SEMESTER-IV

பருவம் **IV**

தமிழ் – தாள் **- 4**

CODE: 16TIED41 **Credits: 3 (2L:1T:0P)**

Hours: 4/Week

நோக்கங்கள்: -

1. தமிழ் மொழியின் வரலாற்றை அறிவியல் கண்ணோட்டத்துடனும் மொழிக்குடும்மங்களின் அடிப்படையுலும் விளக்குதல்
2. சங்க இலக்கியத்தை வழி மாணவர்களிக்கு பண்டைய மக்களின் வாழ்க்கை நிலையை அறியச் செய்தல்
3. படைப்பாற்றல் திறனை வளர்த்தல்
4. பயன்பாட்டு தமிழ் வழியாக மாணவர்களுக்கு எழுதும் திறன் பேச்சு திறனை வளர்த்தல்

அலகு – 1 தமிழ்மொழி கற்பித்தலின் நோக்கங்களும் குறிக்கோள்களும்: -

பொதுநோக்கம் – வெளியிடும் கருவி – பட்டறிவை எடுத்தியம்பல் – செயலாற்றல் – அறிவுகளஞ்சியவாயில் – அடிப்படை மொழித்திறன்கள் – இலக்கிய இன்பம் – படைப்பாற்றல் – கற்பனையாற்றல் – அழகுணராற்றலை வளர்த்தல் – சமூகப் பண்பாட்டு வளர்சிசி – சமுகமரபுகளைப் பேணுதல்

அலகு – 2 காப்பியங்கள்: -

மணிமேகலை – பவத்திறம் அறுக எனப் பாவை நோற்றகாதை முழுவதும் கம்பராமாயணம் – மந்தரைச் சுழ்ச்சிபடலம்

அலகு – 3 இக்கால இலக்கியம்

நாவல் – தோற்றம் – வளர்ச்சி – ஆசிரியர்கள்
ஒண்பது ரூபாய் நோட்டு (நாவல்)
ஈக்காடுதாங்கள் – சென்னை – 17

அலகு 4 உரைநடை: -

அறிவியல் தமிழ் உலகம் – S.V.சண்முகம்

அலகு – 5 பயண்பாட்டுத்தமிழ் : -

பேச்சுத்திறன் – விளக்கம் – பேச்சுத்திறனின் அடிப்படைகள் – வகைகள் – மேடைப்பேச்சு – உரையாடல் – குழுவாக உரையாடல் – பயிற்சிகள் - தலைவர்களின் மேடைப்பேச்சுகள் – பெரியார் – அண்ணா – கலைஞ்ர்

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Enhance their appreciation skills.

CO2: Justify the contemporary social issueses through studying Tamil Epics.

CO3: Analyze sangam literature incidents and stories.

CO4: Improve their technological knowledge through the novel "Ariviyal tamil ulagam"

CO5: Develop their stage performance through the study of great speakers' experiences.

பார்வை நூல்கள்: -

- பரந்தாமனார் அ.சி.நல்லதமிழ் எழுத வேண்டிமா?பாரி நிலையம்,சென்னை – 600018
- பட்டா பிராமன். கா – மொழிப்பயன்பாடு – நீயுசெஞ்சுரி புக் வுவஸ்
- சுப்புரெட்டியார்.ந – "தமிழ் பயிற்று முறை", மெய்யப்பன் பதிப்பகம், ஐந்தாம் பதிப்பு 2006
- இரவிச்சந்திரன்.சு – "செய்யுள் திரட்டு:, வேல்ஸ் பல்கலைக்கழகம், முதற் பதிப்பு

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SEMESTER – IV

HINDI – PAPER 4

CODE: 16IHED41 **Credits: 3 (2L:1T:0P)**

Hours: 4/Week

Objectives: Students develop proficiency in Hindi which equips them to

1. enable the students to acquire basic skills in functional language.
2. develop independent reading skills and reading for appreciating literary works.
3. internalise grammar rules so as to facilitate fluency in speech and writing .
4. develop functional and creative skills in language.
5. develop values of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region.

Transaction mode :

Lecture cum discussion, group discussion; panel discussion, seminar group work, library work.

COURSE CONTENT:

Unit - I: Functional Language:

Précis Writing: Characteristics-definition-steps to précis writing- models-exercises
Book Reviewing-characteristics-definition-format-models-exercises
Reference: A Handbook of Writing Activities, Prasaranga, University of Bangalore.

Unit - II: Technical Writing

Definition-characteristics-format-models-Language used in the writing-Terminology-Process of writing-planning of document- Styles of writing-Techniques of writing-exercises

Reference: (a) Technical Writing by Richard W.Smith, Barnes and Noble Inc., New York, (b) Technical Report Writing Today –Daniel G.Riordan, 19-A, Ansari Road, New Delhi 110 002.

Unit - III: Ancient Poetry:

Text- **Pracheen evam madhyakaleen Hindi Kavya**, Prof Poornachand Tandan (Ed.) Published by Rajpal and sons, Kashmiri gate, Delhi-110006.
Following poets' work have been prescribed for study Kabir, and Vidyapathi.

Unit - IV: Drama

Malava Kumar Bhoj by Dr.Ramkumar Varma, Published by Rajpal and sons, Kashmiri gate, Delhi -06

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Develop independent reading skills and reading for appreciating literary works.

CO2: Internalize the grammar rules to facilitate fluency in speech and writing.

CO3: Apply the basic skills of functional language in their creative writing.

CO4: Develop functional and creative skills in language.

CO5: Respect the values of liberalism and an insight into the cultural heritage of the region which remains embodied in the literary output of the region.

Sessional work:

In the internal class during the different activities the performance of the student will be assessed by the teacher. Test, assignments and small projects works may be given .

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SEMESTER – IV

ENGLISH – PAPER - 4

CODE: 16IEED41 **Credits: 3 (2L: 1T: 0P)**

Hours: 4/Week

Objectives: Students develop proficiency in English which equips them to

1. understand the demands of audience, subject, situation and purpose and the
2. use of language for effective communication.
3. analyse language in context to gain an understanding of grammar, vocabulary, spelling, punctuation and speech.
4. examine authentic literary and non literary texts and develop insight and appreciation.
5. gain an understanding of study and reference skills.
6. plan, draft, edit and present a piece of writing.

Unit I : Grammar

Conditional Clauses - Simple, Complex, Compound - Idioms and phrases

Unit II : Creative Skills in Writing

Writing dialogues - Writing poems - Writing abstracts

Unit III : Literature – Prose

The Sky is the Limit - Kalpana Chawla

The Challenge of our Time - E. M. Forster

Human Rights - Sivagami Paramasivam

Unit IV : Literature and Short Stories

The Gateman's Gift - R.K. Narayan

The Ant and the Grasshopper - W. Somerset Maugham

How much land does a man need - Leo Tolstoy

The Dying Detective - Sir Arthur Conan Doyle

Unit V : Advanced Skill of Communication

Verbal and non-verbal communication – Creative thinking and speaking – Speaking about future plans

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Build their skills in English language without any grammatical errors.

CO2: Develop functional and creative skills in language.

CO3: Discuss the pros and cons of Indian literature.

CO4: Gain their knowledge though Indian short stories and literature.

CO5: Improve their advanced skill of communication.

Suggested Readings:

- Merrriam, E. (1964). It Doesn't Always Have to Rhyme. Atheneum.
- Hyland, Ken (2004) Second Language Writing. University of Michigan Press.
- Graves,D (1992). Explore Poetry: The reading /writing teacher's companion. Heinemann
- Stone Douglas (1999). Difficult conversations: How to discuss what Matters Most, New York: Penguin Books.
- Gabor Don (2001). How to start a Conversation and Make Friends, New York: Fireside.
- Subramanian.S.Dr. *Word of Wisdom. An Anthology of Modern Prose*. Anu Chitra Pub., Chennai. 2003. P.
- Subramanian.A.E. *Gifts to Prosperity. An Anthology of Modern Short Stories*. Anu Chitra Pub., Chennai. 2003.

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SEMESTER – IV

TEACHING AND LEARNING – PART II

CODE: 16CIED41 **Credits: 2 (1L: 1T: 0P)**

Hours: 3/Week

Objectives: On completion of the course, the student-teachers will be able to

1. understand the basic concepts of Educational Psychology.
2. explain the role of heredity and environment in the development of an individual.
3. recognize the importance of motivation and its role in learning.
4. describe the nature and types of learning.
5. identify the types of learning disabilities

UNIT-I: Basics of Educational Psychology

Definition, meaning, nature and scope of Educational Psychology - The focal areas of Educational Psychology: The learner, learning experience, learning process, learning situation and teacher – Methods of educational psychology: Concept of method and approaches-Methods of collecting scientific data: Interviews - Questionnaire- Case studies- Observation- participative and non-participative- Clinical method- Introspection- its merits and demerits. Approaches: Cross sectional design- Longitudinal design- Sequential design- its merits and demerits- Significance of Knowledge about Educational Psychology for teachers.

UNIT-II: Theoretical Perspectives of development

Approaches to theories of development – Social Cognition- Vygotsky social formation of mind. Constructivist: Piaget's theory of cognitive development. Moral: Kohlberg's theory of moral development. Psycho sexual: Freud theory of development- Psycho social: Erickson's theory- merits and demerits.

UNIT-III: Motivation and Learning

Motivation: Definition, meaning and concept of motivation – Types of Motives: Physiological and Psychological – Intrinsic and extrinsic motivation – Motivation Cycle – Maslow's Hierarchy of Needs – Level of aspiration - Achievement Motivation – Role

of Rewards and Punishments – Attention : Factors of attention – types: voluntary, involuntary - Inattention and Distraction - Span of Attention - Interest : Factors and Types of Interest.

Learning: Definition, concept and nature of learning - Types of learning : Perceptual and conceptual - Learning theories : Trial and Error, classical and operant conditioning, learning by insight, information processing theory – constructivism in learning - Factors affecting learning – learning curve – Transfer of learning - Remembering and Forgetting- Theories of forgetting – causes of forgetting.

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Value the focal areas of educational psychology

CO2: Analyze the different perspectives of development and growth.

CO3: Appraise the theories of development.

CO4: Distinguish the types of motivation and learning theories.

CO5: Find the solution for learning disabilities.

References:

- Baron, Robert A. (2007). Psychology, A.I.T.B.S Publishers, New Delhi, 2007.
- Berk, Laura E. (2010).*Child Development*. New Delhi: PHI Learning Private Limited.
- Bhatia, H.R. (2008). Educational Psychology, Pearson Prentice Hall, New Delhi.
- Chaube,S.P. (2011). *Developmental Psychology*. New Delhi: Neelkamal Publishing Pvt. Ltd.
- Dash, B.N. (2007). Educational Psychology, Neelkamal Publications (P) Ltd, New Delhi.
- Dinkmeyer, Don C. (1965). *Child Development: The Emerging Self*. New Delhi: Prentice Hall of India Pvt. Limited.
- Dumville, Benjamin. (2001) .*Child Psychology.* New Delhi: Sports Publications.
- Human Learning and Memory – E book
- Hurlock, Elizabeth B. (2005). *Developmental Psychology – A life span approach*. New Delhi: Tata McGraw Hill Publishing Company Limited.
- Hurlock, Elizabeth B. (2006). Child Growth and development, Tata Mc Graw Hill Pvt Company, Delhi.
- Mahmud, Jafar. (2011). *Developmental Psychology*. New Delhi: A.P.H. Publishing Corporation.
- Mangal, S.K. (2008). General Psychology, Sterling Publishers (P) Ltd, New Delhi.
- Manivannan, M. (2011). *Psychology of Learning and Human Development*. New Delhi: Neelkamal Publications Pvt. Limited.
- Murthu, K.S. (2008). *Child Psychology: Anti social behaviour.* New Delhi: Cyber Tech Publications.
- Robert A.Baron, (2007). Psychology, A.I.T.B.S Publishers, New Delhi.
- Santrock, John W. (2007). Adolescence, Tata Mc Graw Hill, New Delhi.

- Schaffer, Rudolph H. (2004).*Child Psychology*. New Delhi: Neelkamal Publications Pvt. Limited.
- Stella Reynolds. (2006). Educational Psychology, Lotus Press, New Delhi.

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SEMESTER – IV

INFORMATION AND COMMUNICATION TECHNOLOGY (ICT)

CODE: 16CIED42 **Credits: 4 (3L: 0.5T: 0.5P)**

Hours: 5/Week

Objectives: On completion of the course, the student-teachers will be able to

1. understand the concept of Information and Communication Technology;
2. develop insight into knowledge about new developments in ICT;
3. gain enriched learning experiences in using ICT.

UNIT-I: ICT Perspectives

ICT: Concept, Objectives, Need and Importance of ICT – Characteristics and Scope of Information and Communication Technology – paradigm shift in education due to the influences of ICT – challenges in integrating ICT in school education – Affordability for ICT equipped classroom.

UNIT-II: New Developments in ICT

Recent developments in the area of ICT – Interactive video – Interactive White Board – video-conferencing – M-learning, Social Media – Community Radio: Gyan Darshan, Gyanvani, Sakshat Portal, E-Gyankosh, Blog, MOOC, Whatsapp, Facebook, Twitter, etc. Recent experiments in the third world countries and pointers for India with reference to Education.

UNIT-III: ICT Enabled Learning Experiences - Computer Based

Application of ICT for enriching classroom experiences in learning – Application and use of multimedia educational software for classroom situation - Project based learning using computers, Technology aided learning: Computer Aided Instruction, Computer managed Instruction, Computer mediated Instruction – Computer Based Testing and Evaluation, Computer Managed Testing and Evaluation, etc.

UNIT-IV: ICT Enabled learning experiences - Internet Based

Use of internet based media for enhanced training, learning and testing– Online teaching/ Tutoring, Remote classrooms and Resource centres– Online academic and teaching material transaction line dispatching soft copies of teaching-learning material, e-books, Submission of assignments, Projects and other materials by the learners - Online Test/ Examination and Evaluation, legal and ethical issues – copyright, Hacking, Netiquettes, cybercrimes, students safety on the net.

UNIT-V: ICT Enabled Learning Experiences – web Based

Web based learning, Web Services: Email – E-Chat- online forums, blog, wiki, E-Library. Academic E-Resources: E-Journals, on line dictionary, Virtual tools, virtual learning-Environment , virtual labs, Tele-teaching, Tele-Conferencing, Video-Conferencing.

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Relate the influences and challenges in integrating ICT.

CO2: Examine recent developments in ICT.

CO3: Criticize ICT enabled learning experience.

CO4: Support Web based ICT learning experience.

CO5: Enrich their learning experience in ICT through internet.

References:

- Aggarwal J.C. (2000). *Innovation in Educational Technology.* New Delhi: Vikas Publishing House.
- Aggarwal J.C. (2013). *Modern Learning in Educational Technology.* New Delhi Black Prints.
- Aggarwal. D.D. (2004). *Educational Technology.* New Delhi: Sarup Publishing House.
- Bharihok D. (2000). *Fundamentals of Information Technology*. New Delhi: Pentagon Press.
- Bhattachary S.P. (1994). *Models of Teaching*. Regency Publications
- Byran P. (1997). *Discover the Internet Comdex Computer.* New Delhi: Dream Tech Publishing.
- Conrad K. (2001). *Instructional Design for Web Based Training*. HRD Press.
- Crouton T. E. (1962). *Programmed Learning and Computer Based Instruction*. New Work.
- Mrunalini, T., & Ramakrishna, A. (2014), *ICT in Education*. Hyderabad: Neelkamal Publications.

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SEMESTER-IV

MATHEMATICS – PAPER - VI

INTEGRAL CALCULUS AND LAPLACE TRANSFORMS

CODE: 16EIED42 **Credits: 3 (2L:1T:0P)**
Hours: 4/Week

Objectives: To enable students to

1. provide working knowledge to apply the integral principles in other courses.
2. learn new topics like Beta and Gamma functions and Multiple integrals.
3. expose different techniques in Integration.

UNIT – I: Integral Calculus: Reduction formulae, Bernoulli's formula

UNIT – II : Multiple integrals - Evaluation of Double and Triple integrals - change of order of integration- applications to plane area (Cartesian co-ordinates only)

UNIT – III : Beta and Gamma functions – properties and simple problems.

UNIT – IV : Laplace Transforms – Definition – standard results – simple theorems – Inverse Laplace transform.

UNIT – V: Applications of Laplace transform to solution of first and second order linear differential equations (constant coefficients) and simultaneous linear differential equations.

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Solve problems using reduction formulas and Bernoulli's formula

CO2: Evaluate double and triple integrals

CO3: Compare the properties of Beta and Gamma functions

CO4: Explain the concept of Laplace transforms and inverse Laplace transforms

CO5: Execute the first and second order linear differential equations

Reference Books:

- S.Narayanan & T.K. Manicavachagom Pillay , Calculus Volume II & III, Integral Calculus, S.Viswanathan (Printers & Publishers) PVT.LTD.
- P.R. Vittal , Differential Equations and Laplace Transforms, Margham Publications, Chennai.

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SEMESTER-IV

MATHEMATICS – PAPER - VII

REAL ANALYSIS

CODE: 16EIED43 **Credits: 3 (2L:1T:0P)**
Hours: 4/Week

Objectives: To enable students to

1. get acquainted with the concepts of real analysis
2. work comfortably with concepts
3. explore sequence and series , the varies limiting processes viz. continuity, differentiability and integrability

UNIT – I: Countability, Real numbers, least upper bounds, sequences and subsequences, limit of a sequence, convergent and divergent sequence , bounded sequences , Monotone sequences, Cauchy sequences. Chapter 1: sections 1.5 - 1.7 Chapter 2: sections 2.1 - 2.8, 2.10.

UNIT – II: Convergence and divergence of series, series of non-negative terms, Alternating Series conditional and absolute convergenc, test for absolute convergence. Chapter 3: sections 3.1 - 3.4 & 3.6

UNIT – III: Limit of a function, metric spaces, functions continuous at a point on a real line, Open sets, closed sets. Chapter 4: sections 4.1 & 4.2 Chapter 5: sections 5.1 - 5.4 & 5.

UNIT – IV: Sets of measure zero, definition of Riemann integral, Existence and properties of Riemann integral. Chapter 7: sections 7.1 - 7.4

UNIT – V: Derivations, Rolle's Theorem, the law of mean. Chapter 7: sections 7.1 - 7.7

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Understand the concept of Monotone and Cauchy's equations

CO2: Execute convergence and divergence series of non-negative terms

CO3: Define metric spaces and limit of a function

CO4: Appraise the concepts of Riemann integrals and properties of Riemann integral functions

CO5: Formulate the derivation of Rolle's Theorem

Recommended Books:

- Richard .R .Goldberg, 'Methods of Real Analysis', Oxford & IBH Publishing Co., Pvt. Ltd, New Delhi.
- Shanthi Narayan, A Course of Mathematical Analysis, S. Chand & Co., 1995.

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SEMESTER-IV

PHYSICS – PAPER - 4

ANALOG ELECTRONICS

Code: 16EIED41 **Credits: 4 (3L:0T:1P)**
Hours: 5/Week

Objectives: To enable students to

- understand the various techniques and concepts in Electronics
- apply these techniques in practical circuits.
- develop the skill in handling instruments.

Unit - I: Diode Characteristics and Applications

Constant voltage source - constant current source - Maximum power transfer theorem - Thevenine's theorem - procedure for finding Thevenin Equivalent circuit - PN junction theory - V-I characteristics of a PN junction diode – Half wave rectifier - Bridge rectifier - Efficiency - filters - Shunt capacitor filter – p filter - Zener diode - equivalent circuit - voltage regulator - LED - V-I characteristics - advantages - applications - photo diode - characteristics - applications.

Unit - II: Transistor characteristics and biasing techniques

Junction transistor structure - working of a transistor - transistor amplifying action - transistor characteristics - CB, CE, CC - comparison between the three configurations - basic CE amplifier circuit -selection of operating point - need for bias stabilization - requirements of a biasing circuit - fixed bias - voltage divider biasing circuit - h parameter equivalent circuits - Types of FET - JFET - working principle - symbol - comparison with bipolar transistor - output characteristics - shorted gate drain current, pinch off voltage and gate source cut off voltage - JFET parameters.

Unit - III: Single stage, multistage and power amplifiers

Single stage transistor amplifier - BJT, FET - analyzing an amplifier – graphical method - equivalent circuit method - gain of a multistage amplifier - RC and transformer coupling - frequency response curve of an RC coupled amplifier - analysis of two stage RC coupled amplifier - classification of amplifiers - single ended and power amplifier - push pull amplifier.

Unit - IV Feedback amplifiers and oscillators

Concept of feedback in amplifiers - types of feedback - voltage gain of feedback amplifier - advantages of negative feedback - amplifier circuits with negative feedback -

classification of oscillators - positive feedback amplifier as an oscillator - LC oscillators - Hartley, Colpitts and RC oscillators - Phase shift and Wien's bridge - Crystal oscillators - Astable multivibrator.

Unit - V: Switching circuits & Integrated circuits

Clipping and clamping circuits - SCR: working - equivalent circuit – important terms - V-I characteristics - Integrated circuits - advantages and disadvantages - Operational amplifier - differential amplifier - basic circuit - operation - common mode and differential mode signals - voltage gains - CMRR- Schematic symbol of OP AMP - output voltage - OP-AMP with negative feedback - inverting amplifier - Non inverting amplifier – Voltage follower - summing amplifiers - Integrator and differentiator

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Understand the properties and applications of semiconductor diodes.

CO2: Analyze the rectifier and regulator circuits.

CO3: Design and implement combinational logic circuits using reprogrammable logic devices.

CO4: Demonstrate the programs of digital to analog and analog to digital conversion.

CO5: Create circuits to solve clocked Flip-Flops problems.

Reference Books

- Bhargava N.N, Kulshreshtha D.C and S.C Gupta - Basic electronics an linear circuits, Tata McGraw Hill Publishing Company Limited, 2007.
- V.K. Mehta and Rohit Mehta, Principles of Electronics, S. Chand & Co. Ltd, New Delhi, 2013.

Physics Practicals – IV

Paper – IV

Any Seven Practicals

1. Compound pendulum.
2. Study of basic and universal gates (IC's).
3. NAND & NOR as universal building blocks.
4. Bridge rectifier – π filter.
5. Transistor – characteristics C.E mode.
6. Zener Diode – characteristics.
7. Maxwells bridge – (AC method – self-induction)

8. Bandgap of semiconductor.

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SEMSTER-IV

CHEMISTRY – PAPER-IV

MOLECULAR REARRANGEMENS AND STERO CHEMISTRY

CODE: 16CIED43 **Credits: 4 (3L: 0T: 1P)**

Hours: 5/Week

Course objective: To understands about what is isomers their classification conformational analysis and the mechanism of important rearrangement

Unit-I: Stereoisomerism

Definition – classification into optical and geometrical isomerism. Optical isomerism: optical activity – conditions for optical activity – asymmetric center – chirality – methods of racemisation and resolution – asymmetric synthesis – (partial and absolute) – Walden inversion.

Unit-II: Absolute configuration

Cahn – Ingold – Prelog rules, R-S notations for optical isomers with one and two asymmetric carbon atoms.

Unit-III: Geometrical isomerism

Cis, *trans* and E, Z notations – geometrical isomerism in maleic and fumaric acid – physical and chemical methods of distinguishing geometrical isomers.

Unit-IV: Conformational analysis

Conformers-dihedral angle – conformational analysis of ethane and n-butane – energy diagram – conformers of cyclohexane – boat and chair forms.

Unit-V: Molecular rearrangements

Pinacol-Pinacolone, Wagner Meerwein, Wolff, Beckmann, Hofmann, Benzilic acid, Cope and Claisen rearrangements.

COURSE OUTCOME

At the end of this course the students will be able to,

CO1: Recognize and comment on different synthetic strategies and methods for stereo control when faced with a synthetic scheme.

CO2: Predict the conformational preferences of common organic structures based on steric and electronic interactions.

CO3: Describe stereochemical and conformational structure on the chemical reactivity and on the mechanisms of organic reactions.

CO4: Draw mechanisms for reactions involving heterocycles as starting materials, intermediates, and products.

CO5: Analyze the molecular rearrangements.

Text books:

- L. Finar. "Organic chemistry: Stereochemisty and the Chemistry of Natural Products. Vols. II, Pearson education, London 5th edition, **1975**.
- P. S. Kalsi, "Stereochemistry: Conformation and Mechanism" New age international Pvt ltd. 6th edition **2005**

Reference Books:

- Robert Thornton Morrison, Robert Neilson Boyd, "Organic Chemistry" Ashok K. Ghosh 10th edition, **2013**
- Dr. Jagadamba singh, Dr. L. D. S. Yadav, "Advanced Organic Chemistry" Pragati Prakashan, 7th Edition, **2011.**

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CHEMISTRY
PRACTICAL-IV

Complexometric titration

1. Estimation of Magnesium
2. Estimation of Calcium

Demonstration Experiment

3. Estimation of Chloride using Silver nitrate

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