar, S.C. and Singh, Raminder: Teaching of Mathematics
8. Kumar and Ratnalikar, D.N.: Teaching of Mathematics
9. Mangal, S.K.: Teaching of Mathematics N.C.E.R.T. Text Books (6th Class to 10th Class)
10. Sidhu, K.S.: The Teaching of Mathematics
11. Travers, et al.: Mathematics Teaching
12. Bloom, B.S: Taxonomy of educational objectives; the classification of educational goals.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED203CO	PC:02(Part :02) TEACHING OF COMPUTER SCIENCE - II	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Describe the methods of Teaching computer Science	Cog.	Analyzing
CO2	Examine the resources and its needs of computer science lab and objective of instruction design	Cog.	Analyzing
CO3	Assess the concepts of assessment and evaluation	Cog.	Evaluating
CO4	Explain the uses of internet and CAI	Cog.	Understanding

UNIT I	Methods of Teaching Computer Science	19

Methods of teaching of Computer Science: demonstration, lecture, problem solving, laboratory and project methods, multimedia; internship in teaching: concept and importance

UNIT II	Maintenance of computer science laboratory planning and instruction	9

Computer Science Laboratory: importance and organization, Year Plan, - Unit Planning: preparation and use of unit plan – micro teaching and its cycle – practicing any 5 skills.

UNIT III	Assessment and Evaluation	18

Evaluation in computer science: concept, importance and types; different type of tests: essay type, objective and short answer type; importance and steps. Achievement test – Teacher Made and Standardized Test. Diagnostic and prognostic tests.

UNIT IV	Internet	19

Internet: meaning, scope and applications in Education, Role of ICT in teacher education, video technology in education, CAI.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following) Hands on experience:

(i) MS Power Point
(ii) MS Word and
(iii) MS Excel

BOOKS RECOMMENDED

1. Abbott, C. (2001). ICT: Changing Education. UK: Psychology Press.
2. Khan, N. (2004).Educational Technology. New Delhi: Rajat Publications.
3. Mambi, Adam J. (2010). ICT Law Book: A Source Book for Information and Communication Technologies. Tanzania: Mkukina Nyota Publishers Ltd.

4. Mangal, S.K., & Mangal, Uma (2010).Essentials of Educational Technology. New Delhi: PHI Learning Pvt. Ltd.
5. Mehra, V. (2004).Educational Technology. New Delhi: S.S. Publishers.
6. Sharma, R.A. (2006). Technological Foundations of Education. Meerut: R. Lall Book Depot.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED203C	PC:02(Part :02) TEACHING OF COMMERCE - II	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Explain the methods of teaching commerce	Cog.	Understanding
CO2	Describe the audio – visual aids and skills of teaching commerce	Cog.	Remembering
CO3	Analyzing the pedagogical analysis of teaching commerce	Cog.,	Analyzing
CO4	Examine the assessment and evaluation techniques of teaching commerce	Cog.,	Evaluating

UNIT I	Methods of teaching commerce	19

Methods of teaching commerce: concept, characteristics, methods - lecture, discussion, source, case study, role playing and problem solving

UNIT II	Audio – Visual Aids	18

Audio-visual aids: meaning, importance. Analysis and discussion of skills of teaching commerce - Internship in teaching: concept and importance

UNIT III	Pedagogical Analysis	18

Pedagogical analysis of content: pedagogical analysis of unit, identification of new concepts in a unit, behavioural outcomes, selecting and development learning experiences and activities in a unit, preparation of a unit plan, maintenance of classroom environment

UNIT IV	Assessment and Evaluation	19

Evaluation in commerce: concept, importance and types; different type of tests: essay type test, objective and short answer type; lesson plan: concept, objectives, importance and steps. Types and techniques of evaluation.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i) Prepare a balance sheet of any educational institution

(ii) Critical analysis of one unit of commerce at the secondary level

(iii) Role of financial sector in modern economy.

BOOKS RECOMMENDED

1. Gupta, Rainu: Teaching of Commerce. Delhi: Shipra.
2. Ghosh, D.K.:Financing of Education. (Vol.I to III). Delhi:Cosmo.
3. Douglas, Palmford and Anderson:Teaching Business Subjects, Prentice Hall.
4. Musselman and Hann:Teaching Book-keeping and Accounting, McGraw Hill.
5. Tonne, Lopham and Freeman:Methods of Teaching Business Subjects,McGraw Hill.
6. Tonne, Herbert, A.:Principles of Business Education, McGraw Hill.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED203EC	PC:02(Part :02) TEACHING OF ECONOMICS - II	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Analyzing the methods of teaching economics	Cog.	Analyzing
CO2	Describe the uses of text book	Cog.	Understanding
CO3	Apply the significant principle of instructional design	Cog.,	Applying
CO4	Examine the assessment and evaluation of teaching economics	Cog.,	Evaluating

UNIT I	Methods of Teaching Economics	18

Methods - lecture, discussion, source, project and problem solving; Audio visual aids: meaning and importance. Using of teaching aids

UNIT II	Text book	18

Use of text books, workbooks, newspaper, models, computer based instruction in economics.

UNIT III	Instructional Design in economics	19

Meaning, importance and format of lesson plan – principles of lesson planning – characteristics of a lesson plan – prepare lesson plan according to active learning strategies – unit plan - resources plan.

UNIT IV	Assessment and Evaluation	19

Evaluation in Economics: concept, importance and types; different type of tests: essay type test, objective and short answer type.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i) Construction of an achievement test in Economics.

(ii) Evaluate income and expenditure of any one institution.

(iii) Preparation of a low-cost teaching aid

BOOKS RECOMMENDED

1. Dhillon, Satinder: Teaching of Economics.
2. Kanwar, B.S.: Teaching of Economics.
3. Mittal, R.L.: Arth Shastar Da Adhiapan (Pbi. Univ.)
4. Mukherjee, Sandhya: Teaching of Economics.
5. Rai, B.C.: Teaching of Economics.
6. Sidhu, H.S.: Teaching of Economics
7. Siddiqui, M.H.: Teaching of Economics.
8. Yadav, Amita:Teaching of Economics

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED203G	PC:02(Part :02) TEACHING OF GEOGRAPHY - II	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Assess the methods of teaching geography	Cog.	Evaluating
CO2	Describe the concept of audio – visual aids	Cog.	Understanding
CO3	Examine the maintenance and organization skill in teaching geography	Cog.	Analyzing
CO4	Apply the significance of teaching geography through lesson plan	Cog.	Applying

UNIT I	Methods of teaching geography	19

Methods of teaching geography: concept, characteristics, methods - lecture, excursion, project and problem solving

UNIT II	Audio – visual aids	18

Audio visual aids: meaning, importance, projective and non-projective teaching aids. Internship in teaching: concept and importance.

UNIT III	Maintenance and organization skills	19

Organizational skills: place finding from Atlas, map making, organizing quiz competition, exhibition, wall magazine, organizing field trips, use of geographical dictionary, use of geographical instruments and equipment. Photography as a learning tool: meaning, importance and use in teaching of geography.

UNIT IV	Concept of lesson plan	18

Lesson plan: concept, objectives, importance and steps, Evaluation in geography: concept, importance and types; Continuous and comprehensive evaluation (CCE), different type of tests: essay type test, objective and short answer type; computer based instruction; power point presentation.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i) Concept of Green society

(ii) Critically evaluate Ecological problems due to today‟s development model

(iii) Role of NGO‟s for geographical importance of nature.

BOOKS RECOMMENDED

1. Arora, K.L.: Teaching of Geography.
2. Braiult, E.W.H. and Share, D.W.: Geography in & out of School:(Suggestions for teaching in second schools), London.
3. Dhand Harry: Dictionary of Geography Technique in Teaching, Ashish Publishing.
4. Gopsil, Gitt: The Teaching of Geography, Macmillan & Co., London.
5. Grave, N.J.: Geography in Education, Reinenman.
6. Grave, N.J.: Geography in Education, Reindnman Education Books, New Delhi.

COURSE CODE	SUBJECT NAME	Category			
		L	T	P	C
BED203H	PC:02(Part :02) TEACHING OF HISTORY - II	3	1	0	4
C:A:P		L	T	P	H
3:0:0		3	2	0	5

Course outcome		Domain	Level
CO1	Define the methods of teaching history	Cog.	Understanding
CO2	Summaries the concept of audio – visual aids	Cog.	Remembering
CO3	Explain the importance of library resources	Cog.	Understanding
CO4	Examine the evaluation and examination in teaching history	Cog.	Analysing

UNIT I	Methods of teaching history	19

Methods of teaching history: concept, characteristics, methods -story telling, lecture, discussion, source, project and problem solving

UNIT II	Audio – visual aids	18

Audio-visual aids: meaning, importance, types. Internship in teaching: concept and importance;

UNIT III	Importance of library resources	18

Importance of library resource, reference books, atlas and maps, collection and upkeep of history resource, trend analysis in history.

UNIT IV	Evaluation and examination	19

Evaluation in history: concept, importance and types; Continuous and comprehensive evaluation (CCE), different type of tests: essay type test, objective and short answer type; principle for setting a summative evaluation question paper in history, techniques of using and reporting test results.

		Lecture	Tutorial	Total
		45	30	75

Activities (Any one of the following)

(i) Importance of historical studies.

(ii) Write down any historical event

(iii) Role of history for future orientation.

BOOKS RECOMMENDED

1. Burnston, W.H.:Principles of History Teaching.
2. Car, E.H.:What is History.
3. Chaubhe, K.P.:Audio-visual Aids in Teaching of Indian History.
4. Ghata, V.D.:The Teaching of History.
5. Ghosh, K.D.:Creative Teaching in History.
6. Hill, C.P.:Suggestion for Teaching of History, UNESCO.
7. N.C.E.R.T.:Effective Teaching of History in India.
8. Prakash, Budh:A New Approach to History.