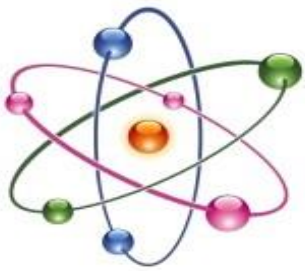
RAMAIAH COLLEGE OF ARTS, SCIENCE AND COMMERCE

DEPARTMENT OF CHEMISTRY/BIOCHEMISTRY

DEPARTMENT MANUAL

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FOREWORD

Dear students and parents,

Welcome to the Department of Chemistry & Biochemistry at RCASC, where student's success and prosperity are our prime motive. We have a very dynamic faculty of highly qualified, who are dedicated to teaching and research for both graduate and postgraduate students.

Department offers certificate courses, add on courses workshops, value added programs bridge course and remedial classes for students to bring them to great heights in their future. The department has infrastructure required for academic practicals and M.Sc projects. The research activities are funded by VGST, KSCST and KSTA etc.

The department always works with set objectives to reach its goals. Students and faculty of the department are well aware of the vision, mission, objectives and goals of the department during their orientation.

We welcome enquires, questions, and suggestions and look forward to seeing you in the RCASC campus.

Sincerely

(HOD, Dept of Chemistry & Biochemistry)

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INTRODUCTION:

The department of chemistry & biochemistry initially was established in the year of 1994 with student strength of 14 and at present strength has reached to 600. The department has well qualified & experienced faculties with rich academic background and their innovative skills to ensure quality education. The department offers a curriculum balanced between theoretical learning & training in experimental methods, with the aim of nurturing qualified scientists with flexible application capabilities of specialized knowledge in the fields of physics, organic chemistry, inorganic chemistry, analytical chemistry, industrial chemistry and biochemistry and other frontier fields of life sciences. Students are guided to understand chemistry & biochemistry by participating in research projects & will be trained to obtain application capabilities that will serve as a foundation for academic research as well as industrial development. We are conducting special coaching classes for advanced learners to secure university ranks, centum in the subject & remedial classes for slow learners. The department not only ensures academic development but also provides students with opportunities to prove themselves by means of extracurricular & co-curricular activities. Due to the continuous effort of our faculties, our students have obtained several laurels of university ranks & centum in subjects. We encourage the students to attend and participate in the National conferences, seminars & workshops, organized by various Institutions to acquire knowledge in various fields. Further, we give intensive guidance to our M.Sc students to continue their higher studies in reputed universities and research centres of National and International standards.

COURSES OFFERED:

1. BSc (BT/MB/CHEM)
2. BSc (GEN/MB/BIOCHEM)
3. M.Sc Biochemistry
4. M.Sc Chemistry

SYALLABUS:

BSc (BT/MB/CHEM)

Sem	Paper	Paper Code	Paper	Paper Code	Paper	Paper Code
I	Cell Biology	ST1S11	Chemistry-I	SC1S11	Microbiology-I	SM2S11
II	Microbiology and Biostatistics	ST1S21	Chemistry –II	SC1S21	Microbiology -II	SM2S21
III	Biochemistry And Biophysics	ST1S31	Chemistry -III	SC1S31	Microbiology -III	SM2S31
IV	Molecular Biology	ST1S41	Chemistry –IV	SC1S41	Microbiology -IV	SM2S41
V	Genetic Engineering and Environmental Biotechnology	ST1S51	Physical Chemistry -V	SC1S51	Microbiology -V	SM2S51

V	Immunology and Animal Biotechnology	ST1S52	Organic Chemistry-VI	SC1S52	Microbiology -VI	SM2S52
VI	Plant Biotechnology	ST16S1	Inorganic Chemistry-VII	SC16S1	Microbiology -VII	SM26S1
VI	Industrial Biotechnology	STI6S2	Biochemistry-VIII	SC16S2	Microbiology -VIII	SM26S2

BSc (GEN/MB/BIOCHEM)

SEM	PAPER	PAPER CODE	PAPER	PAPER CODE	PAPER	PAPER CODE
I	Genetics-I	SG2S11	Biochemistry –I	SC1S13	Microbiology -I	SM2S11
II	Genetics -II	SG2S22	Biochemistry –II	SC1S23	Microbiology -II	SM2S21
III	Genetics -III	SG2S33	Biochemistry –III	SC13S3	Microbiology -III	SM2S31
IV	Genetics -IV	SG2S44	Biochemistry –IV	SC1S43	Microbiology -IV	SM2S41
V	Genetics -V	SG2S51	Biochemistry –V	SC1S55	Microbiology - V	SM2S51
V	Genetics -VI	SG2S52	Biochemistry –VI	SC1S56	Microbiology -VI	SM2S52
VI	Genetics -VII	SG2S61	Biochemistry –VII	SC1S67	Microbiology - VII	SM26S1
VI	Genetics VIII	SG2S62	Biochemistry –VIII	SCIS68	Microbiology -VIII	SM26S2

M.Sc Biochemistry

Semester	Subject code	Title of the paper	Instruction hr/week	Exam marks			Duration of exam (hrs)	Credits
				Exam	CIA	Total		
I	BCHT- 01	Basic Biophysical and general chemistry	4	70	30	100	3	4
	BCHT- 02	Metabolism-I	4	70	30	100	3	4
	BCHT-03	Analytical Biochemistry – I	4	70	30	100	3	4
	BCHT-04	General Physiology	4	70	30	100	3	4
	BCHSCT-05	Clinical Biochemistry and Nutrition	3	70	30	100	3	2
	BCHP – 06	Gen. Biochemistry	8	70	30	100	4	4
	BCHP – 07	Bioanalytical techniques	8	70	30	100	4	4
Total credits for the semester								**26**
II	BCHT- 08	Protein structure and Enzymology	4	70	30	100	3	4
	BCHT- 09	Analytical Biochemistry – II	4	70	30	100	3	4
	BCHT-10	Immunology and Microbiology	4	70	30	100	3	4
	BCHT-11	Metabolism-II	4	70	30	100	3	4
	BCHSCT-12	Bioinformatics and Research methodology	3	70	30	100	3	2
	BCHP – 13	Immunochemistry and Informatics	8	70	30	100	4	4
	BCHP – 14	Enzymology	8	70	30	100	4	4

Total credits for the semester								**26**
III	BCHT-15	Molecular Biology	4	70	30	100	3	4
	BCHT-16	Biochemistry of Cell Signaling	4	70	30	100	3	4
	BCHT-17	Membrane Biochemistry	4	70	30	100	3	4
	BCHT-18	Open elective	4	70	30	100	3	3
	BCHP -19	Clinical Biochemistry	8	70	30	100	4	4
	BCHP -20	Molecular Biology	8	70	30	100	4	4
Total credits for the semester								**23**
IV	BCHT-21	Gene Regulation and Genomics	4	70	30	100	3	4
	BCHT-22	Molecular Genetics	4	70	30	100	3	4
	BCHT-23	Genetic Engineering	4	70	30	100	3	4
	BCHT-24	Drug Discovery and Clinical Research	4	70	30	100	3	4
	BCHP-25	Genetic Engineering and Protein chemistry	8	70	30	100	4	4
	BCHPR- 26	Project (Report and Viva-Voce; 45+25)	12	70	30	100	-	5
Total credits for the semester-IV								**25**
Total credits for the course								**100**

M.Sc Chemistry – FIRST SEMESTER

Code No.	Title	Theory/ Practical (Hrs/ Week)	Total No.of Hrs/ Semester	Duration of Exam. Hours	Max. Mark (Exam)	Continuous Evaluation	Total Marks	Credits
C-101	Inorganic Chemistry I	4	52	3	70	30	100	4
C-102	Organic Chemistry I	4	52	3	70	30	100	4
C-103	Physical Chemistry I	4	52	3	70	30	100	4
C-104	Biophysical, Bioorganic and Medicinal Chemistry	4	52	3	70	30	100	4
C-105	Green Synthesis (Soft Core)	3	36	3	70	30	100	2
C-105	Photochemistry (Soft Core)	3	36	3	70	30	100	2
C-106	Practical-I Inorg/Org/Phy	4	60	4	35	15	50	2

C-107	Practical-II Inorg/Org/Phy	4	60	4	35	15	50	2
C-108	Practical-III Inorg/Org/Phy	4	60	4	35	15	50	2
C-109	Practical-IV Inorg/Org/Phy	4	60	4	35	15	50	2
Total marks/credits							**700**	**26**

SECOND SEMESTER

Code No.	Title	Theory/ Practical (Hrs/ Week)	Total No.of Hrs/ Semester	Duration of Exam. Hours	Max. Marks (Exam)	Continuous Evaluation	Total Marks	Credits
C-201	Inorganic Chemistry-II	4	52	3	70	30	100	4
C-202	Organic Chemistry-II	4	52	3	70	30	100	4
C-203	Physical Chemistry-II	4	52	3	70	30	100	4
C-204	Spectroscopy-I	4	52	3	70	30	100	4
C-205	Mathematics for Chemists (Soft Core)	3	36	3	70	30	100	2
C-206	Practical-I Inorg/Org/Phy	4	60	4	35	15	50	2
C-207	Practical-II Inorg/Org/Phy	4	60	4	35	15	50	2
C-208	Practical-III Inorg/Org/Phy	4	60	4	35	15	50	2
C-209	Practical-IV Inorg/Org/Phy	4	60	4	35	15	50	2
Total marks/credits							**700**	**26**

THIRD SEMESTER – ORGANIC CHEMISTRY SPECIALIZATION

Code No.	Title of the Paper *(Syllabus hours for each theory paper: 52)*	Teaching/ contact hrs/week	Examination Hrs.	Max. Marks	Continuous Evaluation	Total Marks	Credits
C-301-OC	Organic Reaction Mechanisms	4	3	70	30	100	4
C-302-OC	Chemistry of Natural Products	4	3	70	30	100	4
C-303-OC	Organic Spectroscopy	4	3	70	30	100	4

C-304*	Open Elective	4	3	70	30	100	4
C-305-OC	Organic Chemistry Practicals-I	4	4	35	15	50	2
C-306-OC	Organic Chemistry Practicals-II	4	4	35	15	50	2
C307-OC	Organic Chemistry Practicals-III	4	4	35	15	50	2
C308-OC	Organic Chemistry Practicals-IV	4	4	35	15	50	2
Total marks/credits for the semester						**600**	**24**

FOURTH SEMESTER – ORGANIC CHEMISTRY SPECIALIZATION

Code	Title of the paper (Syllabus hours for each theory paper:52)	Teaching/ contact hrs/week	Exam Hrs.	Max. Marks	Continuous Evaluation	Total Marks	Credits
C-401-OC	Organometallic and Heterocyclic Chemistry	4	3	70	30	100	4
C-402-OC	Stereochemistry & Retrosynthetic Analysis	4	3	70	30	100	4
C-403-OC	Organic Synthesis	4	3	70	30	100	4
C-404-OC	Medicinal Organic Chemistry	4	3	70	30	100	4
C-405-OC	Organic Chemistry Practical-V	4	4	35	15	50	2
C-406-OC	Organic Chemistry Practical-VI	4	4	35	15	50	2
C 407-OC	PROJECT	8		70*	30	100	4
Total marks/credits for the semester						**600**	**24**

FLEXIBILITY AND ENRICHMENT:

- The department offers certificate courses and add-on courses as an extension to community service learning, and theory extended projects.
- Career opportunities: Chemistry graduates are recruited as technical assistant, junior scientist, quality controller, medical representative etc., by pharmaceutical companies.
- After graduation they can pursue higher studies in various streams like MSc, M. Tech, MBA, etc,
- The role of Chemist is extremely important in almost all the fields like Agro chemistry, Analytical Chemistry, Astrochemistry, Atmospheric Chemistry, Biochemistry, Biotechnology, Catalysis ,Ceramics Industry, Chemical Information Specialist ,Chemical Sales, Chemical Technology, Colloid Science ,Consumer Products ,Environmental Chemistry, Food Chemistry ,Forensic Science ,Geochemistry, Hazardous Waste Management, Inorganic Chemistry ,Materials Science, Medicine ,Metallurgy, Organic Chemist ,Paper Industry, Perfume Chemistry, Petroleum and, Natural Gas Industry, Pharmaceuticals, Plastics Industry ,Polymer Industry ,Surface Chemistry, Textile Industry.

OBJECTIVES

In support of our mission the Chemistry Department faculty members strive to:

- Act as mentors to undergraduates through advising them in research.
- Promote innovative curriculum development while exposing students to advanced instrumentation and technology.
- Foster multi-disciplinary curriculum development to provide students with a breadth of course options in Forensic Chemistry, Biochemistry, Natural Product Chemistry, Environmental Science, Polymer Science and Chemical Education.
- Encourage community engagement by providing students with service-learning and community-based research opportunities.
- Serve as good role models to students for safe and ethical professional behavior.
- Provide high quality academic advising for all majors.
- Encourage students to value diversity and to develop a global perspective through international experiences in chemistry.

FACULTY PROFILE – UG FACULTY:

Sl. No.	Name of the Faculty	Qualification	Designation	Experience (Years)	Research Areas
1.	**Dr. Prasanna Kumar S G**	M.Sc., M.Phil. D. Pharma, Ph.D	Associate Professor	26	Material Chemistry
2.	**Mrs. Malini M R**	M.Sc., M.Phil., K-SET	Assistant Professor	22	Biochemistry
3.	**Mrs. Ramya Kumari B S (Head of the Department)**	M.Sc., M.Phil, (Ph.D)	Assistant Professor	16.5	Biochemistry
4.	**Dr. Hareesh Kumar P**	M Sc., Ph. D.	Assistant Professor	24	Organic Chemistry
5.	**Dr. Shashidhar Bharadwaj S.**	M Sc., Ph. D.	Assistant Professor	13.2	Bio-organic and Medicinal Chemistry
6.	**Ms. N D Jyothilakshmi**	M.Sc., K-SET	Assistant Professor	1	Organic and computational chemistry

PG - Faculty:

Sl. No.	Name of the Faculty	Qualification	Designation	Experience (Years)	Research Areas
1.	**Dr. Surendra A S**	Ph.D.,M.Phil.,KSET,B.Ed, HDCS.	Assistant Professor	20	
1.	**Dr. Vasanth Kumar B**	M.Sc., Ph.D., PDF (USA) CSIR-UGC – JRF/NET	Assistant Professor	19	Cancer cell biology & Signal transduction
2.	**Dr. Bharath K. Devendra**	M.Sc., Ph.D	Assistant Professor	11	Electrochemistry-Batteries
4.	**Ms. Tanisha Rathore**	MSc., CSIR NET	Assistant Professor		
5.	**Dr. S Nandini**	M.Sc., Ph.D	Assistant Professor	8	Biosensors, Nanotechnology, Electrochemistry and Enzymology
6.	**Dr. Panchami H R**	M.Sc., Ph.D., (KSET, GATE)	Assistant Professor	1.4	Membrane Technology, Nanotechnology, Wastewater treatment
7.	**Dr. Pooja G. Singh**	M.Sc., Ph.D	Assistant Professor	7	Cancer cells, Phytochemicals and Nutraceuticals

8.	**Dr. Amreen Khanum**	M.Sc., Ph.D	Assistant Professor	7	Organic synthesis, Green chemistry and Biological applications
9.	**Dr. G. Robin Wilson**	M.Sc., Ph.D	Assistant Professor	8	Nanomesoporous materials, Catalysis and Organic synthesis

POLICIES OF THE DEPARTMENT:

A. Attendance

- The students are expected to be present on the opening day of each semester and to be punctual for every class mentioned in their time-table.
- Leave of absence from College must be applied in writing mentioning specific, explicit reason, such application must be given to the proctor.
- A student who falls short of 75% attendance will not be permitted to write the semester exams
- Those who are absent for more than 5 days must get the approval from the Chief proctor to attend classes.
- Attendance will be given to all students who have to represent the College outside the city in NCC, NSS and inter-collegiate competitions. If the students have to represent the College, they should have 75% attendance

B. Internal assessment

- Internal Assessments will be conducted twice every semester.
- The students will be informed about their IA marks, by displaying on the notice board.
- The final Internal Assessment Grades will be decided based on Attendance and Internal Assessment test Marks.
- Two Model Exams will be conducted at the end of every Semester.

C.Proctor system

- One proctor will be allotted 20 students for all three years of his/her study in the college.

The proctor will help the student in the following activities

1. Choose his/her goal.
2. Identify his/her academic problems and to find solutions.
3. Sending proctor letters by post to parents in each semester. Proctor letters specify the attendance percentage, marks in college exams and remarks.

D. Parent Teacher meeting

- The last Saturday of every month, parents are welcomed to meet the proctor/ teachers.
- For PG students every semester on the first day PTM will be conducted

E. Department Library

- Books from the department book bank will be available on a long-term basis to deserving students. Contact proctors for more information.

F. Laboratory instructions

DO's

1. Wear a chemical resistant apron
2. Use the chemicals water and gas very economically to avoid pollution.
3. Read the procedure from the manual and listen carefully the instructions given by the teacher before starting any experiment.
4. Keep your work area clean and clutter free.
5. Handle organic chemicals very carefully while heating as they are highly inflammable and wear gaggles during qualitative analysis
6. Know the location of all safety and emergency equipments used in the lab including, First-aid kit, Fire extinguisher, fire alarm and the emergency exits.
7. Dispose all chemicals, broken glass pieces, used filter papers and other lab materials into the proper containers as directed by the instructor.
8. Before leaving the laboratory, gas and water taps must be closed tightly and replace lids or caps on reagent bottles.
9. Report ALL accidents, hazards or chemical spills to the instructor or teacher immediately (no matter how small). DO NOT PANIC.
10. Any breakage of glass/failure of equipment must be reported to the teacher

DON'Ts

1. Do not wear bulky or dangling clothing.
2. NEVER attempt to taste, smelling of gases, or touch chemicals without instructions since many are hazardous and carcinogens.
3.
4. NEVER experiment on your own without the instructions of teacher.
5. NEVER mix chemicals before asking the instructor. Don't add water to concentrated acids.
6. NEVER put back unused chemicals to the original container.
7. NEVER leave the lab without washing your hands.
8. Do not spoil or erase the labels pasted on the reagent bottles.
9. Students are not allowed to work in Laboratory alone or in the absence of teacher
10. NEVER place chemicals dirctly on the balance pan during weighing. Never weigh a hot object.

11. Do not use mobile phone in laboratory area. Absolutely no running, practical jokes, or horseplay is allowed in the laboratory.

G. Projects –

Along with the academic projects, we are encouraging and motivating the involvement of students in research projects funded by external agencies like VGST, KSCST etc. Also, our management is sponsoring dissertation research projects. Faculty with their filed of expertise, guiding the students to carry out such research work. Students are doing internships at various research and health centers through the contacts obtained from the faculty of the department.

F. Internal Assessments

There will be 3 model practical exams and 1model theory exam, one month before the university examination.

RULES AND RESPONSIBILITIES OF STUDENTS

- **Ragging is forbidden. Students found ragging will be dismissed from the College.**
- Disobedience, neglect of work, indecent language or conduct, obscenity in word, dress or deed render a student liable to temporary or permanent dismissal.
- The dress code for boys is a pair of full pants and shirts with half or full sleeve. Jeans pants and T shirts are allowed provided there are no wordings on them.
- The dress code for girls is churidar/ salwar-kurta with kurta/kameez with sleeves. Alternatively, a pair of pant and shirt with half or full sleeve. Shirt must be below waist and upto hip. Jeans pants and T shirts that are not tight fitting and with sleeves are permitted.
- In addition to the above said rules on the dress code, any other rules regarding dress/uniform as stipulated by the department will also be followed by the students.
- During Inter college competitions (whenever such competitions are), Interviews for placement of any other activity as decided by the college, the student shall be required to follow a common dress code as instructed prior to such events.
- Every student is required to carry his/her identity card to college. The card should be shown to any member of the staff or College officials when asked for, especially when dealing with the office and library.
- No money is to be collected from students without the prior permission of the Principal.
- Boys and girls are expected to observe norms of decency and dignity in their interactions.
- There are waste collecting bins placed at different points in the campus. Students are requested to place all waste material in those boxes.
- Posters and notices must not be put up without the permission of the Principal. If permission is granted, all posters and notices should be placed on the notice board only.

- Each student shall conform to the rules of good conduct and respect the authority of members of the teaching and non teaching staff.
- For any fine/recovery/ breakage repayment paid by student, the student must demand and get receipt from the college.

INSTRUCTIONS TO PARENTS AND GUARDIANS

- Parents and guardians are requested to keep track of their wards activities, attendance, IA marks etc.
- Parents have to intimate proctor about sick leave taken, either through telephone or through fax.
- No absence will be entertained for festivals during the semester.

MEMORANDUM OF UNDERSTANDINGS (MOUs)

1. Department of Biochemistry has got MoU with **Central Research Laboratory (CRL), RMCH**.
2. Department has got MoU with **Pharma Training Institute**, Bangalore.
3. Department of Biochemistry has got MoU with **Indian Wood Science Technology (IWST)**, Bangalore.
4. Department of Biochemistry has got MoU with **C.V.R. Food Products,** Tamilnadu.
5. Department of Chemistry/ Biochemistry has got MoU with **Unigene Labs and Research Center Pvt. Ltd.**
6. Department of Chemistry/ Biochemistry has got MoU with **HAC, Keremane, Sagar Taluk,** Karnataka.
7. Department of Chemistry/ Biochemistry has got MoU with **Bhandimane life science research foundation, Sirsi,** Karnataka.

DEPARTMENTAL SOCIAL RESPONSIBILITY:

- We create awareness among students regarding water and gas conservation, environmental issues, eco-friendly chemical waste disposal along with the regular topics taught both in theory and practicals.

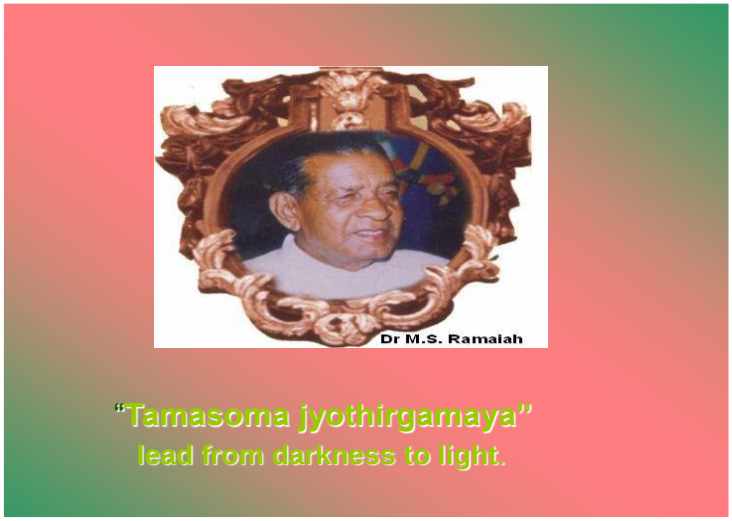
- Our students along with faculty are visiting the schools of nearby villages and conducting activities related to science for students to bring science awareness and enthusiasm to peruse their career in science.

INTER-INSTITUTIONAL ACTIVITIES:

- We conduct workshops/seminars/Conferences/FDPs and various inter-collegiate competitions in association with organizations like Indian Academy of Sciences (IASc), KSTA etc. for students of various colleges in Bengaluru.

BEST PRACTICES:

- Students should present seminars, poster and power point presentation of the topic of their choice related to chemistry other than their prescribed syllabus, to enhance the habit of reading and learning process.
- Innovative methods of learning the subject can be shared through the teacher in charge through the departmental mail id.
- Library resources: Departmental library with the collection of 164 reference books
- Outreach program like visit to schools in the rural area to nurture importance of science in young minds
- Hands on training: through conducting projects and workshops
- Department encourages teachers to apply for various govt. / Industry sponsored research grants and motivate the students to take part in such projects.
- Continues Career counselling and proctorial system.
- Biocon-Ramaiah QCA training.



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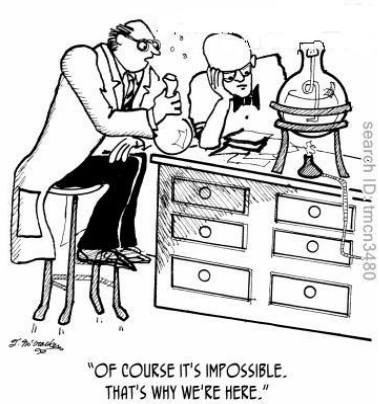

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