

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

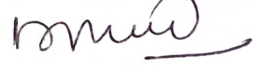
1. Prof. K. Deepti, Adikavi Nannaya University, Rajahmundry

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

SEMESTER IV
Paper IV (SPECTROSCOPY & PHYSICAL CHEMISTRY)
60 hrs (4 h / w)

OBJECTIVES:

1. Understands heterogeneous equilibria and the application of phase rule
2. Gains knowledge of principles of electrolysis and galvanic cells
3. Understands the application of colligative properties in the determination of molecular weight
4. Understands the applications of spectrophotometry and spectroscopic interpretations.

SPECTROSCOPY

30 hrs (2h / w)

UNIT-I

6h

General features of absorption - Beer-Lambert's law and its limitations, transmittance, Absorbance, and molar absorptivity. Single and double beam spectrophotometers. Application of Beer-Lambert law for quantitative analysis of 1. Chromium in $K_2Cr_2O_7$ 2. Manganese in Manganous sulphate

Electronic spectroscopy:

2h

Interaction of electromagnetic radiation with molecules and types of molecular spectra. Energy levels of molecular orbitals (σ , π , n). Selection rules for electronic spectra. Types of electronic transitions in molecules effect of conjugation. Concept of chromophore and auxochrome.

UNIT-II

Infra red spectroscopy

2h

Different Regions in Infrared radiations. Modes of vibrations in diatomic and polyatomic molecules. Characteristic absorption bands of various functional groups. Interpretation of spectra-Alkanes, Aromatic, Alcohols carbonyls, and amines with one example to each.

Proton magnetic resonance spectroscopy (1H -NMR)

8h

Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals, Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants, Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

PHYSICAL CHEMISTRY

30 hrs (2h / w)

UNIT-III:

Dilute solutions

10h

Colligative properties, Raoult's law, relative lowering of vapour pressure, its relation to molecular weight of non-volatile solute, Elevation of boiling point and depression of freezing point, Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point, Experimental methods of determination, Osmosis, osmotic pressure, experimental determination, Theory of dilute solutions, Determination of molecular weight of non-volatile solute from osmotic pressure, Abnormal Colligative properties- Van't Hoff factor.

UNIT-IV

Electrochemistry-I

10h

Specific conductance, equivalent conductance. Variation of equivalent conductance with dilution. Migration of ions, Kohlrausch's law. Arrhenius theory of electrolyte dissociation and its limitations. Ostwald's dilution law. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only). Definition of transport number, determination by Hittorfs method. Application of conductivity measurements- conductometric titrations.

UNIT-V

1. Electrochemistry-II

4h

Single electrode potential, sign convention, Reversible and irreversible cells Nernst Equation- Reference electrode, Standard Hydrogen electrode, calomel electrode, Indicator electrode, metal – metal ion electrode, Inert electrode, Determination of EMF of cell, Applications of EMF measurements - Potentiometric titrations.

2. Phase rule

6h

Concept of phase, components, degrees of freedom. Thermodynamic Derivation of Gibbs phase rule. Phase equilibrium of one component system - water system. Phase equilibrium of two- component system. solid-liquid equilibrium. Simple eutectic diagram of Pb-Ag system, simple eutectic diagram, desilverisation of lead., NaCl-Water system. Freezing mixtures.

List of Reference Books

1. Spectroscopy by William Kemp
2. Spectroscopy by Pavia
3. Organic Spectroscopy by J. R. Dyer
4. Modern Electrochemistry by J.O. M. Bockris and A.K.N.Reddy
5. Advanced Physical Chemistry by Atkins
6. Introduction to Electrochemistry by S. Glasstone
7. Elementary organic spectroscopy by Y.R. Sharma
8. Spectroscopy by P.S.Kalsi

LABORATORY COURSE – IV

Practical Paper - IV Physical Chemistry and IR Spectral Analysis
(At the end of semester IV)

30 hrs (2 h / W)

Physical Chemistry

25M

1. Critical Solution Temperature- Phenol-Water system
2. Effect of NaCl on critical solution temperature (Phenol-Water system)
3. Determination of concentration of HCl conducts metrically using standard NaOH solution.
4. Determination of concentration of acetic acid conducts metrically using standard NaOH Solution.

IR Spectral Analysis

10 M

5. IR Spectral Analysis of the following functional groups with examples
- a) Hydroxyl groups
 - b) Carbonyl groups
 - c) Amino groups
 - d) Aromatic groups

SCHEME OF VALUATION FOR IV SEMESTER
CHEMISTRY LABORATORY COURSE
PHYSICAL CHEMISRY AND IR SPECTRAL ANALYSIS

Max. Marks: 50

Time: 3 hrs.

For Record - 10 Marks
For Viva-voce - 5 Marks
For Practical - 35 Marks

Splitting of Practical Marks for Physical Chemistry:

- | | | |
|------|---------------------------------|---------------------------|
| i) | Procedure in first five minutes | : 5 Marks |
| ii) | Tabulation of the readings | : 5 Marks |
| iii) | Calculation | : 5 Marks |
| iv) | For result | : 10 Marks |
| | Error < 10% | : 10 Marks |
| | Error 10-15 % | : 8 Marks |
| | Error > 20% | : 5 Marks (Minimum Marks) |

Splitting of Practical Marks for IR spectral analysis:

Identification of the frequencies of the bonds present in the IR spectrum of an organic compound : 10 Marks