

# **RANI CHANNAMMA UNIVERSITY, BELAGAVI**



## **CURRICULUM STRUCTURE (I and II Semesters)**

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### **Programme: Sugar Science & Technology**

**THE COURSE STRUCTURE AND SYLLABUS OF  
UNDER GRADUATE**

**I - SEMESTER**

**Academic Year 2018-19**

## Semester – I

Sl. No	Course code	Course	No of Teaching hours per week	Total of Internal Assessment marks	Final Examination Marks	Total marks	Department	Exam hours
1	18SS101T	Basic English	05	20	80	100	English	3 Hours
2	18SS102TA/ 18SS102TB/ 18SS102TC	Additional English	05	20	80	100	English	3 Hours
		Basic Kannada	05	20	80	100	Kannada	3 Hours
		Hindi Basic	05	20	80	100	Hindi	3 Hours
3	18SS103T	Chemistry – I	05	20	80	100	Chemistry	
4	18SS104P	Chemistry Practicals - I	04	10	40	50		4 Hours
5	18SS105T	Sugar Science & Technology – I, ( Juice extraction and clarification )	05	20	80	100	Sugar Technology	3 Hours
6	18SS106P	Sugar Science & Technology – I, Practicals - I	04	10	40	50		4 Hours
7	18SS107T	Sugar Science & Technology - II, (Sugarcane Production Technology)	05	20	80	100	Agriculture (Agronomy)	3 Hours
8	18SS108P	Sugar Science & Technology – II, Practicals - II	04	10	40	50		4 Hours
9	18SS109T	Indian constitution	05	20	80	100	Political Science	3 Hours

Total teaching hours per week:52

Total marks per semester: 950

**Group – I Languages**  
**Semester I**

**Course code: 18SS101T**

**Course: Basic English**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Internal Assessment:20**

**I. Text: Prose**

- 1) Science and Religion – S. Radhakrishnan
- 2) Time to Ignite the Minds of the People – APJ Abdul Kalam
- 3) The Portrait of Lady – Khushwant Singh
- 4) The coffee House of Surat – Leo Tolstoy
- 5) Good Manners – J. C. Mill

**Poetry**

- 1) Delhi – R. Parthasarathy
- 2) The Purdah Nashin – Sarojini Naidu
- 3) Mirror – Sylvia Plath
- 4) No second Troy – W. B. Yeats
- 5) To Blossoms – Robert Herrick

**II. Grammar and Communication Skills**

- A) Use of Articles
- B) Use of Prepositions
- C) Transformation of Sentences
  - a) Remove too ... to/use so... that (vice versa)
  - b) Remove if/use unless (vice versa)
  - c) Remove As soon as/use No sooner...than (vice versa)
  - d) Change the assertive sentence into exclamatory sentence without changing the meaning (vice versa)
  - e) Change the degrees
- D) Communicative Skills
  - a) Introducing: Self Introduction and Introducing the chief-guest / Principal/ President / family member / friend
  - b) Report writing (Tour. Project, News, Functions, Seminars, Accident, Earthquake and Flood)
  - c) Welcome address and Vote of Thanks
  - d) Dialogue writing

## Pattern of Question paper

(80 Marks paper of three hours and 20 Marks for I.A)

- |   |           |
|---|-----------|
| 1) Objective type questions<br>(5 from Prose and 5 from Poetry)                       | 10x1=10   |
| 2) Reference to Context (One from Prose out of two and<br>one from Poetry out of two) | 2x5=10    |
| 3) Essay type question on Prose (One out of two)                                      | 1x10=10   |
| 4) Essay type question on Poetry (One out of two)                                     | 1x10=10   |
| 5) Short Notes (One from Prose out of two and<br>one from Poetry out of two)          | 2x5=10    |
| 6) A) Use of Articles and Prepositions<br>(2 for articles and 3 for prepositions)     | 5x1=05    |
| B) Transformation of Sentences  | 5x1=05    |
| C) Report Writing   | 5x1=10    |
| 7) A) Introducing   | 1x5=05    |
| B) Welcome and Vote of Thanks   | 1x5=05    |
| C) Dialogue Writing   | 1x5=05    |
|   | <b>80</b> |

**Semester I**  
**Course code: 18SS102TA**  
**Course: Additional English**

**Teaching Hours: 50 Hours**  
**Teaching Hours per week – 05 Hours**

**Max. Marks: 80**  
**Internal Assessment:20**

**Text: Seven One-Act Plays (Ed). K. S. Ramamurthy: OUP**

Only the following plays are to be studied

1. The seven slaves – A. Ball
2. One good turn – A. E. M. Bayliss
3. Night watches – Allan Monkhouse
4. The Unexpected – Ella Adkins
5. Sunday Costs Five Pesos – Josephina Niggli

**Grammar and Communication Skills**

Modals (Making Sentences using Modals)

Sentence Linkers (make Sentences using Linkers)

Use of Words, phrases and idioms

Describing a situation (Marriage, Birthday, Local fair, Temple festivals, National festivals, Funerals etc.)

**Pattern of question paper**

(80 Marks paper of three hours and 20 Marks for I.A)

- |   |         |
|---|---------|
| 1) Objective type question on the play  | 10x1=10 |
| 2) Reference to context   | 2x5=10  |
| 3) Essay type question on the plays (One out of two)  | 1x10=10 |
| 4) Easy type question on the plays (One out of two)   | 1x10=10 |
| 5) Short notes on the plays (One out of two)  | 2x5=10  |
| 6) A) Modals make sentences using given modals 5 out of 7   | 1x5=05  |
| B) Sentence Linkers Make sentences using given sentence linkers 5 out of 7  | 1x5=05  |
| 7) A) use of words, phrases and idioms<br>(3 Marks for Use of Words, 3 Marks for Phrases and<br>4 marks for idioms and phrases) | 1x10=10 |
| B) Describing a situation (About 200 words)   | 1x10=10 |

**Semester I**  
**Course code: 18SS102TB**  
**Course: Basic – Kannada**

ಸಾಹಿತ್ಯ ಕೌಮುದಿ

ಬಿ.ಎಸ್ಸಿ. ತರಗತಿಗಳಿಗೆ ಮೋದಲ ಸೆಮಿಸ್ಟರ್

ಕನ್ನಡ ಅವಶ್ಯ ಪತ್ರಿಕೆ

2016-17 ರಿಂದ

(ಒಟ್ಟು ಪಾಠದ ಅವಧಿ 80 ಗಂಟೆಗಳು. ವಾರಕ್ಕೆ 05 ಗಂಟೆಗಳ ಪಾಠ, ಒಟ್ಟು ಅಂಕಗಳು 100. ಆಂತರಿಕ ಗುಣಾಂಕಕ್ಕೆ 20 ಅಂಕಗಳು (ಹಾಜರಾತಿಗೆ 04, ಮೋದಲ ಕಿರು ಪರಿಕ್ಷೆಗೆ 04, ಎರಡನೆ ಕಿರು ಪರಿಕ್ಷೆಗೆ 10, ನಿಯೋಜಿತ ಕಾರ್ಯಕ್ಕೆ 03 ಅಂಕಗಳು) ಹಾಗೂ ಥಯರಿ ಪರಿಕ್ಷೆಗೆ 80 ಅಂಕಗಳು)

ಪರಿವಿಡಿ

- |                            |                        |
|----------------------------|------------------------|
| 1. ಸಾಮಾನ್ಯ ನೀತಿ            | - ಸೋಮೇಶ್ವರ ಶತಕ         |
| 2. ಇಳಿಯಾಂಡಗುಡಿಮಾರರ ರಗಳೆ    | - ಹರಿಹರ                |
| 3. ಅವೆಡೆಯೊಳೆರ್ಪೆಯೋ ಮಲ್ಲಮ್ಮ | - ರಾಘವಾಂಕ              |
| 4. ಮಾನಗೇಡಿ ಮಂದಿ            | - ಕಡಗೋಳ ಮಡಿವಾಳ         |
| 5. ಕನ್ನಡ ಪದಗೋಳ             | - ಜಿ. ಪಿ. ರಾಜರತ್ನಂ     |
| 6. ಚೌಪಡಿಗಳು                | - ದಿನಕರ ದೇಸಾಯಿ         |
| 7. ಕಟ್ಟುವೆವು ನಾವು          | - ಎಂ. ಗೋಪಾಲಕೃಷ್ಣ ಅಡಿಗ  |
| 8. ನನ್ನ ಅವದಾರ              | - ಶಶಿಕಲಾ ವೀರಯ್ಯ ಸ್ವಾಮಿ |
| 9. ಗರತಿಯ ಹಾಡುಗಳು           | - ಜಾನಪದ                |
| 10. ಕೊನೆಯ ಗಿರಾಕಿ           | - ನಿರಂಜನ               |
| 11. ಮೂಢ ನಂಬಿಕೆಗಳು          | - ರಾ.ಯ. ಧಾರವಾಡಕರ       |
| 12. ಅಕ್ಕರೆಯ ಮೂರ್ತಿ         | - ಪಿ. ಲಂಕೇಶ            |
| 13. ವಿಜ್ಞಾನವೆಂದರೇನು?       | - ಜಿ. ಹಣುಮಂತರಾವ್       |
| 14. ಜಾನಪದ ಚಿಕ್ಕಿತ್ನೆಗಳು    | - ಸಿಂಪಿ ಲಿಂಗಣ್ಣ        |
| 15. ನ್ಯಾನೊ ತಂತ್ರಜ್ಞಾನ      | - ಜಿ. ಆರ್. ಲಕ್ಷ್ಮಣರಾವ  |

**Semester I**  
**Course code: 18SS102TC**  
**Course: Hindi Basic**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Internal Assessment:20**

**Text Books:**

1. अभिनव कथा भारती - सं. चक्रधर, सुमित्र प्रकाशन, इलाहाबाद
2. व्याकरण - (विकारी शब्द - संज्ञा, सर्वनाम, विशेषण, क्रिया)
3. अपठित रचना

**Distribution of Marks**

1. अभिनव कथा भारती – 55 अंक	
2. व्याकरण – 15 अंक	
3. अपठित रचना - 10 अंक	
A. Objective type questions (10 out of 14)	10 Marks
B. Annotations from text book (3 out of 5)	15 Marks
C. Essay type of questions from test book (2out of 4)	20 Marks
D. Short notes from text book (2 out of 4)	10 Marks
E. Grammer	15 Marks
F. अपठित रचना (Comprehension)	10 Marks
Theory total	80 Marks
Internal Assessment	20 Marks
Total	100 Marks

**Reference books:**

1. प्रेमचंदऔर जनवादी साहित्य की परम्परा – कुंवरपालसिंह
2. हिंदी कहानी और इतिहास - गोपाल राय
3. हिंदी कहानी एक अन्तर्यात्रा - रामदरश मिश्र
4. हिंदी कहानी का विकास – मधुरेश
5. साठोत्तरी हिंदी कहानी मे पात्र और चरीत्र चित्रण - डॉ. रामप्रसाद
6. हिंदी कहानी पाठ और प्रक्रिया - सुरेंद्र चौधरी
7. आजकी कहानी - विजय मोहन सिंह
8. व्याकरण प्रदीप – राजदेव
9. आधुनिक हिंदी व्याकरण रचना - डॉ. वासुदेवनंदन प्रसाद
10. आधुनिक हिंदी व्याकरण का स्वरूप - डॉ. भारती खुबलकर
11. चक्रधर की साहित्यधारा – माकडेंय



**Group II**  
**Semester I**  
**Course code: 18SS103T**  
**Course: Chemistry -1**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Internal Assessment:20**

**IN ORGANIC CHEMISTRY**

**Unit-I**

**Atomic structure**

**6 Hours**

Review of Bohr's model of hydrogen atom-Postulates of Bohr's theory, Bohr's theory of hydrogen atom, calculation of radius and energy of nth orbital, electronic transitions and origin of spectral lines of hydrogen atom.

Quantum numbers and their significance.

**Unit-II**

**Periodic trends**

**4 Hours**

The modern periodic law, Periodicity properties, Classification elements into s, p, d and f blocks, comparative studies of elements group I & II (With respect to ionic radii, ionization Energy, Anomalous behavior of Li & Be.), electronic configuration of the elements up to atomic number 60, Aufbau principle, Hund's rule, (n+1)rule, Pauli's exclusion principle

**Unit-III**

**Chemical bonding – I**

**4 Hours**

**Ionic bonding:** factors affecting the formation of ionic bonding, Lattice energy and its determination by Born-Haber cycle.

**Covalent bond:** Types, factors favoring covalent bond, properties of covalent bond: Types, factors favoring covalent bond, properties of covalent compounds.

Valence bond theory with respect to H<sub>2</sub>, F<sub>2</sub>, HCl molecules and its limitations.

**Unit-IV**

**Methods of analysis**

**3 Hours**

Errors in quantitative analysis, classification and minimization, accuracy, precision standard deviation, e-test, significant figure and rules for computations

# ORGANIC CHEMISTRY

10 Hours

## Unit-I

**Carbohydrates I :** Introduction, definition and classification, D and L structure of glucose, Haworth and Fischer structure of (+)-Glucose and (-)-Fructose, Stereoisomers of (+)-glucose, Oxidation of (+)-Glucose by Nitric Acid, Osazone formation of (+)-Glucose and (-)-Fructose, Conversion of aldose into Ketose, Formation of glycosides, Configuration about C-1 (anomers), Methylation, Mutarotation, Structure and composition of Disaccharides (+)-Sucrose, (+)-Maltose, (+)-Lactose, Polysaccharides starch and cellulose structures, Reducing and Non-reducing sugars.

## Unit-II

### Stereochemistry of organic molecules

6 Hours

Cycloalkanes: Baeyer's strain theory, calculation of angle strain, Sachse Mohr theory of strainless rings. Chair and boat forms of cyclohexane. Axial and equatorial bonds.

**Conformational isomerism:** Basic concept of conformational analysis with reference to ethane and butane.

**Geometrical isomerism:** definition, E and Z notation for 2-butene and butenedioic acid, rules for assigning notations. Determination of configuration of butenedioic acid by anhydride formation, dipole moment measurement melting point and stability.

**Optical isomerism:** Chirality, van't Hoff-Lebel hypothesis, optical activity, D and L-configurations, R and S notations, sequence and priority rules, enantiomers, diastereoisomers, epimers, anomers, racemic and meso (with suitable examples like lactic and tartaric acids.), racemisation resolution of racemic mixture by chemical method, asymmetric synthesis Walden inversion.

## PHYSICAL CHEMISTRY

### Unit-I Gaseous state

7 Hours

Real gas isotherms, Andrew's experiment of CO<sub>2</sub>, PV-relationship, critical phenomenon of gases.

Critical constants ( $P_c$ ,  $V_c$ ,  $T_c$ ). Definition, of critical temperature, critical pressure and critical volume.

Relationship between critical constants and Vanderwaals constants, experimental determination of critical constants, reduced equation of state and statement of law of corresponding states.

Liquification of gases (Linde's method only), Maxwell's law of distribution of molecular velocities (No derivation), effect temperature on distribution of molecular velocities.

### Unit-II

#### Solutions

4 Hours

Solutions of gas in liquid. Henry's law and limitations. Completely miscible liquid pairs. Azeotropes, theory of azeotropic mixtures, partially miscible liquid systems, critical solution temperature with respect of phenol water, triethyl amine-water and nicotine-water system.

### Unit-III

#### Salt-hydrolysis

4 Hours

Types of salts, definition of degree of hydrolysis and hydrolysis constant derive the relation between  $K_h$ ,  $K_a$  &  $K_w$  and expression for pH in case of hydrolysis of the following – salts weak base and strong acid, weak acid and strong base. Numerical problems.

### Unit-IV

#### Nernst distribution law

2 Hours

Statement and limitations. Applications of Nernst distribution law in solvent extraction.

## REFERENCE BOOKS

### Inorganic chemistry

- |   |                               |
|---|-------------------------------|
| 1. Advanced Inorganic chemistry                 | Cotton and Wilikinson         |
| 2. Concise Inorganic chemistry                  | J. D. Lee                     |
| 3. Inorganic chemistry                          | Huhee and Keiter              |
| 4. Inorganic chemistry                          | Shriver and Atkin             |
| 5. Principles of Inorganic chemistry            | Puri and Sharma               |
| 6. Inorganic chemistry                          | A. G. Sharpe                  |
| 7. Essential chemistry                          | R. Chand                      |
| 8. University chemistry                         | Mahan and Myers               |
| 9. Modern Inorganic chemistry                   | Madan                         |
| 10. Modern Inorganic chemistry                  | Satya prakash                 |
| 11. Inorganic chemistry for Under<br>Graduates  | R. Gopalan                    |
| 12. Collage Practical chemistry                 | Ahluwalia, Dhingra and Gulati |
| 13. Instrumental method of<br>Chemical analysis | Willard, Martin and Dean      |

### Organic chemistry

- |                                   |                         |
|-----------------------------------|-------------------------|
| 1. Text book of Organic chemistry | Bahl and Bahl           |
| 2. Organic spectroscopy           | P. S. Kalsi             |
| 3. Organic chemistry              | I.L. Finar Vol I and II |
| 4. Advanced Organic chemistry     | Jerry March             |
| 5. Organic chemistry              | Morrison & Boyd         |
| 6. Modern Organic chemistry       | Norman & Wadding        |

### Books recommended for Physical chemistry:

- |                                       |                        |
|---------------------------------------|------------------------|
| 1. Physical chemistry                 | P. W. Atkins           |
| 2. Introduction to Physical chemistry | Mark Latd              |
| 3. Text book of Physical chemistry    | S. Glastone            |
| 4. Principles of Physical chemistry   | Puri Sharma & Pathania |
| 5. Text book of Physical chemistry    | P.L. Soni              |
| 6. Text book of Physical chemistry    | M.V. Sangaranarayanan  |

**Course code: 18SS104P**  
**Course: Chemistry Practicals -I**

**Total number of hours per week:4 Hours**

**Internal Assessment :10 Marks**

**Total No. of Hours per semester:52 Hours**

**Practical: 40 Marks**

- A. Demonstration of calibration of glasswares (Burette, pipette) and weights (grams and milligrams)
- B. Preparation of standard solution, calculation of mass of the solute to be dissolved in 250 ml solution to get required normally.
- C. Volumetric estimations:
1. Preparation of standard sodium carbonate solution (Idea of primary standard solution), standardization of HCL and estimation of  $\text{NaOH}$  using standard HCL solution.
  2. Preparation standard oxalic acid solution, standardization of  $\text{KMnO}_4$  solution and estimation of FAS solution.
  3. Preparation of standard potassium dichromate, standardization of ferrous sulphate solution and estimation of  $\text{KMnO}_4$  using standard ferrous sulphate solution.
  4. Estimation of iodine using standard thiosulphate solution
  5. Estimation of zinc using standard EDTA solution.
  6. Estimation of total hardness using standard EDTA solution
  7. Estimation of available chlorine in bleaching power by iodometric method.
  8. Estimation of carbonate of bicarbonate in a mixture using phenolphthalein and methyl orange indicators.
- D. Simple gravimetric experiments
- E. Determination of the percentage loss in weight of I) Zinc carbonate II) barium chloride III) mixture of barium sulphate and ammonium chloride IV) mixture of zinc oxide and zinc carbonate on heating.

**Semester I**  
**Course code: 18SS105T**  
**Course: Sugar science & Technology- I**  
**Juice Extraction & clarification**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Internal Assessment: 20**

**Unit – I**

**10 Hours**

Definitions and concept of various terms used in sugar technology – Cane, Binding Material, Extraneous Matter, Pol, Brix, Recovery, Juice, Bagasse, Primary Juice, Secondary Juice, Maceration, Imbibition Water, Bagasse, Press Mud / Filter Cake, Clear Juice, Mixed Juice, Raw Juice, Filtrate, Syrup, Masecuite, Molasses, Final Molasses, Vacuum, Live Steam, Exhaust Steam, Vapour, Vacuum, Condensate, Boiler Water, Effluent, Spent Wash, Distillation, Fermentation, Etc ., General sugar processing flow diagram

**Unit – II**

**10 Hours**

Cane preparation & Milling : cane weighing, cane unloading system, General arrangement & working of cane carrier, feeder tables, cane preparatory equipments – leveler, cutter, fibrizer, shredder etc, Preparatory index, prepared cane carrier, General arrangement of mills & drive assembly, different parts of mill assembly, concept of mill & milling tandem, Working of mill, Juice extraction from cane, maceration and simple imbibition, compound imbibition, mill sanitation, raw juice screening , rotary screens, Mill extraction, Primary extraction, Bagasse & Juice quality, Measurement and weighment of juice – Mag flow / mass flow/load cell base weighing tank, Normal quantities of various products, Idea about diffusion.

**Unit – III**

**10 Hours**

Juice heating & clarification equipments: General Construction & working of Different types of juice heaters – Tubular /DCH/PTHE, Tubular heaters – HS, passes concept, heat transfer; General working sulphur burner, General construction & working of modern continuous sulphur burner, sulphur sublimation and reasons, Properties of SO<sub>2</sub> gas, Juice sulphiter working & construction details, Composition of cane and juice – their difference , principles of cane juice clarification, Effect of lime on the different constituents of juice, effect of pH, effect of heating, different processes of cane juice clarification, Juice sulphiter – working & construction, Concept of shock liming /preliming/simultaneous liming, Milk of preparation equipment working & construction details, Phosphoric acid preparation, Preparation of flocculants

**Unit – IV****10 Hours**

Definition of double sulphitation/phosphotation, chemicals used for juice clarification, physical & chemical properties of Sulphur, Lime, Phosphoric acids, settling agents, sulphur burning reaction, Action of lime/sulphur/phosphoric acid/settling agent on juice, Flocculent agents used for settling and their properties, dosing calculations for chemicals.

**Unit – V****10 Hours**

Clarifier & Vacuum Filter: General construction & working of various clarifiers - 444 clarifier / rafi clarifier/ Single tray (SRT) clarifier, vacuum filter, Types of clarification/juice sulphiter/sulphur burner/clarifier/vacuum filter

### **Reference Books:**

1. Principles of sugar technology, Honig Pieter, Elsevier publishing company Amsterdam
2. Hand book of Cane Sugar Engineering, Hugot e., Elsevier Science publishing Co.Inc. New York.
3. Sugar Technology for Administrators in the Indian sugar factories; Manohar Rao,P.J.; Jayajirao Shinde Editor Bharatiya Sugar Jeevan Darshan Laxmi Rd. Pune.
4. Training manual for sugar mills.; Mangal Singh; Somaiya publications Pvt.Ltd. Mumbai.
5. Efficient Management of sugar factories, Mangal Singh, Somaiya publication Pvt.Ltd. Bombay
6. Cane Sugar Manufacture in India, Kulkarni, D.P., The Sugar Technologists Association of India N.Delhi.
7. System of Technical control for cane sugar factories in India; Varma, N.C. The Sugar Technologists Association of India N.Delhi.
8. Hand book of Cane Sugar Technology, Mathur R.B.L., Oxford DBH publishing Co.N.Delhi.
9. Unit operations in cane sugar production; Payne, J.N.; Elsevier pub Co. Amsterdam.
- 10.Introduction to cane Sugar Technology, Jenkins, Q.H., Elsevier scientific publishing company Amsterdam.



**Course code: 18SS106P**  
**Course: Sugar Science & Technology - I : Practicals -I**

**Total number of hours per week- 04**  
**Total No. of Hours per semester-52**

**Internal Assessment = 10 Marks**  
**Practical's: 40 Marks**

1. Brix Analysis by brix hydrometer
2. Use of polarimeter for Pol reading
3. Analysis of Primary juice /Mixed juice for Brix % , Pol % & Purity
4. Analysis of Bagasse for Pol % & moisture %
5. Analysis of Filter cake for Pol % & Moisture %
6. Calibration of pH meter and analysis of juice for pH
7. Analysis of RS % & RS per 100 brix in Primary juice & clear juice
8. Analysis of syrup for Brix % & purity
9. Analysis of CaO content in Mixed juice & clear juice
10. Analysis of bagacillo in mixed juice
11. Analysis of quick lime for available CaO content
12. Analysis of juice for dirt%

**Semester I**  
**Course code: 18SS107T**  
**Course: Sugar science & Technology-II**  
**Sugarcane Production Technology**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Internal Assessment: 20**

**Unit – I**

**04 Hours**

Origin, History and distribution sugarcane growing regions of India. The taxonomic classification of sugarcane. Morphology – stem of sugarcane. Economic root system and inflorescence in sugarcane and growth phases in sugarcane. Economic important cane v/s beet sugar. Importance and varieties of sugarcane. Major varieties of sugarcane cultivated in Karnataka and their features.

**Unit – II**

**04 Hours**

Water requirement, photosynthesis, factors of influencing photosynthesis, effect of temperature, photoperiod, Transpiration, Growth promoters, Growth inhibitors. History and perspectives. Importance of Biotechnology in Agriculture. Requirements to develop tissue culture lab steps involved in micro-propagation sterilization and maintenance of aseptic conditions. Tissue culture media preparation. Advantages of micro-propagation in sugarcane.

**Unit – III**

**06 Hours**

Elements of Soils and their Characters; Meaning of Normality, Molar, Milli equivalent and parts per million. Definition of soil. Importance and functions of soils. Soil forming rocks and minerals, soil forming factors, soil profile, soil particles, structure, texture, density, porosity, physical properties, soil pH, Electrical Conductivity and Ion exchange process.

Soil moisture, percolation of water in the soil, drainage, soil climate and gas exchange. Soil temperature and its importance. Soil organic matter, importance, characters and carbon and nitrogen ration and its importance. Acid soils, saline and alkaline soils, their characters, formation, problems

and their management practices. Uses of different quality irrigation water in agriculture.

Meaning of soil fertility, soil fertility deciding factors, plant nutrients and their classification. Essential nutrients, Forms of nutrients required by plant, movement of nutrients towards roots, availability of nutrients. Organics, meaning and classification / types. Nitrogen, Phosphorus and potassium fertilizers and their characters and reactions in the soil. Complex. Mixed and liquid fertilizers and micronutrient fertilizers. Soil analysis, plant analysis, critical limits of nutrients in plant. Recommendations of fertilizers based on soil test results.

#### **Unit – IV**

**30 Hours**

##### **Production practices**

##### **Ecology**

Temperature, Rainfall, Relative humidity (RH), Atmospheric Co<sub>2</sub> concentration, Sunlight, Frost, Wind, Microclimate, Effect of greenhouse gases (GHGs) and Effect of climate on ripening.

Varieties in sugarcane, preparatory tillage, green manuring and application of bulky manures, seed material and seed rate, geometry of planting and planting depth, planting period, agronomy of late planted crop, planting methods, mechanical planters, aftercare. Sugarcane based cropping and farming systems, companion cropping in sugarcane, sugarcane based farming systems.

##### **Stress management in sugarcane**

Cold stress, agronomy of water logged for excess moisture conditions, moisture stress conditions, managing acid soils, managing saline-alkali soils, sugarcane in shallow black soils.

### **Nutrition and fertilizer management**

Time and method of N application, bio-fertilizers, Time and method of applying Bio-fertilizers, Ex situ composting of trash and press mud (modified Japanese method), Vermi-composting, major nutrients and micro nutrients.

### **Water management**

Evapo-transpiration (ET) or consumptive use (CU), Irrigation efficiency (IE) and Water use efficiency (WUE), Soil moisture status and leaf water potential (YL). Sprinkler irrigation, Furrow method of irrigation and Drip or trickle Irrigation and Drainage.

### **Management of ratoon cane**

Time and method of fertilizer application, yield attributes of ratoon cane, quality ratoon, quality ratoon vs plant cane. Cultural requirement, number of rations, ratooning power of cultivars, water requirement, gap filling, trash management, management of weeds, pests, and diseases associated with rations, effect of growth regulates of sprouting and ratoon yield, Allelopathy in ratoon cropping.

### **Management of seed cane**

Sett treatment, agronomy of seed cane, thermotherapy or heat therapy and Three-tier seed programme.

### **Integrated weed management**

Integrated weed control, herbicide, antidotes or safeners, surfactants and adjuvants, control of noxious perennial weeds and methods of weed control measures.

### **Pests and disease management**

**Pests:** Shoot borer, top borer, internode borer, stalk borer, gurudaspur borer, root borer, White Grubs, Termites, Scale insect: (Green), Pyrillapurpusilla, Walker), White flies, Non-insect pests, Biological control of sugarcane pests, parasites.

**Diseases:** Red rot, Smut, Wilt, Pineapple disease, Yellow Leaf Disease (YLD), Leaf spots, Ratoon stunning disease (RSD), Grassy Shoot Disease (GSD), Nematodes and Mosaic.

**Unit – V**

**06 Hours**

Ripening methods, Methods of cane purchase, Harvest strategy, Pre-harvest maturity survey, Methods of harvest, Mechanized harvesting. Composition of sugarcane and juice and quality parameters of juice, Post harvest losses and measures to reduces the losses. Cost of cultivation of sugarcane.

### Reference Books:

1. Hartmann and Kester's – Plant propagation – Principles and practices – Hudscan T. Hartmann, Dale E. Kester, Fred T. Davies, Jr. Robert L. Geneve.
2. Textbook of Plant Physiology – C. P. Malik
3. Diseases of Crop plants in India – G. Rangaswami and A. Mahadevan
4. Plant Pathology – R. S. Mehrotra
5. Practical cytology – Applied Genetics and Biostatistics – H. K. Goswami and Rajeev Goswami
6. Recent Advances in Plant Diseases Vol-1 to 5-K.M. Chandniwala
7. Introduction to Principles of Plant Pathology – R.S. Singh
8. An Introduction to Plant Anatomy – Authur R. Eames and Laurence H. Mac Deniels.
9. Genetics and Plant Breeding – E. B. Babcock
- 10.Plant Taxonomy – O.P. Sharma
- 11.Plant Breeding – Theory and Techniques – S.K. Gupta
- 12.Breeding Asian Field Crops – John Milton Poehlman and Dhirendranath Borthakur.
- 13.Crop Production and Field Experimentation – Dr. V. G. Vaidya, K. R. Sahasrabudhe, Dr. V. S. Khuspe.
- 14.Agricultural Problems of India – A. N. Agrwal and Kundam Lal
- 15.Elementary Principles of Plant Breeding – H.K. Chaudhari
- 16.Trends in Agricultural Insect Pest Management – G.S. Dhaliwal and Ramesh Arora.

**Course code: 18SS108P**  
**Course: Sugar science & Technology - II : Practicals -II**

**Total number of hours per week- 04**  
**Total No. of Hours per semester-52**

**Internal Assessment = 10 Marks**  
**Practical's: 40 Marks**

1. Identification of sugarcane varieties and weeds.
2. Soil sampling methods.
3. Calculation of fertilizer dose based on soil test report.
4. Identification of Pests and diseases.
5. Analysis of brix of cane sample by hand refractometer at various points
6. Analysis of cane sample for pol % - Cane weighment, Juice weighment, analysis of bagasse for pol % & moisture %, Analysis of juice for Brix % , Pol %, purity,
7. Working of cost of cultivation of sugarcane.

**Semester I**  
**Group – III**  
**Course code: 18SS109T**  
**Course: Indian constitution**

**Compulsory paper for all U. G. Courses (Total = 80 Marks)**

**Chapter – I** **8 Hours**  
Constitutional History, Preamble salient features, citizenship, Method of Amendment and Recent Amendments

**Chapter – II** **10 Hours**  
Fundamental Rights and Directive Principles of State Policy  
Fundamental duties, difference between fundamental Rights and Directive Principles of State Policy

**Chapter – III**  
a) President – powers and functions. Vice-president powers and functions, Prime Minister and council of ministers.  
b) Parliament – Lok sabha, Rajya sabha – composition powers and functions.  
c) Judiciary (Supreme Court) composition powers and functions Judicial Activism

**Chapter – IV State Government** **10 Hours**  
a) Governor: powers and functions  
b) Chief minister:  
c) State Legislative Assembly and Legislative Council-composition powers and functions.  
d) High court: Composition powers and function

**Chapter – IV Recent Trends in Indian Constitution** **12 Hours**  
a) Basic structure of Indian Constitution  
b) National integration and obstacles to National integration  
c) Federalism, Centre State Relations  
d) Recent Electoral Reforms and Anti Defection Law  
e) Recommendations of National Commission to Review the working of Indian constitution.



### **Books of reference:**

1. M. V. Pylee, An introduction to the Constitution of India, New Delhi, Vikas, 2005
2. Subhasg C. Kasgyap, Our Constitution: An Introduction to India.fs constitution Hall of India, 2001
3. Durga Das Basu, Introduction to the constitution of India, New Delhi. Prentice Hall of India. 2001
4. D. C. Gupta, Indian Government and Politics, VII edition, New Delhi, Vikas, 1994
5. J. C. Johari, Indian Govern,ent and politics, Delhi, Sterling publishers, 2004
6. V.D. Mahajan, Constitutional Development and National Movement in India , New Delhi, S. Chand and Co. lates edition.
7. Constituent Ascyssembly Debates, New Delhi, Lok Sabha Secretariat, 1989
8. Granville Austin, Working of Democratic Constitution: The Indian Experience, New Delhi, Oxford University Press 1999
9. A. P. Avathi, Indian Government and Politics, Agra, naveen Agarwal, 2004
- 10.S.A Palekar, Indian constitution, New Delhi, Serials publications, 2003
- 11.Brij Kishore Sharma, introduction to the Constitution of India (Second Edition), New Delhi, Prentice Hall of India, 2004
- 12.H. H. Rajashekhar, Understanding the Indian constitution, Mysore Prabodha, 2005
- 13.J. N. pandey, Constitutional Law of India, Allahabad, central Law Agency.
- 14.Indian Policy – M Laxmikanth, MgGRAW hill education WE Series, 4<sup>th</sup> Edition.

### **Model question paper**

1. There will be Eight questions
2. Student has to answer any five question
3. Each question carry 16 marks.

**THE COURSE STRUCTURE AND SYLLABUS OF  
UNDER GRADUATE**

**II - SEMESTER**

**Academic Year 2018-19**

## Semester – II

Sl. No	Course code	Course	No of Teaching hours per week	Total of Internal Assessment marks	Final Examination Marks	Total marks	Department	Exam hours
1	18SS201T	Basic English	05	20	80	100	English	3 Hours
2	18SS202TA / 18SS202TB/ 18SS202TC	Additional English	05	20	80	100	English	3 Hours
		Basic Kannada	05	20	80	100	Kannada	3 Hours
		Hindi Basic	05	20	80	100	Hindi	3 Hours
3	18SS203T	Chemistry - II	05	20	80	100	Chemistry	3 Hours
4	18SS204P	Chemistry Practicals	04	10	40	50		4 Hours
5	18SS205T	Sugar Science & Technology -I, (Evaporators )	05	20	80	100	Sugar Technology	3 Hours
6	18SS206P	Sugar Science & Technology – I, Practicals -I	04	10	40	50		4 Hours
7	18SS207T	Sugar Science & Technology II, (Sugar Factory Chemical Control)	05	20	80	100	Sugar Technology	3 Hours
8	18SS208P	Sugar Science & Technology – II, Practicals - II	04	10	40	50		4 Hours
9	18SS209T	Environmental Studies & Human Rights	05	20	80	100	Political Science	3 Hours

Total teaching hours per week:52

Total marks per semester: 950

**Group – I     Languages**  
**Semester II**  
**Course code: 18SS201T**  
**Course: Basic English**

**Teaching Hours: 50 Hours**  
**Teaching Hours per week – 05 Hours**

**Max. Marks: 80**  
**Internal Assessment:20**

**I. Text: Prose**

- 1) A Chameleon – Anton Chekhov
- 2) The False Gems – Guy de Maupassant
- 3) The Secret of Work – Swami vivekanand
- 4) Duty – Mulk Raj Anand
- 5) Our Home in space – Sir James Jeans

**Poetry**

- 1) Huger – Jayant Mahapatra
- 2) Telephone Conversation – Wole Souanka
- 3) The Diameter of the Bomb- Yehuda Amichai
- 4) This is a Photograph of Me – Margret Atwood
- 5) The Emperor of Ice Cream – Wallace Stevens

**II. Grammar and communication skills**

- A) Synonyms and Antonyms text based
- B) Frame – questions
- C) Communicative Skills
- D) Short speech skills – Global Warming, Water Scarcity , Pollution, Terrorism, Anti-social activities, Startups, Plantation, Bio-diversity, Rain Harvesting, Women Education, Clean Mission India, Impact of strikes, Alcoholism, First day in college, Mother’s day, Yoga day, Environment day and Science day. (about 100-150 words)
- E) Preparing an Advertisement – Notebook, Pen, Soap, Smart Phone, TV, Computer, Shoes etc.,
- F) Resume and CV writing

## Pattern of Question paper

(80 Marks paper of three hours and 20 Marks for I.A)

- |   |            |
|---|------------|
| 1) Objective type questions<br>(5 from Prose and 5 from Poetry)                       | 10x1=10    |
| 2) Reference to Context (One from Prose out of two and<br>one from Poetry out of two) | 2x5=10     |
| 3) Essay type question on Prose (One out of two)                                      | 1x10=10    |
| 4) Essay type question on Poetry (One out of two)                                     | 1x10=10    |
| 5) Short Notes (One from Prose out of two and<br>one from Poetry out of two)          | 2x5=10     |
| A) Synonyms   | 5x1=05     |
| B) Antonyms   | 5x1=05     |
| <br>B) farming Wh- question   | <br>5x1=05 |
| <br>7) A) short speeches  | <br>1x5=05 |
| B) preparing and advertisement  | 1x5=05     |
| C) Resume Writing / CV  | 1x5=05     |

**Semester II**  
**Course code: 18SS202TA**  
**Course: Additional English**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Internal Assessment:20**

**I. Text: The Cutting Edge: Science & Scientists**

(Ed. Colin Swatridge (Macmillan)

Only the following biographical sketches are to be taught.

1. Rene Descartes (1596-1650)
2. Antoine Lavoisier (1743-94)
3. Ivan Pavlov (1849-1926)
4. Sigmund Freud (1856-1939)
5. Werner Heisenberg (1901-1976)

**Grammar and Composition**

- 1) Relative Clauses
- 2) Conditionals and 'wish'
- 3) Use of words ad two different forms of speech
- 4) Report writing (functions, seminars, excursion, tours, accident, earthquake, flood, etc)

**Pattern of Question paper**

(80arks paper of three hours and 20 Marks for I.A)

- |   |                  |
|---|------------------|
| 1) Objective type questions<br>(5 from Prose and 5 from Poetry)             | 10x1=10          |
| 2) Comprehension questions on the biographical sketches<br>(One out of two) | 5x2 =10          |
| 3) Essay type question on biographical sketches<br>(One out of two)         | 1x10=10          |
| 4) Essay type question on biographical sketches<br>(One out of two)         | 1x10=10          |
| 5) Short Notes on the biographical sketches<br>(One out of four)            | 2x5=10           |
| 6) A) Relative Clauses<br>B) Conditional and 'wish'                         | 5x1=05<br>5x1=05 |
| 7) Use of words ad two different forms of speech                            | 5x1=05           |
| 8) Report Writing   | 1x5=05           |

## Semester II

### Course code: 18SS202TB Course: Basic – Kannada

ಸಾಹಿತ್ಯ ಕೌಮುಡಿ - 2  
ಬಿ.ಎಸ್. ಸಿ. ಎರಡನೆಯ ಸೆಮಿಸ್ಟರ್

Teaching Hours: 50 Hours  
Teaching Hours per week – 05 Hours

Max. Marks: 80  
Internal Assessment:20

ಅನುಬಂಧ - 3  
ಪದ್ಯ ಭಾಗ

1. ಕಾವ್ಯ ಪ್ರಯೋಗ ಪರಿಣತಮತಿಗಳ್ - ಶ್ರೀವಿಜಯ
2. ವಚನಗಳು - ಬಸವಣ್ಣ ಮತ್ತು ಅಕ್ಕಮಹಾದೇವಿ
3. ಭೇದದಲಿ ಹೊಕ್ಕರಿದನೋ ಮಧುಸೂದನ - ಕುಮಾರಸ್ವಾಮಿ
4. ಬ್ಲೇನ್ ಹೀಂ ಕದನ - ಬಿ ಎಂ ಶ್ರೀ
5. ಕುರುಡು ಕಂಚಾಟಾ - ದ. ರಾ. ಬೇಂದ್ರೆ
6. ನೀವಲ್ಲವೆ? - ಕೆ. ಎಸ್, ನರಸಿಂಸ್ವಾಮಿ
7. ನನ್ನ ಹಣತೆ - ಜಿ. ಎಸ್. ಶಿವರುದ್ರಪ್ಪ
8. ಯಾತಕವ್ವಾ ಹುಬ್ಬಳ್ಳಿ-ಧಾರವಾಡ - ಬೆಟಗೇರಿ ಕೃಷ್ಣಶರ್ಮ
9. ಕೋರಿಕೆ - ಈಶ್ವರ ಸಣಕಲ್ಲ
10. ಸಂಕ್ರಾಂತಿ - ಶ್ರೀರಾಮ ಇಟ್ಟಣ್ಣವರ

ಗದ್ಯ ಭಾಗ

11. ಧನ್ವಂತರಿಯ ಚಿಕಿತ್ಸೆ - ಕುವೆಂಪು
12. ಸಂಸ್ಕೃತಿ ಮತ್ತು ಸಾಹಿತ್ಯ - ಎ. ಎನ್. ಮುರ್ತಿರಾವ್
13. ಸಿ. ವಿ. ರಾಮನ್ - ಜಿ. ಆರ್. ಲಕ್ಷ್ಮಣರಾವ
14. ಫ್ರೆಡ್‌ಹಾಯ್ಲ್: ಅಪ್ರತಿಮ ಖಭೌತ ವಿಜ್ಞಾನಿ - ಡಾ. ಶಂಕರ ಆರ್. ಕಂಡಗಲ್
15. ಪ್ರಿಯದರ್ಶಿ ಅಶೋಕ - ಮಾಸ್ತಿ ವೆಂಕಟೇಶ ಅಯ್ಯಂಗಾರ
16. ದೇವಿ - ಶಾಂತಾದೇವಿ ಕಣವಿ

**Semester II**  
**Course code: 18SS202TC**  
**Course: Hindi Basic**

**Teaching hours per week: 5 Hours**  
**Examination : 3 Hours**

**Total Marks: 100 Marks**  
**Theory: 80 Marks**  
**Internal assessment: 20 Marks**

Text books:

1. काव्य सरगम - सं. संतोष कुमार चतुर्वेदी, लोकभारती प्रकाशन, इलाहाबाद-1  
(अध्ययन के लिये मैथिली शरण गुप्त से अशोक वाजपेयी तक की कविताएँ)
2. सामान्य निबंध
3. अनुवाद

Disruption of Marks :

1. काव्य सरगम	- 55 अंक	
2. सामान्य निबंध	- 15 अंक	
3. अनुवाद	- 10 अंक	
A. Objective type questions (10 out of 14)		10 Marks
B. Annotations from text book (3 out of 5)		15 Marks
C. Essay type of questions form text book (2 out of 4)		20 Marks
D. Short notes from text book (2 out of 4)		10 Marks
E. General essay(सामान्य निबंध) (1 out of 3)		15 Marks
F. Translation (अनुवाद )(Kannada/ English in to Hindi)		10 Marks
	Theory total	80 Marks
	Internal Assessment	20 Marks
	Total	100 Marks

Reference Books:

1. छायावाद - डॉ. नामवर सिंह
2. प्रगतीवाद - डॉ. शिवकुमार मिश्र
3. अज्ञेय और प्रयोगवाद - शैल सिन्हा
4. प्रेमचंद के श्रेष्ठ निबंध - डॉ. सत्यप्रकाश मिश्र
5. अनुवाद विज्ञान - डॉ. भोलानाथ तिवारी
6. अनुवाद कला - डॉ. विश्वनाथ अय्यर
7. निबंधो का खजाना - आरती अग्निहोत्री
8. श्रेष्ठ हिंदी निबंध - ब्रज किशोर प्रसाद सिंह



**Semester II**  
**Course code: 18SS203T**

**Course: Chemistry - II**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Internal Assessment:20**

**Inorganic Chemistry**

**Unit-I**

**Chemical bonding – II**

**10 Hours**

**Hybridization:** Salient features of hybridization, geometry of molecules with respect to  $sp$ ,  $sp^2$ ,  $sp^3$ ,  $dsp^3$ ,  $sp^3d^2$  hybridization.

VSEPR theory – Postulates, regular and irregular geometry ( $BF_3$ ,  $CH_4$ ,  $NH_3$  and  $H_2O$ ). Molecular orbital theory: L C A O c o n c e p t, elementary account with respect to  $H_2$ ,  $He_2$ ,  $Li_2$ ,  $B_2$ ,  $N_2$ ,  $O_2$ ,  $O_2^+$ ,  $O_2^-$  and  $O_2^{2-}$  molecules, calculation of bond order, stability, magnetic property etc.

Hydrogen bonding: Types, significance of hydrogen bonding properties explained by hydrogen bonding like a) State of  $H_2O$  and  $H_2S$  b) Melting and Boiling point c) Ice has less density than water

**Unit-II**

**Organic reagents in inorganic analysis**

**2 Hours**

Sensitivity, selectivity and specificity, advantages of organic reagents over inorganic reagents – Dimethyl glyoxime, 8-hydroxy questions (oxime)

**Unit-III**

**Principles of volumetric analysis**

**4 Hours**

Concentration terms, normality, molarity, mole fraction, percentage, primary standards solution, titration-acid-base, precipitation, iodometric redox and complex metric (with reference to EDTA) titrations, choice of indicators in the above titrations.

# ORGANIC CHEMISTRY

## Unit-I

### Purification of organic compounds

6 Hours

**Methods of purification of solids:** Crystallization, fractional crystallization and sublimation.

**Methods of purification of liquids:** Distillation, fractional distillation, distillation under reduced pressure, steam distillation.

**Chromatography:** General principles, types, brief outline of thin layer chromatography, paper chromatography and column chromatography solvent extraction.

Criteria of purity: Melting point and boiling point.

## Unit-II

### Spectroscopy

5 Hours

Introduction, Electromagnetic spectrum.

**UV spectroscopy:** Principle, types of transitions, chromophores, concept of auxochromes and their effect on Wave length max. Bathochromic shift, hypsochromic shift, hypochromic and hyperchromic shift.

Woodward and Fieser rules and illustration of calculation of  $\lambda_{\text{Emax}}$  taking myrcene and B-phelladrene and examples.

### Aromatic Hydrocarbons

5 Hours

Resonance in benzene, Aromaticity – Huckel's  $4n+2$  rule with respect to benzene, furan, pyridine and (10) – annulene.

Mechanism of electrophilic aromatic substitution – halogenations, nitration, sulphonation and Friedel-craft's reaction (evidences for two step mechanism and evidences for formation of electrophile)

## PHYSICAL CHEMISTRY

### First law to thermodynamics

5 Hours

Statement, isothermal and adiabatic process, expression for work done in the reversible expansion of adiabatic expansion of an ideal gas ( $PV^{\gamma} = \text{Constant}$ )  
Joule- Thomson effect, Joule- Thomson experiment, derivation of Joule Thomson coefficient for an ideal gas and inversion temperature.

**Thermochemistry:** Kirchoff's equation, bond energies and bond dissociation energies, calculation of bond energy and bond dissociation energies by taking simple molecules. Numerical problems.

### Liquid State: Physical properties of Liquids

5 Hours

Surface Tension: Effect of temperature on surface tension Determination of surface tension of liquid by drop numbers method, parachor and its application.

Viscosity: Effect to temperature on viscosity, determination of relative, absolute and intrinsic viscosity of liquids by ostwald's viscometer method.

Refractive index of liquid: specific and molar refractions, determination of refractive index of liquid by Abbe's refractometer.

### Colloids

4 Hours

Emulsions: Types of emulsions, Preparation and emulsifiers.

Gels: Classification, preparation and properties, general application of colloids.

### Solids

4 Hours

Space lattice, unit cell, crystal systems, calculation of particles per unit cell, laws of crystallography, x-ray diffraction of crystals, derivation of Bragg's equation, Miller indices, determination of structure of NaCl by rotating single crystal method.

### Reference books for Inorganic chemistry

- |   |                               |
|---|-------------------------------|
| 1. Advanced Inorganic chemistry                 | Cotton and Wilikinson         |
| 2. Concise Inorganic chemistry                  | J. D. Lee                     |
| 3. Inorganic chemistry                          | Huhee and Keiter              |
| 4. Inorganic chemistry                          | Shriver and Atkin             |
| 5. Principles of Inorganic chemistry            | Puri and Sharma               |
| 6. Inorganic chemistry                          | A. G. Sharpe                  |
| 7. Essential chemistry                          | R. Chand                      |
| 8. University chemistry                         | Mahan and Myers               |
| 9. Modern Inorganic chemistry                   | Madan                         |
| 10. Modern Inorganic chemistry                  | Satya prakash                 |
| 11. Inorganic chemistry for Under<br>Graduates  | R. Gopalan                    |
| 12. Collage Practical chemistry                 | Ahluwalia, Dhingra and Gulati |
| 13. Instrumental method of<br>Chemical analysis | Willard, Martin and Dean      |

### Books recommended for Organic chemistry

- |   |                                  |
|---|----------------------------------|
| 1. Organic chemistry                          | I.L. Finar Vol I and II          |
| 2. Organic chemistry                          | Morrison & Boyd                  |
| 3. Organic chemistry                          | F.A. carry and R. J. Sundberg    |
| 4. Reaction Mechanism in<br>Organic chemistry | Singh and Mukherji               |
| 5. Text book of Organic chemistry             | Bahl and Bahl                    |
| 6. Text book of Organic chemistry             | C. N. Pillai, Universities Press |

### Books recommended for Physical chemistry:

- |                             |                       |
|-----------------------------|-----------------------|
| 1. Physical chemistry       | Puri and Sharma       |
| 2. Physical chemistry       | P.L. Soni             |
| 3. Physical chemistry       | Roberty A Alberty     |
| 4. Physical chemistry       | M.V. Sangaranarayanan |
| 5. Physical chemistry       | Atkins                |
| 6. Physical chemistry Bahl, | Madan and Tuli        |

**Semester II**  
**Course code: 18SS204P**  
**Course: Chemistry Practicals**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Internal Assessment:20**

A. **Organic spotting:** Identification of following organic compounds and preparation of their derivatives and confirmation by melting points:

1. Oxalic Acid
2. Phenol
3. Naphthalene
4. Urea
5. Benzaldehyde
6. 1-Naphthol
7. Phthalic acid
8. 2-Naphthol
9. Aniline
10. Acetanilide
11. Benzamide
12. Benzoic Acid
13. Salicylic Acid
14. Acetone
15. Ethyl benzoate

B. Identification by

1. Element determination
2. Solubility
3. Functional group
4. Physical constant
5. Preparation of derivatives and finding melting points

**Semester II**  
**Course code: 18SS205T**  
**Course: Sugar Science & Technology- I**  
**Evaporator**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Internal Assessment:20**

**Unit – I** **10 Hours**

**Evaporator basic:** Concept of live steam/exhaust steam/vapour, Heat transfer & condensation, Basic concept of evaporator body, Working & construction of Robert body, Evaporator body – Major accessories, steam distribution to calandria, juice distribution, Study of different types of evaporators, Rising & falling film evaporator,

**Unit – II** **10 Hours**

**Evaporator operation:** single effect Vs multiple effect evaporator, vapour cell and pre evaporators, Rileuxe principles, Evaporation under vacuum, vacuum creation, Types of condensers – Barometric/multijet/single entry/counter current /co –current; removal of condensate and non condensable gases, Online Brix measuring devices

**Unit – III** **10 Hours**

**Vapor Bleeding System:** Use of steam table, Vapour bleeding calculations for Quadruple & quintuple effect, Dessin's formulas, Specific evaporation coefficient calculation & importance, estimation of evaporation rate based on brix data, BPR and its calculations

**Unit – IV** **10 Hours**

**Evaporator performance:** Calculations for HS / steam/ vapour/ juice, Factor affecting evaporator performance; operational problems, Comparative study of Quadruple Vs Quintuple effects. Modern evaporator configuration

**Unit – V** **10 Hours**

**Evaporator operation & Cleaning:** Testing of evaporator bodies after maintenance, Procedure for starting of evaporator body, operating procedures, Liquidation procedure, Chemical cleaning of evaporator – Soda boiling & descaling procedures followed on general cleaning day. chemicals used/ concentration/process; Mechanical descaling of evaporator tubes

**Reference Books:**

1. Principles of sugar technology, Honig Pieter, Elsevier publishing company Amsterdam
2. Hand book of Cane Sugar Engineering, Hugot e., Elsevier Science publishing Co.Inc. New York.
3. Sugar Technology for Administrators in the Indian sugar factories; Manohar Rao,P.J.; Jayajirao Shinde Editor Bharatiya Sugar Jeevan Darshan Laxmi Rd. Pune.
4. Training manual for sugar mills.; Mangal Singh; Somaiya publications Pvt.Ltd. Mumbai.
5. Efficient Management of sugar factories, Mangal Singh, Somaiya publication Pvt.Ltd. Bombay
6. Cane Sugar Manufacture in India, Kulkarni, D.P., The Sugar Technologists Association of India N.Delhi.
7. System of Technical control for cane sugar factories in India; Varma, N.C. The Sugar Technologists Association of India N.Delhi.
8. Hand book of Cane Sugar Technology, Mathur R.B.L., Oxford DBH publishing Co.N.Delhi.
9. Manufacture and Refining of Raw cane sugar; Baikow, V.E., Elsevier publishing Co. Am Sterdam London New-york.
10. Unit operations in cane sugar production; Payne, J.N.; Elsevier pub Co. Amsterdam.
11. Machinery and Equipment of the cane sugar factory, Tromp, L.A., Norman Rodger, 7 & 8 Idol Lane.
12. Sugar Science and Technology, Birch, G.G. Parker, K.J. Applied science publishers Ltd. London.
13. The principles of cane sugar manufacture, Davies, J.G., Norman Rodger; London
14. Technology for sugar Refinery Workers, Oliver Lyle, Chapman & Hall Ltd. London
15. Introduction to cane Sugar Technology, Jenkins, Q.H., Elsevier scientific publishing company Amsterdam.
16. Industrial utilization of sugar cane and its Co-products , Manohar rao, P.J. , ISPCK publishers & Distibutors N.Delhi

**Course code: 18SS206P**  
**Course: Sugar Science & Technology - I: Practicals -I**

**Total number of hours per week - 04**

**Internal Assessment = 10 Marks**

**Total No. of Hours per semester-52**

**Practical's: 40 Marks**

1. Analysis of RS % & RS per 100 brix in clear juice & syrup
2. Analysis of clear juice & syrup for ICUMSA colour
3. Estimation of % transmittance of clear juice
4. Analysis of quick lime – Available CaO, Unburnt %
5. Analysis of Milk of lime for slakability test
6. Analysis of condensate for – pH, TDS, Sugar test, Conductivity, COD
7. Evaporator scale analysis for various contents
8. Analytical of intermediate products of boiling house – Clear Juice /  
Syrup/ Masecuite / Molasses for RS% / Colour/
9. Turbidity in clear juice and syrup by ICUMSA method.
10. Analysis of conductivity ash % of clear juice /syrup/ molasses
11. Estimation of RS/Ash ratio of clear juice / syrup / molasses
12. Analysis of Carbonated and sulphated ash % - Final molasses.



**Semester II**  
**Course code: 18SS207T**  
**Course: Sugar Science & Technology- II**  
**Sugar Factory Chemical Control**

**Teaching Hours: 50 Hours**

**Max. Marks: 80**

**Teaching Hours per week – 05 Hours**

**Unit – I**

**10 Hours**

**General:** Weighment system & estimation of % cane figures – MJ/imbibition/ bagasse, Calculation for estimation of Pol in bagasse, Pol in MJ, Pol % cane

**Unit – II**

**10 Hours**

**Milling control:** Fundamental equations for milling control, Mill extraction, fiber % cane, fiber % bagasse, Estimation of RME ,Deer & RME (Mittal), Imbibition % cane, Imbibition % fibre, dilution indicator ,

**Unit – III**

**10 Hours**

**Sugar balance and its losses** – Estimation of sugar losses –bagasse/filter cake/ molasses/ recovery/ unknown, Estimation of Pol balance, RS balance and total losses.

**Unit – IV**

**10 Hours**

Available sugar / available molasses, General stock taking, Reduced boiling house control, Boiling house recovery, Reduced BHR, Purity drop, % exhaustion, Masecuite % cane, Steam % cane

**Unit – V**

**10 Hours**

**Overall:** Preparation of daily manufacturing report(DMR),TR(8)C,RT(7)C.

**Reference Books:**

1. Training manual for sugar mills.; Mangal Singh; Somaiya publications Pvt.Ltd. Mumbai.
2. Efficient Management of sugar factories, Mangal Singh, Somaiya publication Pvt.Ltd. Bombay
3. Cane Sugar Manufacture in India, Kulkarni, D.P., The Sugar Technologists Association of India N.Delhi.
4. System of Technical control for cane sugar factories in India; Varma, N.C. The Sugar Technologists Association of India N.Delhi.

**Course code: 18SS208P**  
**Course: Sugar Technology – II: Practicals - II**

**Total number of hours per week - 04**  
**Total No. of Hours per semester-52**

**Internal Assessment = 10 Marks**  
**Practical's: 40 Marks**

1. Analysis of various chemicals used in sugar industry
  - a. Lime
  - b. Phosphoric acid
  - c. Mill sanitation chemicals
  - d. Antiscalents
  - e. Sulphur
  - f. Caustic Soda
  - g. Hydrogen peroxide
  
2. Analysis of clear juice /syrup for estimation of pol % , Sucrose % by double polarization, TRS %.

**Group – III**  
**II semester**  
**Course code: 18SS209T**  
**Course: Environmental Studies and Human Rights**  
Teaching hours: 4 Hours per week  
**Section A: Environmental Studies**

**Max. Marks: 80**

**Unit – 1: NATURE OF ENVIRONMENTAL STUDIES**

Definition, scope, importance and awareness  
Basics of our solar system  
Earth is called blue planet  
Public awareness using an environment calendar of activities

**Unit – 2: NATURAL RESOURCES**

Meaning of natural resources  
Types of natural resources  
Protection  
Conservation methods

**Unit – 3: ECOSYSTEM**

Introduction  
Types of components of ecosystem  
Structure and function of following ecosystem  
a. Forest ecosystem  
b. Grassland ecosystem  
c. Desert ecosystem  
d. Aquatic ecosystem

**Unit - 4: BIODIVERSITY AND ITS CONSERVATION**

Definition  
Levels of biodiversity  
Biodiversity at global and national level  
Western Ghat as biodiversity, hotspot of biodiversity  
Treats of biodiversity  
Red data book

**Unit – 5: ENVIRONMENTAL ISSUES**

Air pollution and its control  
Water pollution and its control  
Noise pollution and its control  
Thermal pollution and its control  
Green house effect and global warming

Ozone depletion in the stratosphere  
Acid rain, Nuclear winter  
Rules to regulate environmental pollution

**Unit – 6: ENVIRONMENTAL PROTECTION ACT**

Power of central government to take measure to protect and improve environment – 1986 act.

Wildlife protection act – 1972  
Forest conservation act – 1980  
Authorities who sanction grants for conservation of environment

**Unit – 7: HUMAN POPULATION AND THE ENVIRONMENT**

Population explosion, family welfare programme  
Environment and human health  
Value education – HIV/ AIDS  
Woman and child welfare

**FIELD WORK**

Visit to nearby industrial area to check the impact on environment.

## **Section B: Human Rights**

### **Chapter -I Concept and Development of Human Rights 07 Hours**

- a) Meaning Scope and Development of Human Rights
- b) United Nations and Human Rights – OHCHR ( Office of the United Nations High Commissioner for Human Rights)
- c) Universal Declaration of Human Rights. UDHR 1948, International Covenant on Civil and Political rights. ICCPR 1966 and International Covenant on Economic social and Cultural Rights. (ICESCR) 1966

### **Chapter -II Human Rights in India 07 Hours**

- a) Protection of Human Rights Act, 1993
- b) Third Generation Human Rights (Group Rights) and Fourth Generation Human Rights. (Right to Development and Environmental Rights.)
- c) Judicial Activism and Human Rights.
- d) Convention on the Elimination of All forms of Discrimination against Women.
- e) Convention on the Rights of the Child

### **Chapter -III Enforcement of Human Rights 06 Hours**

- a) National Human Rights Commission, State Human Rights Commission powers and functions.
- b) Media and NGO's
- c) Human Rights Education, Terrorism and Violation of Human Rights.
- d) States Role in Preservation and Protection of Human Rights.

#### **REFERENCES:**

1. K.P. Saksena "Human Rights" 1996 New Delhi.
2. Dr. S. Mangalmurthy a "Human Rights " Chetan Book House Mysore 2004.
3. Krishnamurthy S. "Human Rights and Police Administration" B. R. Publishing Corporation, Bangalore.
4. B.P. Singh "Human Rights in India" Deep & Deep Publication New Delhi.
5. D.D. Basu, "Human Rights in Constitutional Law" prentice hall.

6. S.O. Agarwal, “Human Rights” Central law Agency, Allahabad.
7. V.A. Anand “Human Rights” Allahabad Law Agency, Faridabad.
8. Dr. M. Jayakar Bhandari, Vasantkumar, Raghava Naik “Environmental Studies and Human Rights”
9. Gokulesh Sharma, Human Rights.
10. Arjun Dev, “Human Rights” Publication 1996
11. Human Rights- A Source Book

**Note: The Final Examination is on Multiple Choice Base**