

Pithapur Rajah's Government College (Autonomous) Kakinada

Affiliated to Adikavi Nannaya University
NAAC Accredited with "A" Grade (3.17 CGPA)



DEPARTMENT OF CHEMISTRY

B. Sc. Chemistry Syllabus Under CBCS

**Board of Studies
2020 – 21**

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P. R. Govt. College (A), Kakinada
Recommended Composition of the Board of Studies of Chemistry
And it's Functions of an Autonomous College
June-2020-21

I Composition

1. Head of the Department concerned (Chairman):

Dr. T. Vara Prasad, M.Sc., M.Ed., M.Phil., Ph.D.

2. The entire faculty of each specialization.

1. Dr. D.Rama Rao, M.Sc., B. Ed., M.Phil., Ph.D.
2. Sri V.Mallikarjuna Sarma, MSc, M.Phil, NET
3. Dr.V.Narayana Rao M.Sc, Ph.D
4. Sri U.Sai Krishna M.Sc, NET
5. Sri. K Baburao M. Sc., M.Phil.
6. Smt. S Swarna Latha M.Sc.

3. ONE experts in the subject from outside the college to be nominated by the Academic Council

- a. Dr. K. Jhansi Lakshmi, Principal, Ideal Degree College, Kakinada

4. One expert to be nominated by the Vice-Chancellor from a panel of six recommended by The College Principal

- a. Dr. K. Deepthi, Adikavi Nannaya University, Rajahmundry

5. One representative from industry/ Corporate Sector/ allied area relating to Placement.

- a. Dr. Ch. V. N. S. Vara Prasad, Managing partner, DAS Pharma Ltd, Kakinada

6. One postgraduate meritorious alumnus to be nominated by the Principal.

The chairman, Board of Studies, may with the approval of the Principal of the College, Co-opt.

- a. Dr.K.Raghavachari M.Sc., M.Phil, Ph.D.

Term

The term of the nominated members shall be two years.

II. Meeting

The Principal of the College shall draw the schedule for meeting of the Board of Studies for different Departments. The meeting may be scheduled as and when necessary but at least once in a year.

III. Functions

The Board of Studies of a Department in the College shall:

- a) Prepare syllabus and various courses keeping in view the objectives of the College interest of the stakeholders and national requirement for consideration and approval of the Academic Council.
- b) Suggest methodologies for innovative teaching and evaluation techniques.
- c) Suggest panel of names to the Academic Council for appointment of examiners.
- d) Coordinate research, Teaching, Extension and other academic activities in the Department/College.

P.R.GOV.T.COLLEGE (A), KAKINADA

DEPARTMENT OF CHEMISTRY,

Minutes of board of studies (BOS) meeting 2020-21 on 20. 06. 2020 at 10.30 am

Agenda

- Online BOS.
- Approve Syllabus for III, IV, V and VI Semesters, Same Syllabus Will be Followed Intoto I and II Semester (I Year UG) After getting the APSHE Guidelines.
- Grant of Extra credits for Certain activities.
- Syllabus, Model Question Papers and Model Blue Prints for III, IV, V and VI Semesters.
- Internal and External Exams to be Assessed in the Ratio for III, IV, V and VI Semesters.
- Department action plan for 2020-21.
- Any Other Proposal with the Permission of the Chairman.

Resolutions:

The board of studies meeting was held online through Video Conference by Google Meet by the Chemistry Department on 20. 06. 2020 at 10.30 am under the chairmanship of Dr. T.Vara Prasad, in charge of the department. The principal, Dr. Chappidi Krishna, Dr.K.Deepthi, University Nominee., Dr. K. Jhansi Lakshmi, Head in Chemistry and Principal, Ideal College, Kakinada and all members of the faculty of chemistry and student representatives attended the meeting. The following agenda items are discussed and resolutions are made.

1. It is resolved to continue choice-based credit system in the chemistry combination programmes as per the directions of the CCE, Hyderabad to the first year and second year and second year and final year students w.e.f. 2019-20.
2. Resolved to follow 60%-40% external and internal w.e.f. 2017-2018 admitted batch and it continued in second and third year.
3. It is resolved to allot 50 marks project work for final year students in chemistry preferably in cluster paper C - 3 practicals, w.e.f 2019-20 in accordance with APSCHE.
4. It is resolved to conduct departmental activities such as OZONE DAY, CHEM FEST, CHEMISTRY DAY and SCIENCE DAY.
5. It is resolved to offer Subject Electives and clusters A, B and C in the V and VI Semester Respectively as per the guidelines of AKNU
6. It is resolved to implement the recommended pedagogy for the first semester 2020-21
7. Resolved to conduct practical examinations semester wise.
8. It is resolved to organize guest lectures by eminent professors.
9. Resolved to implement pass minimum for internal assessment for CBSE pattern students as the pattern is learner oriented.
10. It is resolved to maintain status quo for same question paper pattern in I, II, III years.
11. It is resolved to encourage students enroll in MOOCS Online Programmes and give extra credits for students after successful completion of the courses.
12. It is resolved that if there is any change in the syllabus in the first year as prescribed by APSCHE, Vijayawada in this academic year, the same syllabus will be adopted as such.

11. Resolved to submit proposals to conduct a faculty development program in instrumentation techniques/ advanced topics with the assistance of the industry representatives and university representatives.
12. Resolved to assist the orphan children of below two years age being taken by department of women and child welfare as an extension activity with the funds contributed by the faculty members of the department.
13. Resolved to change the syllabus components in semester **I** to Semester **II** and vice versa. Sly semester **III** to **IV** and vice versa on par with the affiliating university.
14. It is proposed to give 33.3% weightage competitive exam questions pertaining to the syllabus prescribed
 - 20. Resolved to reduce the intake of B.Sc. MPC TM students from 60 to 30 w.e.f from 2019-20.
 - 21. Resolved to increase the intake of B.Sc. MPC EM students from 30 to 60 w.e.f. from 2019-20
 - Resolved to take girls students also for admissions into B.Sc. MCPC w.e.f. from 2019-20.

The Following Paper Setter Are Recommended.

1. Dr. G. Nagarjuna, SRR CVR GDC, Vijayawada.
2. Dr. B. Mallikarjun, Govt. College (A), Rajamahendravaram.
3. Dr. G. Venkatarao, GDC, Vijayawada
4. Shri B. Venkatarao, GDC, Ramachandrapuram
5. Dr. Ramachandra Rao, Y.N.College,Narasapuram
6. Dr. T. Narasimha Murthy, GDC, Mandapeta.
7. Smt. G. Tejaswini, SVD GDC (W), Nidadavole.
8. Dr. M. Trinadh, GDC (A), Rajahmundry.
9. Sri. M. Sudhakara Rao, ASNM Govt. College (A), Palakol.
- 10.Sri. V. Satyanarayana, Govt. Arts College, Rajahmundry.
- 11.Sri. V Rambabu, GDC, Perumallapuram
- 12.Sri V. Sanjeev Kumar, GDC, Mandapeta.
- 13.Dr. K. Ravindra Babu, Govt.Arts College, Rajahmundry.
14. Sri T. V. V. Satyanarayana, GDC, Ramachandrapuram
15. Sri V. Sridhar, GDC, Nidadavol

Signatures of the members who attended the
Board of studies in Chemistry on 20. 06. 2020 at 10.00am

Mode of Conduct of meeting: Online video conference through Google Meet

- | | |
|----------------------------------|---|
| 1. Dr. T. Vara Prasad | Chairman & Lecturer in Charge |
| 2. Dr. K. Deepthi, | University representative
Adikavi Nannaya University
Rajamahendravaram. |
| 3. Dr. Ch. V. N. S. Vara Prasad, | Managing partner,
DAS Pharma Ltd, Kakinada |
| 4. Dr. K. Jhansi Lakshmi | Subject expert
Lecturer in Chemistry,
Ideal Degree College, Kakinada |
| 5. Dr. K. Raghavachari | Retired Head of the Chemistry Department |
| 6. Sri D. Rama Rao | Member |
| 7. Sri V. Mallikarjuna Sarma | Member |
| 8. Dr.V.Narayana Rao | Member |
| 9. Sri U.Sai Krishna | Member |
| 10. Sri K. Babu Rao | Member |
| 11. Smt. S. Swarna Latha | Member |
| 12. M.S.T.B.V.Ratnam | Member |
| 13. G. Rama Lakshmi | Member |
| 14. G. Sandhya | Member |
| 15. P. K. M. S. Devi | Member |
| 16. M. Siva Sankar | Member |
| 17. T. S. S. Lakshmi | Member |
| 18. T. Pavan Kumar | Member |
| 19. S. Vijaya Lakshmi | Member |
| 20. B. S. V. A. L. Jyothi Sree | Member |
| 21. K. N. S. Swami | Member |

- | | |
|---|----------------|
| 22. P. Sai Kalyani | Member |
| 23. B. Vijaya Durga, II MPC TM
(Regd. No. 2190214) | Student member |
| 24. K. Pushpa Kumari, II MPC TM
(Regd. No. 2190229) | Student Member |
| 25. Surimilli Kishore Kumar, II MCCS
(Regd. No. 2191320) | Student Member |
| 26. Akula Mounika, II MPC EM
(Regd. No. 2190103) | Student Member |
| 27. Bandaru Srinivasu, II MPC EM
(Regd. No. 2190104) | Student Member |

Signatures of the members who attended the

Board of studies in Chemistry on 20. 06. 2020 at 10.00am

Mode of Conduct of meeting: Online video conference through Google Meet

NAME	SIGNATURE	CONTACT NO.
Dr. T. Vara Prasad		
Dr. K. Deepthi,		
Dr.Ch. V. N. S. Vara Prasad		
Dr. K. Jhansi Lakshmi		
Dr. K. Raghavachari		
Dr. D. Rama Rao		
Sri V. Mallikarjuna Sarma		
Dr.V. Narayana Rao		
Sri U.Sai Krishna		

On line Video Conference Through Google Meet

Signatures of the members who attended the

Board of studies in Chemistry on 20-6-20 at 10.00am

1. Dr. T. Vara Prasad
2. Dr. K. Deepti,
3. Dr. Ch. V. N. S. Vara Prasad,
4. Dr. K. Jhansi Lakshmi
5. Dr. K. Raghavachari
6. Sri D. Rama Rao
7. Sri V. Mallikarjuna Sarma
8. Dr. V. Narayana Rao
9. Sri U. Sai Krishna
10. Dr. D. S. V. N. M. Rama Murthy
11. Sri K. Babu Rao
12. Smt. S. Swarna Latha
13. Miss. M. S. T. B. V. Ratnam
14. Miss. G. Rama Lakshmi.
15. Mr. B. V. Siva Kumar
16. Miss. S. G. Kalyani
17. G. Sandhya
18. P. K. M. S. Devi
19. J. Aruna Kalyani (MPC EM)
20. Sankar Rao (MPC EM)
21. A. Sravani Devi (MBC)

Chairman & Lecturer in Charge

University representative

Adikavi Nannaya University

Rajamahendravaram

Managing partner

DAS Pharma Ltd, Kakinada

Subject expert

Lecturer in Chemistry,

Ideal Degree College, Kakinada

Retired Head of the Chemistry Department

Member

Member

Member

Member

Member

Member

Member

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Student Member

Student Member

Student Member

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ACTION PLAN BOS MEETING -CHEMISTRY HELD ON 20. 06. 2020.

1. Department activities for 2020-21 academic year. Annexure I

Month	Activity proposed	Faculty member in charge
July-20	Departmental staff meeting to review results and class work allotment	Dr.T. Vara Prasad
July - 20	Preparation of curricular plans, time-tables etc.,	All Faculty Members
Aug - 20	Remedial coaching classes for II & III year supplementary exams	All Faculty Members
	Bridge classes for I year students	All Faculty Members
Aug-20	Student awareness programmes on ragging & eve teasing - consequences , self- discipline, career guidance, higher education opportunities etc.,	All Faculty Members
August-20	Conference on prospects in pharmaceutical Industries	Dr.T. Vara Prasad
	Study tour / Field trips	
Sept-20	Ozone day	All Faculty Members
Oct-20	MOLE Day	Dr. D.Ramarao
	Faculty development program	V.Mallikarjuna Sarma
Nov-20	National Education Day – Outreach Program to nearby school	
Dec-20	World AIDS Day	All Faculty Members
	Chemistry day & Chem fest	V.Mallikarjuna Sarma
Jan-21	10 days coaching for PG entrance examinations in chemistry Study tour / Field trips	V.Mallikarjuna Sarma
Feb-21	NATIONAL SCIENCE DAY	All Faculty Members
March-21	Consumer awareness day	Dr.T. Vara Prasad

2. Organizing National/ State level seminars/Workshops/ Conferences/ Training programs etc., with topics and other details.

(Mandatory for each Department)

- i) Staff development program
- ii) Training in the use of HPLC
- iii) Awareness on OZONE protection
- iv) National Chemistry day
- v) Chem. fest
- vi) National Science day 2021
- vii) Guest lectures
- viii) National seminar in chemistry
- ix) Training in Soil analysis
- x) Training in water analysis

3. Change of modules in the syllabus content.

Syllabus changed for first and second years as per university regulations. CBCS introduced for final year w.e.f. 2018-19.

4. Plan for utilization of funds for Autonomous/CPE/other grants available for arranging guest lectures, faculty improvement programs, study tours, equipping laboratories, reference books & other necessary teaching-learning material with ICT enabled teaching.

I. Study visits to: Rs, 50,000

1. Visakha Steel Plant, Visakhapatnam
2. Hetero Laboratories, Nakkapally
3. Dr. Reddy's Laboratories, Yanam.
4. National Institute of Hydrology, Kakinada.
5. SAR Chandra Environ Solutions, Kakinada.
6. ONGC mini refinery, Tatipaka.
7. Soil analysis laboratory, Samalkot.
8. IICT, HYD
9. Venky parenterals, Yanam

II.

- | | |
|--|-----------|
| 1. Sophisticated version UV-Visible spectrophotometer- | 5.0 lakhs |
| 2. Other equipment | 1.0 lakhs |

5. Plan for organizing subject oriented community outreach programs & allocation of necessary funds. (Mandatory for each Department)

- | | |
|--------------------------------|------------|
| i) Adoption of village | Rs. 20,000 |
| ii) Medical Awareness programs | Rs. 10,000 |

6. Instituting of new medals/incentives/prizes etc., from alumni, philanthropists, parents, faculty etc., - Strategies to be recommended

7. Introduction of new programs –PG/UG/Diploma and certificate courses.

8. Any other program that enhances the learning capacity of students and their employable & knowledge skills.

Training in the use of instruments like AAS, UV-Vis, HPLC, flame photometer, uranium analyzer, soil and water analysis projects, air quality projects.

9. Change in internal assessment exams for conducting II mid Semester by way of Project work/Assignment.

Not possible as the number of students is more. However it is proposed to give 33.3% weightage for competitive exam questions pertaining to the syllabus prescribed.

10. Proposed panel of examiners/paper setters & other experts/nominees for BOS deliberations.

Chemistry:

1. Dr. G. Nagarjuna, SRR CVR GDC, Vijayawada.
2. Dr. B. Mallikarjun, Govt. College (A), Rajamahendravaram.
3. Dr. G. Venkatarao, GDC, Vijayawada
4. Shri B. Venkatarao, GDC, Ramachandrapuram
5. Dr. Ramachandra Rao, Y.N.College,Narasapuram
6. Dr. T. Narasimha Murthy, GDC, Mandapeta.
7. Smt. G. Tejaswini, SVD GDC (W), Nidadavole.
8. Dr. M. Trinadh, GDC (A), Rajahmundry.
9. Sri. M. Sudhakara Rao, ASNM Govt. College (A), Palakol.
- 10.Sri. V. Satyanarayana, Govt. Arts College, Rajahmundry.
- 11.Sri. V Rambabu, GDC, Perumallapuram
- 12.Sri V. Sanjeev Kumar, GDC, Mandapeta.
- 13.Dr. K. Ravindra Babu, Govt.Arts College, Rajahmundry.
14. Sri T. V. V. Satyanarayana, GDC, Ramachandrapuram
15. Sri V. Sridhar, GDC, Nidadavol

Structure of Chemistry Syllabus under CBCS

YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS
I	I	I	Inorganic and Organic Chemistry	100	03
			Practical – I	50	02
	II	II	Physical and General Chemistry	100	03
			Practical – II	50	02
II	III	III	Inorganic and organic Chemistry	100	03
			Practical – III	50	02
	IV	IV	Spectroscopy and Physical Chemistry	100	03
			Practical – IV	50	02
III	V	V	Inorganic ,Organic and Physical Chemistry	100	03
			Practical – V	50	02
		VI	Inorganic ,Organic and Physical Chemistry	100	03
			Practical – VI	50	02
		* Any one Paper from VII A, B and C	VII (A)* Elective	100	03
			Practical - VII A	50	02
			VII (B)* Elective	100	03
			Practical - VII B	50	02
			VII (C)* Elective	100	03
			Practical - VII C	50	02
		** Any one cluster from VIII, A, B and C	VIII (A)** Cluster Electives - I : VIII-A-1 VIII-A-2 VIII-A-3 Practical Practical Project	100 100 100 50 50 50	03 03 03 02 02 02
			VIII (B)** Cluster Electives - II :: VIII-B-1 VIII- B-2 VIII-B-3 Practical Practical Project	100 100 100 50 50 50	03 03 03 02 02 02
			VIII (C)** Cluster Electives - III :: VIII-C-1 VIII-C-2 VIII-C-3 Practical Practical Project	100 100 100 50 50 50	03 03 03 02 02 02

Allotment of Extra credits guidelines

Sl.No.	Activity	Details of achievement	Credits
1	MOOC Course	SWAYAM / NPTEL / CEC etc., (Course Completion certificate with credits should be produced for the claim of extra credits)	Total credits achieved will be considered
2	NCC	B CERTIFICATE	2
		Participation in National Camp after 'B' certificate	3
		C certificate	4
		Adventure camp/RD parade along with 'B'	5
		Failed in B certificate Examination	1
3	Sports	Intercollegiate selection	2
		South zone selection	3
		All India participation	4
		Winning medals in all India competitions	5
4	NSS	40% attendance in regular NSS activities	1
		50% attendance with Community Service	2
		Conduct of survey/ Youth exchange/RD	3
5	JKC	Enrollment and training	1
		Campus recruitment local level	2
		MNCs/reputed companies	3
6	Community service	Participation in community service by departments (outreach programmes)	2
7	Cultural activity	Winning medals at state level-2,	2
		District level-1	1
8	COP/Add on Course	Pass in Certificate Exam-1,	1
		Diploma-2	2
9	Support services	Lead India, Health club, RRC and Eco Club etc., participation in various programmes	1

OBJECTIVES

➤ **Objectives**

The students can obtain the knowledge in the following topics and come to know how chemistry is essential in daily life.

CO 1. Preparation, properties and applications of some special compounds of s and p block elements.

CO 2. Structural theory of Organic compounds.

CO 3. Preparation, properties and applications of alkenes, alkynes and cycloalkanes.

CO 4. Benzene structure and its reactivity.

CO 5. Identification of some cations and anions in the unknown salt.

➤ **By the end of II semester, each and every I degree chemistry student can obtain the knowledge in the following topics and come to know how chemistry is essential in daily life.**

CO 1. Features involved in gaseous state, liquid state and solid state and their applications.

CO 2. Importance of colloids and adsorption.

CO 3. Chemical bonding between molecules through M.O. theory.

CO 4. Identification of some cations and anions in the unknown mixture.

CO 5. Basic knowledge and Importance of Stereochemistry.

➤ **By the end of III semester, each and every II degree chemistry student can attain the knowledge in the following topics and come to know their role in serving the society through chemistry.**

CO 1. Properties of d and f block elements.

CO 2. Bonding nature of the metals.

CO 3. Preparation, properties and applications of halogen compounds, hydroxyl compounds, carbonyl Compounds and carboxylic acids.

CO 4. Importance and synthetic applications of active methylene compounds.

CO 5. Estimation of Fe (II) and Cu (II) in the unknown material through practical.

CO 6. Reactions of some functional groups like phenols, carboxylic acids, aldehydes, ketones, amines and Amides.

- **By the end of IV semester, each and every II degree chemistry student can attain the knowledge in the following topics and come to know their role in serving the society through chemistry.**

CO 1. Different types of Electronic transitions present in Organic molecules..

CO 2. Identification of Functional groups using IR spectrum.

CO 3. Analysis of Cr and Mn using spectrophotometer.

CO 4. Structural identifications of organic compounds using H^1 -NMR

CO 5. Different aspects of electrochemistry.

CO 6. Identification of functional group present in the given organic compound by IR spectral analysis.

CO 7. Importance of conductometric techniques by doing strength of acids and bases.

- **By the end of V semester, each and every III degree chemistry student can obtain the knowledge in the following topics and come to know how to serve the society by becoming a chemist.**

CO 1. Involved theories and properties of coordination compounds.

CO 2. Preparation and properties of nitrogen compounds.

CO 3. Importance, preparations, properties and medicinal uses of heterocyclic compounds.

CO 4. Structural elucidation of glucose and fructose.

CO 5. Importance of Amino acids and Proteins.

CO 5. Determination of Rate of the reactions through chemical kinetics.

CO 6. Some photochemical reactions photophysical processes.

CO 7. Importance of thermo dynamical aspects.

CO 8. Identification of functional group present in the given organic compound by following organic qualitative analysis.

CO 9. Determination of surface tension and viscosity of some liquids.

- **By the end of VI semester, each and every III degree chemistry student can get the knowledge in the following topics depending on their choice/interest and come to know how to serve the society by becoming a chemist.**

- CO 1. Various types of instrumental techniques like IR and NMR spectroscopies.
- CO 2. Different aspects of Environmental Chemistry.
- CO 3. Importance of green chemistry.
- CO 4. Analyses of drugs, dairy products
- CO 6. Importance of petrochemicals.
- CO 7. Preparation of some organic compounds.
- CO 8. Synthesis of organic compounds using green synthesis.
- CO 9. Hands on experience in operating colorimeters, pH meters and potentiometers.
- CO 10. Submission of a project work.

OUT COMES

After completion of B.Sc. course the students will be able to:

1. Acquire comprehensive knowledge in physical inorganic and organic chemistry.
2. Acquire experimental skills in chemical analysis.
3. Apply their knowledge and understanding in new situations.
4. Have industrial exposure by visiting nearby industry plants.
5. Achieve good ranks in PG entrance examinations.
6. Acquire employable skills and become industry ready persons.
7. Get motivation for research by carrying out projects.
8. Gain leadership quality by participation in extension programs and group projects etc

Valence bond theory and Free electron theory, explanation of thermal and electrical conductivity of metals based on these theories, Band theory- formation of bands, explanation of conductors, semiconductors and insulators.

PHYSICAL CHEMISTRY

36h

UNIT-III

Solidstate

10h

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Miller indices, Definition of lattice point, space lattice, unit cell. Bravais lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Powder method. Defects in crystals. Stoichiometric and non-stoichiometric defects.

UNIT-IV

1. Gaseous state

6h

van der Waal's equation of state. Andrew's isotherms of carbon dioxide, continuity of state. Critical phenomena. Relationship between critical constants and vander Waal's constants. Law of corresponding states. Joule- Thomson effect. Inversion temperature.

2. Liquid state

4h

Liquid crystals, mesomorphic state. Differences between liquid crystal and solid/liquid. Classification of liquid crystals into Smectic and Nematic. Application of liquid crystals as LCD devices.

UNIT-V

Solutions, Ionic equilibrium & dilute solutions

1. Solutions

6h

Azeotropes-HCl-H₂O system and ethanol-water system. Partially miscible liquids-phenol-water system. Critical solution temperature (CST), Effect of impurity on consolute temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

2. Ionic equilibrium

3h

Ionic product, common ion effect, solubility and solubility product. Calculations based on solubility product.

3. Dilute solutions

7h

Colligative properties- RLVP, Osmotic pressure, Elevation in boiling point and depression in freezing point. Experimental methods for the determination of molar mass of a non-volatile

solute using osmotic pressure, Elevation in boiling point and depression in freezing point.
Abnormal colligative properties. Van't Hoff factor.

Co-curricular activities and Assessment Methods

1. Continuous Evaluation: Monitoring the progress of students learning
2. Class Tests, Work sheets and Quizzes
3. Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality
4. Semester- end Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

List of Reference Books

1. Principles of physical chemistry by Prutton and Marron
2. Solid State Chemistry and its applications by Anthony R. West
3. Text book of physical chemistry by K L Kapoor
4. Text book of physical chemistry by S Glasstone
5. Advanced physical chemistry by Bahl and Tuli
6. Inorganic Chemistry by J.E. Huheey
7. Basic Inorganic Chemistry by Cotton and Wilkinson
8. A textbook of qualitative inorganic analysis by A.I. Vogel
9. Atkins, P. W. & Paula, J. de Atkin's Physical Chemistry Ed., Oxford University Press
10th Ed (2014).
10. Castellan, G. W. Physical Chemistry 4th Ed. Narosa (2004).
11. Mortimer, R. G. Physical Chemistry 3rd Ed. Elsevier: NOIDA, UP (2009).
12. Barrow, G. M. Physical Chemistry

P. R. GOVERNMENT COLLEGE, KAKINADA
SYLLABUS FOR SEMESTER – I (CHEMISTRY)
Paper I (Inorganic & Organic Chemistry)
Weightage to content

S. No.	Course Content	Essay Questions (10M)	Short Answer Questions (5M)	Total No. Of Questions from each Unit	Total No. of Marks allotted to each Unit
	Inorganic Chemistry				
1	Unit - I	1	2	3	20
2	Unit - II	3	2	5	40
	Physical Chemistry				
3	Unit - III	1	1	2	15
4	Unit - IV	2	2	4	30
5	Unit - V	1	1	2	15
	TOTAL	8	8	16	120

LABORATORY COURSE -I

30hrs (2 h / w)

Practical-I Analysis of SALT MIXTURE

(At the end of Semester-I)

Qualitative inorganic analysis (Minimum of Six mixtures should be analysed)

50 M

Course outcomes:

At the end of the course, the student will be able to;

1. Understand the basic concepts of qualitative analysis of inorganic mixture
2. Use glassware, equipment and chemicals and follow experimental procedures in the laboratory
3. Apply the concepts of common ion effect, solubility product and concepts related to qualitative analysis

Analysis of SALT MIXTURE

50 M

Analysis of mixture salt containing two anions and two cations (From two different groups) from the following:

Anions: Carbonate, Sulphate, Chloride, Bromide, Acetate, Nitrate, Borate, Phosphate. **Cations:**

Lead, Copper, Iron, Aluminium, Zinc, Nickel, Manganese, Calcium, Strontium, Barium, Potassium and Ammonium.

P. R. GOVERNMENT COLLEGE, KAKINADA
MODEL PAPER FOR SEMESTER – I (CHEMISTRY)
Paper I (Inorganic & Organic Chemistry)

Duration: 2hrs. 30Min.

Max. Marks: 60

PART- A

4 X 5 = 20 Marks

Answer any Four of the following questions. Each carries FIVE marks

1. Question from Unit –I
2. Question from Unit –I
3. Question from Unit –II
4. Question from Unit – II
5. Question from Unit –III
6. Question from Unit – IV
7. Question from Unit – V
8. Question from Unit – V

PART- B

4 X 10 = 40 Marks

Answer ALL the questions. Each carries TEN marks

9. Question from Unit –I (OR)
Question from Unit –I
10. Question from Unit –II (OR)
Question from Unit – II
11. Question from Unit –III (OR)
Question from Unit – III
12. Question from Unit – IV (OR)
Question from Unit – IV

P. R. GOVERNMENT COLLEGE, KAKINADA
SEMESTER-I
CHEMISTRY Course-I: INORGANIC & PHYSICAL CHEMISTRY

Question bank

Unit – I

ESSAY QUESTIONS

1. Explain Classification, Preparations & uses of Silicones
2. Explain Preparation and Structure of Diborane.
3. What are Pseudo halogens? Explain the Structures of AX_3 & AX_5 types of inter halogen compounds.

SHORT ANSWER QUESTIONS

1. Explain the preparation and structure of Borazine
2. Explain the structures of Phosphonitrilic compounds.
3. Write any three structures of sulphur oxy acids.
4. Explain the structures of SO_2 & SO_3

Unit – II

ESSAY QUESTIONS

1. Explain magnetic and catalytic properties of d-block elements.
2. What is Lanthanide Contraction? Explain the Consequences of Lanthanide Contraction?
3. Explain Band theory of Conductors, Semi-conductors and Insulators.

SHORT ANSWER QUESTIONS

1. Compare Lanthanides with Actinides with any five properties.
2. Why do d- block elements show variable oxidation states? Explain with examples.
3. Explain free electron theory of metals.
4. Explain Valence bond theory of metals.

Unit – III

ESSAY QUESTIONS

1. Derive Bragg's Law. Explain the determination of structure of a crystal by powder method?
2. Write different types of stoichiometric and non – stoichiometric crystal defects.
3. Explain symmetry elements in crystals.

SHORT ANSWER QUESTIONS

1. Write a short note on Law of constancy of interfacial angles, law of rationality of indices and the law of symmetry.

2. Write short note on Bravais lattices and crystal systems.
3. Define lattice point, space lattice and unit cell?

Unit – IV

ESSAY QUESTIONS

1. Derive the relationship between Critical constants & Van der Waal's constants
2. Why do real gases deviate from ideal gas behavior? Derive Vander Waal's equation of state?
3. State and explain Joule- Thomson effect.

SHORT ANSWER QUESTIONS

1. Explain Law of corresponding states?
2. What are liquid Crystals? Explain.
3. Explain applications of liquid crystals as LCD devices?

Unit – V

SHORT ANSWER QUESTIONS

1. State and write the applications of Nernst distribution Law?
2. Explain Critical solution temperature for Phenol – water system.
3. Define colligative properties. Write different types of colligative properties.
4. Explain briefly Common ion effect & Solubility product?