

P.R.Govt.College (A), Kakinada

(Affiliated to Adikavi Nannaya University)

Department of chemistry

B.Sc. Chemistry Syllabus under CBCS

Board of studies

2017-18

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.

1. Sri. Nemani Ramam, M.Sc., M.Phil

II. Term.

The term of the nominated members shall be two years.

III. 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 a year.

IV. 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.Govt. College (A), Kakinada
Recommended Composition of the Board of Studies of Chemistry
And it's Functions of an Autonomous College
April-2017-18

I Composition

1. Head of the Department concerned (Chairman):

Sri E.V.S. Subrahmanyam, M.Sc., M.Phil, B.Ed

2. The entire faculty of each specialization.

1. Dr. M. Mahaboob Pacha, M.Sc., M.Phil, PhD.
2. Sri T.Vara Prasad, M.Sc., M.Phil., M. Ed.,
3. Sri D.Rama Rao, M.Sc., B. Ed., M.Phil.
4. Sri V.Mallikarjuna Sarma, MSc, M.Phil, NET

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

1. Dr. V .Sambasivarao, Lecturer in Chemistry, Arts College,
Rajahmundry
2. Dr. K . Jhansi, Lecturer in Chemistry, Ideal Degree College,
Kakinada

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

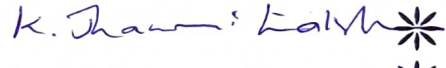
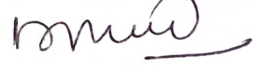
1. Prof. K. Deepti, Adikavi Nannaya University, Rajahmundry

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

1. Dr. N.Krishna Prakasam, Facility Manager, SAR CHANDRA
ENVIRON SOLUTIONS PVT.LTD.KAKINADA

Signatures of the members who attended the

Board of studies in Chemistry.

- | | | |
|-------------------------------|--|--|
| 1. Sri E. V. S. Subrahmanyam | Chairman & Lecturer in Charge |  |
| 2. Dr. K. Deepti, | University representative
Adikavi Nannaya University
Rajamahendravaram | 
13/4/17 |
| 3. Dr. N. K. Prakasam, | Facility Manager,
Industry representative
SAR Chandra Environ Solutions
Pvt. Ltd. | |
| 4. Dr. V. Sambasivarao, | Subject expert
Lecturer in Chemistry,
Govt. Arts College,
Rajamahendravaram | 
13/4/17 |
| 5. Dr. K. Jhansi Lakshmi | Subject expert
Lecturer in Chemistry.
Ideal Degree College, Kakinada | 
K. Jhansi Lakshmi |
| 6. Sri. N. Ramam | Alumnus, Principal. Retd. | |
| 7. Dr. M. Mahaboob Pacha | Member | |
| 8. Sri T. Vara Prasad | Member | 
13/4/17 |
| 9. Sri D. Rama Rao | Member |  |
| 10. Sri V. Mallikarjuna Sarma | Member |  |
| 11. Dr. D.S.V.N.M. Ramamurthy | Member | 
D.S.V.N.M. Ramamurthy |
| 12. K. Babu Rao. | Member | 
K. Babu Rao |

ACTION PLAN BOS MEETING -CHEMISTRY HELD ON 13 -4-2017.

1. Department activities for 2017-2018 academic year. Annexure I

Month	Activity proposed	Faculty member in charge
June-17	Departmental staff meeting to review results and class work allotment	E.V.S.Subrahmanyam
	Preparation of curricular plans, time-tables etc.,	
	Remedial coaching classes for II & III year supplementary exams	
July-17		
	Bridge classes for I year students	
	Student awareness programmes on ragging& eve teasing - consequences , self-discipline, career guidance, higher education opportunities etc.,	T.Vara prasad
August-17	Conference on prospects in pharmaceutical industries	E.V.S.Subrahmanyam
	Study tour / Field trips	
Sept-17	Ozone day	
Oct-17	MOLE Day	D.Ramarao
	Faculty development programme	Dr.M.M.Pacha
Nov-17	11th National Education Day – Out reach Programme to nearby school	
Dec-17	World AIDS Day	
	Chemistry day & Chem fest	V.Mallikarjuna sarma
Jan-18	10 days coaching for PG entrance examinations in chemistry Study tour / Field trips	V.Mallikarjuna sarma
Feb-18	NATIONAL SCIENCE DAY	V.Mallikarjuna sarma
March-18	Consumer awareness day	E.V.S.Subrahmanyam

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

(Mandatory for each Department)

- i) Staff development programme
- ii) Training in the use of HPLC
- iii) Awareness on OZONE protection
- iv) National Chemistry day
- v) Chem. fest
- vi) National Science day 2018
- 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. 2017-18.

**4. Plan for utilization of funds for Autonomous/CPE/other grants
available for arranging guest lectures, faculty improvement
programmes, 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 |
| 3. Petrochemicals equipment | 1.0 lakhs |

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

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

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

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

New courses to be proposed.

S.No.	New course proposed	Justification	Employability
1	Under graduate course in Industrial chemistry	There is dearth of skilled persons to operate various instruments like uv visible spectrophotometer, Atomic absorption spectrophotometer, PH meter, flame photometer, rotavapour instrument, HPLC.GLC, distillation, etc which play as key role in any industry related to chemistry.	Technical assistants, Quality control managers, Plant supervisors etc.

8. Any other programme 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 propose to give 33.3% weightage for competitive exam questions pertaining to the syllabus prescribed.

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

Chemistry:

1. Sri N. Lakshmana Rao, SKBR College, Amalapuram.

2. Dr. D. Madhava Sarma, GDC, Tadepalligudem
3. Dr. V. Sambasiva Rao, Govt. Arts College, Rajahmundry.
4. Dr. K. A.R.S.S. Prasad, VS Krishna College, Visakhapatnam.
5. Sri S.V. Ramana, Arts College, Rajahmundry
6. Sri Machi Raju, Arts College, Rajahmundry
7. Smt. C. Jyoti, St. Theresa College, Eluru.
8. P. Krishna Kumar, S.K.B.R. College, Amalapuram.
9. Dr. G. Venkatarao, GDC, Vijayavada
10. Shri B. Venkatarao, GDC, Tadepalligudem
11. Dr. Ramchadarao, Y.N. College, Narasapuram

Department of Chemistry BOS Meeting Dt. 13 - 4-2017

Resolutions:

Meeting of Board of studies in chemistry is convened on 13-4-17 in the guest room of the College. The Principal Dr. Chappidi Krishna, Dr. K. Deepthi, University Nominee, Dr. N.K. Prakasam, Facility Manager, SAR Chandra Environ Solutions Pvt. Ltd., Dr. V. Sambasiva Rao, Subject Expert, Govt. College, Rajahmundry, Dr. Jhansi, Lecturer in Chemistry, Ideal College, Kakinada, all members of the faculty of Chemistry and student representatives attended the meeting. 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 final year students w.e.f. 2017-18
2. Enhance the internal assessment component from 30% to 40% in theory to first year (admitted batch).
3. It is resolved to allot project works for final year students who opt for project work in chemistry preferably industry based.
4. It is resolved to conduct departmental activities such as Ozone day, Chem fest, Chemistry day and Science day etc.
5. It is resolved to offer subject electives and skill based electives in the V and VI semesters respectively.
6. It is resolved to implement the recommended Pedagogy for the first semester 2017-18.
7. Resolved to conduct practical examinations semester wise.

The following paper setters are recommended.

- i. Dr. V.Sambasiva Rao, Govt.Arts College, Rajahmundry.
 - ii. K.A.R.S.S.Prasad, VS Krishna College, Visakhapatnam.
 - iii. Sri S.V.Ramana , Arts College, Rajahmundry
 - iv. Sri Machi Raju, Arts College, Rajahmundry.
 - v. U. Satyanarayana, GDC, Tuni
 - vi. R. Brahmaji, GDC, Ramachandrapuram
 - vii. N. V. Sudhakar, GDC, Tuni
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. NEW COURSES:
- It is resolved to explore the possibility of introducing a new course in B.Sc Pharmaceuticals/Industrial Chemistry as Restructured course.
11. Resolved to submit proposals to conduct a faculty development programme in instrumentation techniques/ advanced topics with the assistance of industry representatives and university representatives.
12. Resolve 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 for competitive exam questions pertaining to the syllabus prescribed.

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15. Resolved to follow 75-25% External and internal w.e.f. 2017-18 admitted batch 2017-18 as per the directions of APSCTHE and ANUR.

X Sreepti
University
nominee.

P.R.Govt.College (A), Kakinada

(Affiliated to ADIKAVI NANNAYA UNIVERSITY)

(W.e.f. admitted batch 2017 – 2018)

Department of chemistry

B.Sc. 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
		VII (A)*	Elective	100	03
			Practical - VII A	50	02
		VII (B)*	Elective	100	03
			Practical - VII B	50	02
	* Any one Paper from VII A, B and C	VII (C)*	Elective	100	03
			Practical - VII C	50	02

VI	** Any one cluster from VIII, A, B and C	VIII (A)**	Cluster Electives - I :	100	03
			VIII-A-1 ,	100	03
			VIII-A-2	100	03
			VIII-A-3	50	02
				50	02
				50	02
		VIII (B)**	Cluster Electives - II ::	100	03
			VIII-B-1	100	03
			VIII- B-2	100	03
			VIII-B-3	50	02
				50	02
				50	02
		VIII (C)**	Cluster Electives - III ::	100	03
			VIII-C-1	100	03
			VIII-C-2	100	03
			VIII-C-3	50	02
				50	02
				50	02

FIRST YEAR 2017-18
SEMESTER - II
Paper II (Physical & General Chemistry)
60 hrs. (4h/w)

PHYSICAL CHEMISTRY

30 hrs (2h / w)

- OBJECTIVES:**
1. COMPARES THE VB THEORY AND MOLECULAR ORBITAL THEORY
 2. UNDERSTANDS THE PRINCIPLES INVOLVED IN TITRIMETRIC AND GRAVIMETRIC ANALYSIS
 3. ABLE TO APPRECIATE THE APPLICATIONS OF COLLOIDS AND ADSORPTION

UNIT-I

Solid state

10h

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

UNIT-II

1. Gaseous state

6 h

Compression factors, deviation of real gases from ideal behavior. Vander Waal's equation of state. P-V Isotherms of real gases. Andrew's isotherms of carbon dioxide, continuity of state. Critical phenomena. The vander Waal's equation and the critical state. Law of corresponding states. Relationship between critical constants and vander Waal's constants. Joule Thomson effect.

2. Liquid state

4 h

Structural differences between solids, liquids and gases. Liquid crystals, the mesomorphic state. Classification of liquid crystals into Smectic and Nematic. Differences between liquid crystal and solid/liquid. Application of liquid crystals as LCD devices.

UNIT-III

Solutions

10h

Liquid-liquid - ideal solutions, Raoult's law. Ideally dilute solutions, Henry's law. Non-ideal solutions. Vapour pressure - composition and vapour pressure- temperature curves. Azeotropes-HCl-H₂O, ethanol-water systems and fractional distillation. Partially miscible liquids-phenol-water, trimethylamine-water, nicotine-water systems. Effect of impurity on consolute temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

GENERAL CHEMISTRY

30 hrs (2h / w)

UNIT-IV

1. Surface chemistry

8 h

Definition of colloids. Solids in liquids (sols), preparation, purification, properties - kinetic, optical, electrical. Stability of colloids, Hardy-Schulze law, protective colloid. Liquids in liquids (emulsions) preparation, properties, uses. Liquids in solids (gels) preparation, uses.

Adsorption: Physical adsorption, chemisorption. Freundlich, Langmuir adsorption isotherms. Applications of adsorption

2. Chemical Bonding

7h

Valence bond theory, hybridization, VB theory as applied to ClF_3 , $\text{Ni}(\text{CO})_4$, Molecular orbital theory - LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules (N_2 , O_2 , CO and NO).

UNIT-V

Stereochemistry of carbon compounds

15 h

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae. Optical isomerism: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation. Chiral molecules- definition and criteria (Symmetry elements)- Definition of enantiomers and diastereomers - Explanation of optical isomerism with examples Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane. D,L and R,S configuration methods and E,Z- configuration with examples.

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. Stereochemistry of Organic compounds by E L Eliel
6. Advanced Organic Chemistry by F A Carey and R J Sundberg
7. Stereochemistry by P.S.Kalsi
8. Stereochemistry of Organic compounds by D. Nasipuri
9. Advanced physical chemistry by Bahl and Tuli
10. Advanced Inorganic Chemistry Vol-I by Satyaprakash, Tuli, Basu and Madan

LABORATORY COURSE -II
Practical-II Analysis of Mixture Salt

(At the end of Semester-II) 30 hrs (2 h / w) Maximum marks-50

Qualitative inorganic analysis

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, aluminum, zinc, manganese, calcium, strontium, barium, potassium and ammonium.

SCHEME OF VALUATION FOR II SEMESTER
CHEMISTRY LABORATORY COURSE

Max. Marks: 50

Time: 3 hrs.

For Record - 10 Marks

For Viva-voce - 5 Marks

For Practical - 35 Marks

Splitting of Practical Marks:

S.No.	Description	Marks
1.	Colour	01
2.	State	01
3.	Odour	01
4.	Solubility	02
5.	Flame Test	02
6.	Action of Heat	02
7.	Marks for each Anion: 06 Marks	
	Dry test with acid	02
	Confirmation test with SCE	03
	Reporting of Anion	01
8.	Preparation of SCE	02
9.	For Carbonate:	
	Test with acid	02
	Confirmation test with BaCl ₂	03
10.	For Borate:	
	Borontrifluoride test	02
	Ethylborate test	03
11.	For Sulphate:	
	Conformation test with SCE	03
	Solubility of the formed precipitate	02
12.	Marks for each Cation: 06 Marks	
	Identification of cation in correct group	01
	Colour of the precipitate	01
	Mentioning of the group reagents	02
	Confirmation test for the cation	01
	Reporting of Cation	
	For Ammonium:	
	Test with NaOH	02
	Confirmation test	03