B.S. Abdur Rahman Crescent Institute of Science & Technology
Deemed to be University u/s 3 of the UGC Act, 1956

REGULATIONS 2016

CURRICULUM AND SYLLABI (I & II Semesters)

B.Sc

BIO TECHNOLOGY

VISION AND MISSION OF THE INSTITUTION

VISION

B.S. Abdur Rahman Crescent Institute of Science and Technology aspires to be a leader in Education, Training and Research in Engineering, Science, Technology and Management and to play a vital role in the Socio-Economic progress of the Country.

MISSION

- To blossom into an internationally renowned Institution
- To empower the youth through quality education and to provide professional leadership
- To achieve excellence in all its endeavors to face global challenges
- To provide excellent teaching and research ambience
- To network with global institutions of Excellence, Business, Industry and Research Organizations
- To contribute to the knowledge base through Scientific enquiry, Applied research and Innovation

VISION AND MISSION OFTHE DEPARTMENT OF LIFESCIENCES

VISION

To attain new heights in biotechnology research, shaping life sciences into a premier precision tool for the future for creation of wealth and ensuring social justice-specially for the welfare of the poor

MISSION

The mission of the school of life sciences and Technology is to maximize the benefits of biotechnology to the University, the nation and the globe by being an excellent quality, comprehensive, multidisciplinary school that supports, coordinates, disseminates and advances biotechnology in the areas of social welfare and entrepreneurship.

PROGRAMME EDUCATIONAL OBJECTIVES:

- "This course will facilitate the graduates to be professionally competent in Biotechnology to solve the problems in environmental, food, biochemical and biomedical sciences.
- This course will offer students with a solid foundation in Biological Sciences, to enable them to work on applications in biotechnology as per the requirement of the industries, and also will enable the students to pursue higher studies and research.
- This course will enable students to acquire knowledge on the fundamentals of Biochemistry, Cell biology, Microbiology and Molecular biology to enable them to understand basic concept in modern biology and help them to build their carrier in this field.
- This course will facilitate the students to acquire knowledge in skill based courses such as Biofertilizer Technology, Agricultural Biotechnology, Medical Biotechnology, Herbal Technology, Disease Management and Mushroom Culture Technology enabling their skills and give confidence to them for business opportunities.
- This programme will teach students the importance of Bioethics, entrepreneurship, communication and management skills.
- This course will also offer the graduates to demonstrate their proficiency in theory and practice of bio-techniques through life-long learning and provide confidence to perform as an individual and / or member of a team with professional and ethical behavior.

PROGRAMME OUTCOMES:

- Graduates of the course will have strong background in the interface of modern biology and skill based courses and be able to use these tools in business/industry and/or institutes wherever necessary.
- Graduates will identify, formulate, research literature, and analyze complex science problems reaching substantiated conclusions using first principles of mathematics, natural science, and applied sciences.

- Graduates will demonstrate knowledge and understanding of the science and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- Graduates of the course will have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
- Graduates of the course will function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- Graduates of the course will communicate effectively on complex science activities with the science community and with the society at large.
- Graduates of the course will apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering and technology practice.
- Graduates of the course will design solutions for complex science problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and cultural, societal, and environmental considerations.

B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE & TECHNOOGY

REGULATIONS -2016

FOR

BACHELOR OF COMPUTER APPLICATIONS (B.C.A)/

BACHELOR OF SCIENCE (B.Sc)/

BACHELOR OF BUSINESS ADMINISTRATION (B.B.A)/

BACHELOR OF COMMERCE (B.Com)

DEGREE PROGRAMME (Semester Scheme)

(Candidates to be admitted from the academic year 2016-2017 onwards)

1.0 PRELIMINARY DEFINITIONS & NOMENCLATURE

In these Regulations, unless the context otherwise requires:

i) **"Programme"** means Under Graduate Degree Programme (B.C.A/B.Sc/B.Com/B.B.A).

ii) **"Course"** means a theory or practical subject that is normally studied in a semester.

iii) **"Institution"** means B.S. Abdur Rahman Crescent Institute of Science & Technology.

iv) **"Dean (Academic Affairs)"** means the Dean (Academic Affairs) of B.S. Abdur Rahman Crescent Institute of Science & Technology.

v) **"Dean (Student Affairs)"** means the Dean (Students Affairs) of B.S. Abdur Rahman Crescent Institute of Science & Technology.

vi) **"Controller of Examinations"** means the Controller of Examination of B.S. Abdur Rahman Crescent Institute of Science & Technology, who is responsible for conduct of examinations and declaration of results.

2.0 PROGRAMME OFFERED, DURATION AND ELIGIBILITY CRITERIA

2.1 U.G. Programmes Offered

Degree	Mode of Study
B.C.A	Full Time
B.Sc	Full Time
B.B.A	Full Time
B.Com	Full Time

2.2 Duration of the Programme

The duration of the undergraduate program shall be six semesters (three

academic years).

2.3 Eligibility Criteria

2.3.1 Students for admission to the first semester of the under graduate degree programme must have passed the Higher Secondary Certificate examination or any other examination of any authority accepted by this Institution as equivalent thereto.

S.No	Programme	Eligibility Criteria
1	B.C.A	10 +2 (Higher Secondary) with Mathematics or equivalent subject
2	B.Sc Computer Science	10 +2 (Higher Secondary) with Mathematics or equivalent subject
3	B.Sc Bio Technology	10 +2 (Higher Secondary) with Chemistry as one of the subjects.
4	B.B.A (Financial Services)	10 +2 (Higher Secondary) with any stream or equivalent
5	B.Com General	10 +2 (Higher Secondary) with Mathematics, Physics and Chemistry/Physics, Chemistry, Botany and Zoology /Commerce /Statistics as subjects.
6	B.Com (Accounts and Finance)	

2.3.2 Eligibility conditions for admission such as marks obtained, number of in the qualifying examination and physical fitness will be as prescribed by this Institution from time to time.

2.4 Streams of Study

Taking into consideration the rapid developments in technology and to cater the needs of the industry, the following programmes are offered

S.No	Program	Streams of Study
1.	**B.C.A**	i. specialization in Cloud Technology and Information Security ii. specialization in Mobile Applications and Information Security

		iii. specialization in Big Data Analytics
2.	**B.Sc**	i. Computer Science ii. Bio Technology
3.	**B.B.A**	i. Financial Services
4.	**B.Com**	i. General ii. Accounts and Finance

3.0 STRUCTURE OF THE PROGRAMME

3.1 The UG Programme consists of the following components as prescribed in the curriculum

- Core Courses
- Allied Courses
- Elective Courses
- Laboratory courses
- Laboratory integrated theory courses
- Value added Courses
- Project Work

3.2 The curricula and syllabi of all UG programmes shall be approved by Board of Studies of the respective department and Academic Council of this Institution.

3.3 Each course is normally assigned certain number of credits :

- One credit for one lecture period per week.
- One credit for one tutorial period per week.
- One credit each for lab sessions/project of two or three periods per week.
- One credit each for value added courses of two or three periods per week.

3.4 The medium of instruction, examinations and project report shall be English, except for courses in languages other than English.

3.5 The minimum number of credits to be earned for the successful completion of the program shall be normally in the range as follows:

S.No	Programme	Credits
1	B.C.A (Cloud Technology and Information Security)	120 - 126
2	B.C.A (Mobile Applications and Information	120 - 126

	Security)	
3	B.C.A (Big Data Science)	120 - 130
4	B.Sc. (Computer Science)	120 – 126
5	B.Sc. (Bio Technology)	145 – 150
6	B.B.A (Financial Services)	120 - 125
7	B.Com	150 – 158
8	B.Com (Accounts and Finance)	150 – 158

3.6 The number of credits registered by a student in non-project semester and project semester shall be normally in the range as follows:

Non Project Semester: 20-28

Project Semester: 19-25

3.7 Elective courses from the curricula are to be chosen with the approval of the Head of the Department/ Dean of School

4.0 DURATION OF THE PROGRAMME

4.1 The minimum and maximum periods for the completion of the UG programmes are three years (6 semesters) and five years (10 semesters) respectively.

4.2 Each semester shall consist of a minimum of 90 working days.

4.3 Semester end examination will normally follow within a week after the last working day of the semester.

5.0 CLASS ADVISOR AND FACULTY ADVISOR

5.1 Class Advisor

A faculty member will be nominated by the HOD/Dean of School as Class Advisor for the class throughout the period of study.

The Class Advisor shall be responsible for maintaining the academic, curricular and co-curricular records of students of the class.

5.2 Faculty Advisor

To help the students in planning their courses of study and for general counseling, the Head of the Department / Dean of School of the students will attach a maximum of 20 students to a faculty member of the department who shall function as faculty advisor for the students throughout their period of study. Such faculty advisor shall guide the students in taking up the elective courses for registration and enrolment in every semester and also offer advice

to the students on academic and related personal matters.

6.0 COURSE COMMITTEE

Each common theory course offered to more than one group of students shall have a “Course Committee” comprising all the teachers teaching the common course with one of them nominated as course coordinator. The nomination of the course coordinator shall be made by the Head of the Department / Dean of School / Dean (Academic Affairs) depending upon whether all the teachers teaching the common course belong to a single department or to several departments. The Course Committee shall meet as often as possible and ensure uniform evaluation of the tests and arrive at a common scheme of evaluation for the tests. Wherever it is feasible, the Course Committee may also prepare a common question paper for the test(s).

7.0 CLASS COMMITTEE

A class committee comprising faculty members handling the courses, student representatives and a senior faculty member not handling the courses as chairman will be constituted semester-wise by the head of the department.

7.1 The composition of the class committee will be as follows:

- One senior faculty member preferably not handling courses for the concerned semester, appointed as chairman by the Head of the Department
- Faculty members of all courses of the semester
- Six student representatives (male and female) of each class nominated by the Head of the Department in consultation with the relevant faculty advisors
- All faculty advisors and the class advisors
- Head of the Department - Ex-Officio Member

7.2 The class committee shall meet at least four times during the semester. The first meeting will be held within two weeks from the date of commencement of classes, in which the nature of continuous assessment for various courses and the weightages for each component of assessment will be decided for the first and second assessment. The second meeting will be held within a week after the date of first assessment report, to review the students' performance

and for follow up action. The third meeting will be held within a week after the second assessment report, to review the students' performance and for follow up action.

7.3 During these three meetings the student members representing the entire class, shall meaningfully interact and express opinions and suggestions to improve the effectiveness of the teaching-learning process.

7.4 The fourth meeting of the class committee, excluding the student members, shall meet within 5 days from the last day of the semester end examination to analyze the performance of the students in all the components of assessments and decide their grades in each course. The grades for a common course shall be decided by the concerned course committee and shall be presented to the class committee(s) by the concerned course coordinator.

8.0 REGISTRATION AND ENROLMENT

8.1 Except for the first semester, every student shall register for the ensuing semester during a specified week before the semester end examination of the ongoing semester. Every student shall submit a completed registration form indicating the list of courses intended to be enrolled during the ensuing semester. Late registration with the approval of the Dean (Academic Affairs) along with a late fee will be permitted up to the last working day of the current semester.

8.2 From the second year onwards, all students shall pay the prescribed fees for the year on or before a specific day at the beginning of the semester confirming the registered courses. Late enrolment along with a late fee will be permitted up to two weeks from the date of commencement of classes. If a student does not enroll, his/her name will be removed from rolls.

8.3 The students of first semester shall register and enroll at the time of admission by paying the prescribed fees.

8.4 A student should have registered for all preceding semesters before registering for a particular semester.

9.0 COURSE CHANGE/ WITHDRAWAL

9.1 Change of a Course

A student can change an enrolled course within 10 working days from the

commencement of the course, with the approval of the Dean (Academic Affairs), on the recommendation of the Head of the Department/ Dean of School of the student.

9.2 Withdrawal from a Course

A student can withdraw from an enrolled course at any time before the first assessment test for genuine reasons, with the approval of the Dean (Academic Affairs), on the recommendation of the Head of the Department/ Dean of School of the student.

10.0 TEMPORARY BREAK OF STUDY FROM A PROGRAMME

A student may be permitted by the Dean (Academic Affairs) to avail temporary break of study from the programme up to a maximum of two semesters for reasons of ill health or other valid grounds. A student can avail the break of study before the start of first assessment of the ongoing semester. However the total duration for completion of the programme shall not exceed the prescribed maximum number of semesters (vide clause 4.1).If any student is debarred for want of attendance or suspended due to any act of indiscipline, it will not be considered as break of study. A student who has availed break of study has to rejoin in the same semester only.

11.0 ASSESSMENT PROCEDURE AND PERCENTAGE WEIGHTAGE OF MARKS

11.1 Every theory course shall have a total of three assessments during a semester as given below:

Type of Assessment	Course Coverage in Weeks	Duration	Weightage of Marks
Assessment 1	1 to 6	1.5 hours	25%
Assessment 2	7 to 12	1.5 hours	25%
Semester End Exam	Full course	3 hours	50%

11.2 The components of continuous assessment for theory/practical/laboratory integrated theory courses shall be finalized in the first class committee meeting.

11.3 Appearing for semester - end examination for each course is mandatory and a

student should secure a minimum of 40% marks in each course in semester end examination for the successful completion of the course.

11.4 Every practical course will have 60% weightage for continuous assessments and 40% for semester end examination. However a student should secure a minimum of 50% of the marks in the semester end practical examination.

11.5 For laboratory integrated theory courses, the theory and practical components shall be assessed separately for 100 marks each and consolidated by assigning a weightage of 75% for theory component and 25% for practical component. Grading shall be done for this consolidated mark. Assessment of theory component shall have a total of three assessments with two continuous assessments carrying 25% weightage each and semester end examination carrying 50% weightage. The student shall secure a separate minimum of 40% in the semester end theory examination. The evaluation of practical component shall be through continuous assessment.

11.6 In the case of Industrial training /Internship, the student shall submit a report, which will be evaluated along with an oral examination by a committee of faculty members, constituted by the Head of the Department/ Dean of School. The weightage for report shall be 60% and 40% for Viva Voce examination.

11.7 In the case of project work, a committee of faculty members constituted by the Head of the Department/ Dean of School will carry out three periodic reviews. Based on the project report submitted by the student(s), an oral examination (viva-voce) will be conducted as the semester end examination, for which one external examiner, approved by the Controller of Examinations, will be included. The total weightage for all periodic reviews will be 50%. Of the remaining 50%, 20% will be for the project report and 30% for the Viva Voce examination.

11.8 Assessment of seminars and comprehension will be carried out by a committee of faculty members constituted by the Head of the Department/ Dean of School.

11.9 For the first attempt of the arrear theory examination, the internal assessment marks scored for a course during first appearance will be used for grading along with the marks scored in the arrear examination. From the subsequent appearance onwards, full weightage shall be assigned to the marks scored in

the semester end examination and the internal assessment marks secured during the course of study shall be ignored.

12.0 SUBSTITUTE EXAMINATIONS

12.1 A student who has missed, for genuine reasons, a maximum of one of the two continuous assessments of a course may be permitted to write a substitute examination paying the prescribed substitute examination fees. However, permission to write a substitute examination will be given under exceptional circumstances, such as accidents, admission to a hospital due to illness, etc. by a committee constituted by the Dean of School for that purpose. However there is no Substitute Examination for Semester End examination.

12.2 A student who misses any continuous assessment test in a course shall apply for substitute exam in the prescribed form to the Head of the Department / Dean of School within a week from the date of missed assessment test. However the Substitute Examination will be conducted after the last working day of the semester and before Semester End Examination.

13.0 ATTENDANCE REQUIREMENT AND SEMESTER / COURSE REPETITION

13.1 A student shall earn 100% attendance in the contact periods of every course, subject to a maximum relaxation of 25% (for genuine reasons such as medical grounds or representing the Institution in approved events etc.) to become eligible to appear for the semester-end examination in that course, failing which the student shall be awarded “I” grade in that course. For the courses in which “I” grade is awarded, the student shall register and repeat the course when it is offered next.

13.2 The faculty member of each course shall cumulate the attendance details for the semester and furnish the names of the students who have not earned the required attendance in that course to the Class Advisor. The Class Advisor will consolidate and furnish the list of students who have earned less that 75% attendance, in various courses, to the Dean (Academic Affairs) through the Head of the Department/ Dean of School. Thereupon, the Dean (Academic Affairs) shall announce the names of such students prevented from writing the semester end examination in each course.

13.3 A student who has obtained ‘I’ grade in all the courses in a semester is not permitted to move to next higher semester. Such student shall repeat all the

courses of the semester in the subsequent academic year.

13.4 A student should register to re-do a core course wherein "I" or "W" grade is awarded. If the student is awarded, "I" or "W" grade in an elective course either the same elective course may be repeated or a new elective course may be taken with the approval of Head of the Department / Dean of School.

13.5 A student who is awarded "U" grade in a course will have the option either to write the semester end arrear examination at the end of the subsequent semesters, or to redo the course in the evening when the course is offered by the department. Marks scored in the continuous assessment during the redo classes shall be considered for grading along with the marks scored in the semester-end (redo) examination. If any student obtained "U" grade in the redo course, the marks scored in the continuous assessment test (redo) for that course will be considered as internal mark for further appearance of arrear examination.

13.6 If a student with "U" grade, who prefers to redo the course, fails to earn the minimum 75% attendance while redoing that course, then he / she will not be permitted to write the semester end examination and his / her earlier "U" grade and continuous assessment marks shall continue.

14.0 REDO COURSES

14.1 A student can register for a maximum of two redo courses per semester in the evening after regular college hours, if such courses are offered by the concerned department. Students may also opt to redo the courses offered during regular semesters.

14.2 The Head of the Department, with the approval of Dean Academic Affairs, may arrange for the conduct of a few courses during the evening, depending on the availability of faculty members and subject to a specified minimum number of students registering for each of such courses.

14.3 The number of contact hours and the assessment procedure for any redo course will be the same as those during regular semesters except that there is no provision for any substitute examination and withdrawal from an evening redo course.

15.0 PASSING AND DECLARATION OF RESULTS AND GRADE SHEET

15.1 All assessments of a course will be made on absolute marks basis. The Class

Committee, without the student members, shall meet within 5 days after the semester-end examination and analyze the marks of students in all assessments of a course and award suitable letter grades. The letter grades and the corresponding grade points are as follows:

Letter Grade	Grade Points
S	10
A	9
B	8
C	7
D	6
E	5
U	0
W	0
I	0
AB	0

"W" denotes withdrawal from the course.

"I" denotes inadequate attendance and hence prevention from semester-end examination

"U" denotes unsuccessful performance in the course.

"AB" denotes absence for the semester-end examination.

15.2 A student who earns a minimum of five grade points in a course is declared to have successfully completed the course. Such a course cannot be repeated by the student for improvement of grade.

15.3 The results, after awarding of grades, shall be signed by the Chairman of the Class Committee and Head of the Department/Dean of Schools and the results shall be declared by the Controller of Examinations.

15.4 Within one week from the date of declaration of result, a student can apply for revaluation of his / her semester-end theory examination answer scripts of one or more courses, on payment of prescribed fee, through proper application to Controller of Examination. Subsequently the Head of the Department/ Dean of School offered the course shall constitute a revaluation committee consisting of Chairman of the Class Committee as Convener, the faculty member of the course and a senior member of faculty knowledgeable

in that course. The committee shall meet within a week to revalue the answer scripts and submit its report to the Controller of Examinations for consideration and decision.

15.5 After results are declared, grade sheets shall be issued to each student, which will contain the following details:

- credits for each course registered for that semester.
- performance in each course by the letter grade obtained.
- total credits earned in that semester.
- Grade Point Average (GPA) of all the courses registered for that semester and the Cumulative Grade Point Average (CGPA) of all the courses taken up to that semester.

If Ci, is the number of credits assigned for the i^{th} course and GPi is the Grade Point in the i^{th} course, GPA will be calculated according to the formula

$$GPA = \frac{\sum_{i=1}^{n}(C_i)(GPi)}{\sum_{i=1}^{n} C_i}$$

Where n = number of courses

The Cumulative Grade Point Average CGPA shall be calculated in a similar manner, considering all the courses enrolled from first semester.

"I" and "W" grades will be excluded for calculating GPA.

"U", "I", "AB" and **"W"** grades will be excluded for calculating CGPA.

The formula for the conversion of CGPA to equivalent percentage of marks shall be as follows:

Percentage Equivalent of Marks = CGPA X 10

15.6 After successful completion of the programme, the Degree will be awarded with the following classifications based on CGPA.

Classification	**CGPA**
First Class with Distinction	8.50 and above and passing all the courses in first appearance and completing the programme within the Prescribed period of 6 semesters.
First Class	6.50 and above, having completed within a period of 8 semesters.
Second Class	Others

However, to be eligible for First Class with Distinction, a student should not

have obtained 'U' or 'I' grade in any course during his/her study and should have completed the U.G. programme within 6 semesters (except break of study). To be eligible for First Class, a student should have passed the examination in all the courses within 8 semesters reckoned from his/her commencement of study. For this purpose, the authorized break of study will not be counted. The successful students who do not satisfy the above two conditions will be classified as second class. For the purpose of classification, the CGPA will be rounded to two decimal places. For the purpose of comparison of performance of students and ranking, CGPA will be considered up to three decimal places.

16.0 ELECTIVE CHOICE:

16.1 Apart from the various elective courses listed in the curriculum for each programme, the student can choose a maximum of two electives from any stream of the same program during the entire period of study, with the approval of the Head of the parent department and the Head of the other department offering the course.

16.2 Online / Self Study Courses

Students are permitted to undergo department approved online/ self study courses not exceeding a total of six credits with the recommendation of the Head of the Department / Dean of School and with the prior approval of Dean Academic Affairs during his/ her period of study. In case of credits earned through online mode ratified by the respective Board of Studies, the credits may be transferred following the due approval procedures. The students shall undergo self study courses on their own with the mentoring of a member of the faculty. The online/ self study courses can be considered in lieu of elective courses.

17.0 SUPPLEMENTARY EXAMINATION

Final Year students can apply for supplementary examination for a maximum of two courses thus providing an opportunity to complete their degree programme. The students can apply for supplementary examination within three weeks of the declaration of results.

18.0 PERSONALITY AND CHARACTER DEVELOPMENT

18.1 All students shall enroll, on admission, in any of the personality and character

development programmes, NCC / NSS / NSO / YRC / Rotaract and undergo practical training.

- **National Cadet Corps (NCC)** will have to undergo specified number of parades.
- **National Service Scheme (NSS)** will have social service activities in and around Chennai.
- **National Sports Organization (NSO)** will have sports, games, drills and physical exercises.
- **Youth Red Cross (YRC)** will have social service activities in and around Chennai.
- **Rotaract** will have social service activities in and around Chennai.

19.0 DISCIPLINE

19.1 Every student is required to observe disciplined and decorous behavior both inside and outside the campus and not to indulge in any activity which will tend to affect the prestige of the Institution.

19.2 Any act of indiscipline of a student, reported to the Dean (Student Affairs), through the HOD / Dean will be referred to a Discipline and Welfare Committee nominated by the Vice-Chancellor, for taking appropriate action.

20.0 ELIGIBILITY FOR THE AWARD OF DEGREE

20.1 A student shall be declared to be eligible for the award of 3 year Bachelor provided the student has:

i) Successfully completed all the required courses specified in the programme curriculum and earned the number of credits prescribed for the specialization, within a maximum period of 10 semesters. from the date of admission, including break of study

ii) no dues to the Institution, Library, Hostels

iii) no disciplinary action pending against him/her.

20.2 The award of the degree must have been approved by the Institution.

21.0 POWER TO MODIFY

Notwithstanding all that has been stated above, the Academic Council has the right to modify the above regulations from time to time.

B.S. ABDUR RAHMAN CRESCENT INSTITUTE OF SCIENCE & TECHNOLOGY

B.Sc Bio Technology

CURRICULUM & SYLLABUS, REGULATIONS 2016

SEMESTER I

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C	
1	AEC	LNC1184	Tamil – I	4	1	0	4	
2	AEC	ENC1182	General English – I	4	1	0	4	
3	PC	LSC1101	Cell Biology	4	0	0	4	
4	PC	LSC1102	Cell Biology Lab	0	0	3	2	
5	PC	LSC1103	Microbiology	4	0	0	4	
6	PC	LSC1104	Microbiology Lab	0	0	3	2	
7	PC	CHB1182	Chemistry	3	0	0	3	
8	AEC	ENC1183	Communication Skills	2	0	0	2	**25**

SEMESTER II

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C	
1	AEC	ENC1283	English - II	4	1	0	4	
2	AEC	LNC1284	Tamil – II	4	1	0	4	
3	PC	LSC1201	Molecular Biology	4	0	0	4	
4	PC	LSC1202	Molecular Biology Lab	0	0	3	2	
5	PC	LSC1203	Bioinstrumentation	4	0	0	4	
6	PC	LSC1204	Bioinstrumentation Lab	0	0	3	2	
7	AC	LSC1205	Basics of Computers	4	0	0	4	
8	AEC	LSC1206	Confidence building behavioural skills	2	0	0	2	**26**

SEMESTER III

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C	
1	PC	LSC2101	Biochemistry	3	2	0	4	
2	PC	LSC2102	Biochemistry Lab	0	0	3	2	
3	PC	LSC2103	Basics of Genetics	4	0	0	4	
4	PC	LSC2104	Basics of Genetics Lab	0	0	3	2	
5	AC	LSC2105	Biostatistics	3	2	0	4	
6	GE		Skill Based Electives - I	3	0	0	3	
7	PE		Open Elective -I	4	0	0	4	
8	AEC	LSC2106	Quantitative Aptitude & Reasoning -I	2	0	0	2	**25**

SEMESTER IV

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C	
1	PC	LSC2201	Bioprocess Technology	3	2	0	4	
2	PC	LSC2202	Enzymology	3	2	0	4	
3	PC	LSC2203	Bioprocess Technology Lab	0	0	3	2	
4	PC	LSC2204	Enzymology Lab	0	0	3	2	
5	AC	LSC2205	Biophysics	3	2	0	4	
6	GE		Skill Based Electives - II	3	0	0	3	
7	PE		Open Elective -II	4	0	0	4	
8	AEC	LSC2206	Quantitative Aptitude & Reasoning -II	2	0	0	2	**23**

SEMESTER V

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C
1	PC	LSC3101	Plant Biotechnology	4	1	0	4
2	PC	LSC3102	Animal Biotechnology	4	1	0	4

3	PC	LSC3103	Plant Biotechnology Lab	0	0	3	2	
4	PC	LSC3104	Animal Biotechnology Lab	0	0	3	2	
5	PE		Core Elective -I	4	1	0	4	
6	PE		Core Elective -II	4	1	0	4	
7	GE	LSC3105	Environmental Science	3	0	0	3	**23**

SEMESTER VI

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C	
1	PC	LSC3201	Immunotechnology	4	1	0	4	
2	PC	LSC3202	Genomics and Proteomics	4	1	0	4	
3	PC	LSC3203	Immunology Lab	0	0	3	2	
4	PC	LSC3204	Genomics and Proteomics lab	0	0	3	2	
5	PE		Core Elective -III	4	1	0	4	
6	PE		Core Elective -IV	4	0	0	4	
7		LSC3205	Mini Project (Review/Research)	0	0	5	3	**23**

Total Credits: 145 Credits

LIST OF PROGRAMME ELECTIVES

SKILL BASED ELECTIVES

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C
1.	GE	LSCX101	Disease Management	3	0	0	3
2.	GE	LSCX102	Cytogenetics	3	0	0	3
3.	GE	LSCX103	Biofertilizer Technology	3	0	0	3
4.	GE	LSCX201	Agricultural Biotechnology	3	0	0	3
5.	GE	LSCX202	Herbal Technology	3	0	0	3

CORE ELECTIVES

Sl. No.	Course Group	Course Code	Course Title	L	T	P	C
1.	PE	LSCX111	Human physiology	4	0	0	4
2.	PE	LSCX112	Medical Biotechnology	4	0	0	4
3.	PE	LSCX113	Bioinformatics	4	0	0	4
4.	PE	LSCX114	Bioethics, IPR and Biosafety	4	0	0	4
5.	PE	LSCX115	Environmental Biotechnology	4	0	0	4
6.	PE	LSCX211	Nanobiotechonology	4	0	0	4
7.	PE	LSCX212	Cancer Biology	4	0	0	4
8.	PE	LSCX213	Pharmacology	4	0	0	4
9.	PE	LSCX214	Regenerative Medicine	4	0	0	4
10	PE	LSCX215	rDNA Technology	4	0	0	4

SEMESTER I

LNC 1184	TAMIL I	L	T	P	C
		3	1	0	3

OBJECTIVES:

- சமூக மாற்றச் சிந்தனைகளை உள்ளடக்கிய தற்கால இலக்கியங்களை அறிமுகம் செய்தல்
- புதுக்கவிதை, சிறுகதை, உரைநடை ஆகிய இலக்கியங்களின் நயம் பாராட்டுதல்
- சந்திப் பிழையின்றி எழுத மாணவர்களைப் பயிற்றுவித்தல்

MODULE I இருபதாம் நூற்றாண்டு மரபுக்கவிதைகள 8

மனோன்மணியம் சுந்தரனார் - தமிழ்த்தாய் வாழ்த்து, பாரதியார் - யோக சித்தி, பாரதிதாசன் - நீங்களே சொல்லுங்கள், கண்ணதாசன் - காலக்கணிதம்

MODULE II புதுக்கவிதைகள 8

ஈரோடு தமிழன்பன் - கனாக்காணும் வினாக்கள், மீரா - ஊசிகள், வைரமுத்து - அந்தி, நா.காமராசன் - அலிகள், தாமரை - ஒரு கதவும் கொஞ்சம் கள்ளிப்பாலும், மொழிபெயர்ப்புக் கவிதைகள் - கீதாஞ்சலி, மும்பைவாசிகள் (10 கவிதைகள் மட்டும்)

MODULE III சிறுகதைகள் 8

புதுமைப்பித்தன் - பால்வண்ணம் பிள்ளை, பி.எஸ்.ராமையா - பணம் பிழைத்தது, ஜெயகாந்தன் - விதியும் விபத்தும். கி.இராஜநாராயணன் - நாற்காலி, சு.சமுத்திரம் மொழிபெயர்ப்புச் சிறுகதைகள் - காகித உறவு, மாதவிக்குட்டி - நெய்ப்பாயாசம், அந்தோன்செகாவ் - பச்சோந்தி

MODULE IV மொழிப்பயிற்சி 7

கலைச்சொல்லாக்கம், பிழை திருத்தம் (ஒருமை, பன்மை, ல-ள-ழகர, ர�றீறகர, ண-ந-னகர வேறுபாடுகள்), அயற்சொற்களைதல்

MODULE V இலக்கிய வரலாறு 7

பாடந்தழுவியது (இருபதாம் நூற்றாண்டு மரபுக் கவிதைகள், புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும், சிறுகதையின் தோற்றமும் வளர்ச்சியும்)

MODULE VI படைப்பிலக்கியம 7

கவிதை எழுதுதல், சிறுகதை வரைதல்

L – 45; P – 30; TOTAL HOURS – 75

REFERENCES:

1. பொதுத்தமிழ் - செய்யுள்திரட்டு - தமிழ்த்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - சோம. இளவரசு
3. சிறுகதைத் தொகுப்பு (கட்டுரைக்களஞ்சியம்)

OUTCOMES:

1. மாணவர்கள் சமூக மாற்றச் சிந்தனைகளை அறிந்துகொள்வர்
2. சந்திப்பிழைகளை நீக்கி எழுதும் திறன் பெறுவர்
3. புத்திலக்கியங்களைப் படைக்கும் திறனையும் திறனாய்வு செய்யும் திறனையும் பெறுவர்

ENC1181	GENERAL ENGLISH – I	L	T	P	C
		4	1	0	4

OBJECTIVES:

- To help the students acquire efficiency in Spoken English through role plays.
- To enable them to make Presentation effectively.
- To develop reading skills among students through extensive readers.
- To orient them in writing letters.
- To train them in appreciating and interpreting English literature.

MODULE I **8**

Oral and Written Communication – implications in real life and workplace situations Essential English Grammar - 1-6 units

MODULE II **8**

One–minute Presentations (JAM) on concrete and abstract topics that test their creative thinking (ii) Prepared p and extempore presentations
Short Story; O Henry - “Robe of Peace” (Extensive Reading)

MODULE III **8**

Role-Play – establishing a point of view - convincing someone on social issues such as preservation of water, fuel, protection of environment, gender discrimination.
Poetry: William Shakespeare - “All the World’s a Stage”

MODULE IV **7**

Letter Writing- Letter of Invitation & Permission Developing story from hints- Short Story: John Galsworthy - “Quality” (Extensive Reading)

MODULE V **14**

Précis Writing- Writing instructions and recommendations Reading Comprehension: Short Story**--**Rudyard Kipling – “The Miracle of Puran Bhagat”(Extensive Reading) Written correspondence - - e-mail writing Prose : Education, Employment, Unemployment

L – 45; P – 30; TOTAL HOURS – 75

REFERENCES:

1. Anderson, Kenneth & et.al. “Study Speaking : A Course in Spoken English for Academic Purposes” (Second Edition). Cambridge University Press, UK. 2004.
2. Sharma, R.C. & Krishna Mohan, “Business Correspondence and Report Writing”.

3. Tata MacGraw – Hill Publishing Company Limited, New Delhi. 2002
4. Hurlock, B. Elizabeth “Personality Development”. Tata McGraw Hill, New York, 2004.
5. Krishnaswamy. N, Sriraman T. Current English for Colleges. Hyderabad: Macmillan Indian Ltd, 2006.
6. Dahiya SPS. Ed. Vision in Verse- An Anthology of Poems. New Delhi: Oxford University Press, 2002
7. Murphy, Raymond. Essential English Grammar. New Delhi: Cambridge University Press, 2009.
8. Seshadri, K G Ed. Stories for Colleges. Chennai: Macmillan India Ltd, 2003.

OUTCOMES:

Students would be able to

- Actively take part in role plays
- Make effective presentation s
- Read and comprehend various texts.
- Write letters without making mistakes.
- Analyse literary texts.

LSC1101	CELL BIOLOGY	L	T	P	C
		4	0	0	4

OBJECTIVES:

- To get overview of classes of cells and structural and function aspects of membrane structure and functions.
- To develop a detailed knowledge of cell organelle.
- To develop skill to understand Cell division.
- To understand tissue organization and stem cells.

MODULE I INTRODUCTION TO CELL **12**

Discovery of cells-a brief history: Cell Theory; Basic properties of cell, Different classes of cell: Prokaryotic and eukaryotic cell; difference between plant cell and animal cell.

MODULE II CELL MEMBRANE **12**

Structure and function of plasma membrane, Transport of substances through cell membrane- osmosis, diffusion and its types, Active transport (sodium pump) and passive transport; membrane potential, measuring membrane potential, ion channels- Na^+ and K^+ channels, action potential and nerve impulse.

MODULE III CELL ORGANELLE AND CYTOSKELETON **12**

Nucleus-structure and function, concept of chromosomes; Mitochondria, Chloroplast Endoplasmic reticulum, Golgi apparatus, lysosome, Membrane transport- exocytosis and endocytosis, cytoskeleton structures- intermediate filaments, microtubules- tubulin, centrosome structure, actin filaments, muscle contraction.

MODULE IV CELL SIGNALLING **12**

Principles of cell signaling, cell surface receptors, ion channel coupled receptors, G-protein coupled receptors, GPCRs, cAMP signaling pathway, Calcium signaling pathway, Enzyme coupled receptors, RTKs, Ras pathway.

MODULE V CELL DIVISION AND CELL CYCLE **12**

Cell cycle, regulation of cell cycle, mitosis-different stages of mitosis and proteins involved, meiosis- stages of meiosis I and II; genetic recombination, Meiotic non

disjunction.

TOTAL HOURS – 60

REFERENCES:

1. Essential Cell Biology by Albert et.al. John Wiley & Sons, 4Ed, 2015
2. The Cell by Cooper. ASM Press, 4Ed, 2007
3. Cell and Molecular Biology by Karp. John Wiley & Sons, 7Ed, 2013

OUTCOMES:

At the end of this course students will be able to:

- Define components of a cell
- Understand cellular structure and functions
- Understand the mechanisms of Cell cycle control and cell division

LSC1102	CELL BIOLOGY LAB	L	T	P	C
		0	0	3	2

OBJECTIVES:

The students should be able to

1. Understand explicitly the concepts
2. Develop their skills in the preparation and identification of cell structures and their functions

LIST OF EXPERIMENTS

1. Introduction to microscopes used for cell biology studies
2. Microscopic study of cell and cell organelles
3. Cell counting and viability
4. Mitosis and the Cell Cycle in Onion Root-Tip Cells
5. Blood smear preparation
6. Buccal Smear Preparation
7. Isolation of Mitochondria
8. Isolation of Chloroplast

TOTAL HOURS - 45

REFERENCES:

Laboratory Manual

OUTCOMES:

Students will learn about

- Basic methods in cell biology
- Characterization and structure of cell isolated from various sources

LSC1103	MICROBIOLOGY	L	T	P	C
		4	0	0	4

OBJECTIVES:

- To offer a sense of the history of microbial science, its methodology and its many contributions to humanity
- To ensures the students to understand about the microbiology and diseases.

MODULE I BASICS OF MICROBIOLOGY **12**

Microbiology - history and scope– General structure & functions -viruses, bacteria, algae, fungi, protozoa –Microscopy - Principles & classification of microbes – Whittaker five kingdom classification.

MODULE II STERILIZATION **12**

Sterilization and disinfection - stain and staining methods –. Microbial media – methods of obtaining pure cultures - Phases of growth curve, Factors influencing the growth of microbes –classification of microorganisms.

MODULE III FOOD AND INDUSTRIAL MICROBIOLOGY **12**

Role of microbes in food production - Microbiology of fermented food and dairy products - Alcoholic beverages- Food spoilage and Preservation processes. Production of antibiotics, amino acids and organic Acids.

MODULE IV MEDICAL MICROBIOLOGY **12**

Pathogenesis, lab diagnosis, prevention and control of important microbial diseases. Pathogenic bacterial diseases, Fungal diseases, Viral Diseases and Protozoan diseases.

MODULE V ENVIRONMENTAL MICROBIOLOGY **12**

Role of microbes in the ecosystems – Microorganisms in soil, air and water. Sewage treatment methods - biological nitrogen fixation - biofertilizers.

TOTAL HOURS – 60

REFERENCES:

1. Microbiology: An Introduction: Tortora, Funke & Case. 7th edition, 2001

2. A. H. Patel, “Industrial microbiology”, Macmillan Publishers India, 2002.
3. Pelezar, chan, “Microbiology ”– Krieg Tata McGraw Hill Publications, 2007.
4. Prescott, Harley and Klein, “Microbiology”, McGraw Hill publications, Fifth edition, 2003.
5. Wulf Crueger and Anneliese Crueger, “Biotechnology – A textbook of Industrial Microbiology”, Panima publishing corporation, New Delhi , 2000, reprint 2005.
6. Jacquelyn G.Black, “Microbiology -Principles and Explorations” Wiley publications 2008.

OUTCOMES:

At the end of the course the students will be able to

• demonstrate a broad understanding of the diversity and range of microorganisms, the interactions between humans and microorganisms, the role of microorganisms in industrial and environmental processes, and their role in the development of the techniques that underpin modern molecular biology

• demonstrate proficiency in a set of core microbiological and molecular biologicaltechnical methods, including both an understanding of the principles of the methods and their utilisation in laboratory settings

• demonstrate familiarity with the risk assessment process, and use this information to operate safely in the laboratory environment

• collect, organise, analyse, evaluate and interpret experimental data using appropriate quantitative, technological and critical thinking skills

• communicate microbiological principles and information effectively to diverse audiences, using a variety of formats

LSC1104	MICROBIOLOGY LAB	L	T	P	C
		0	0	3	2

OBJECTIVES:

Provides an opportunity to experimentally verify the theoretical concepts already studied. It also helps in understanding the theoretical principles in a more explicit and concentrated manner. The students should be able to

• Understand explicitly the concepts

• Develop their skills in the preparation, identification and quantification of Microorganisms

LIST OF EXPRIMENTS

1. Bio-safety guideline.
2. Preparation of media for growth of various organisms.
3. Identification and culturing of various organisms
4. Staining of microorganisms. – Grams staining, spore staining, capsular staining.
5. Measure of bacterial population by turbidometry and studying the effect of temperature, pH, carbon and nitrogen.
6. Assay of antibiotics production and demonstration of antibiotic resistance.
7. Biochemical tests to identify various organisms

TOTAL HOURS – 45

REFERENCES:

Laboratory Manual

OUTCOMES:

Students will learn about

Basic methods in microbiology

Characterization and isolation of bacteria isolated from various sources

Growth kinetics of Bacteria

CHB1182	CHEMISTRY	L	T	P	C
		3	0	0	3

OBJECTIVES:

The students should be conversant with

- the basic problems like hardness, alkalinity, dissolved oxygen associated with the water used for domestic and industrial purpose and treatment process involved.
- the synthesis, properties and applications of nanomaterials.
- the importance of renewable energy sources like solar, wind, biogas, biomass, geothermal, ocean and their limitations.
- the basic analytical techniques like UV-Visible, FT-IR, NMR, AAS, AES, Circular Dichroism and XRD etc.
- photochemistry concepts related to physical processes and chemical reactions induced by photon absorption and their applications.
- basic principles of electrochemistry, cell construction and evaluation and to understand general methodologies for construction & design of electrochemical cell

MODULE I WATER TECHNOLOGY **8**

Impurities present in water, hardness : types of hardness, demerits of hard water in boilers, estimation of hardness by EDTA method (problems) – alkalinity : estimation of alkalinity (problems) – dissolved oxygen: estimation of dissolved oxygen – conditioning methods : external treatment method: – lime soda and zeolite process (principle only), Ion exchange process – Internal treatment : colloidal, carbonate, phosphate and calgon methods – drinking water: standards (BIS), treatment of domestic water {screening, sedimentation, coagulation, filtration, disinfection }– desalination: electrodialysis, reverse osmosis.

MODULE II NANOCHEMISTRY **8**

Introduction – distinction between molecules, bulk materials and nanoparticles – classification based on dimension with examples – synthesis (top-down and bottom-up approach} : sol-gel, thermolysis (hydrothermal and solvothermal), electrodeposition, chemical vapour deposition, laser ablation – properties and applications (electronic, magnetic and catalytic) – risk factors and future perspectives.

MODULE III ENERGY SOURCES **8**

Energy: past, today, and future – a brief history of energy consumption – present energy scenario of conventional and renewable energy sources – renewable energy : needs of renewable energy, advantages and limitations of renewable energy – solar energy: basics, solar energy in the past , photovoltaic, advantages and disadvantages – bioenergy: conversion, bio degradation, biogas generation, biomass gasifier, factors affecting biogas

generation, advantages and disadvantages – geothermal energy: geothermal resources (hot dry rock and magma resources, natural and artificial), advantages and disadvantages – wind energy: wind resources, wind turbines, advantages and disadvantages – ocean energy: wave energy, wave energy conversion devices, ocean thermal energy, advantages and disadvantages.

MODULE IV PHOTOCHEMISTRY 7

Introduction: absorption and emission, chromophores, auxochromes – laws of photochemistry : Grotthus-Draper law, Stark Einstein law – quantum yield (problems) – photo physical processes : fluorescence and phosphorescence - Jablonski diagram (electronic states and transitions) – quenching, annihilation – photosensitization: principle and applications – chemiluminescence, bioluminescence.

MODULE V ELECTROCHEMISTRY 7

Electrochemistry - types of electrodes (principle and working) : gas (SHE), metal/metal ion electrode, metal-metal insoluble salt (calomel electrode), ion-selective (glass electrode and fluoride ion selective electrode) – Electrolytic and galvanic cells, construction of cell, EMF measurement and applications (problems), standard cell (Weston-cadmium), reversible and irreversible cell, concentration cell. Determination of fluoride ion using fluoride ion selective electrode – Chemically modified electrodes (CMEs) : concept, approaches and applications.

TOTAL HOURS – 45

REFERENCES:

1. S. Vairam, P. Kalyani and Suba Ramesh, “Engineering Chemistry”, Wiley India Ltd., New Delhi, 2011.
2. G.A. Ozin and A.C. Arsenault, “Nanochemistry: A Chemical Approach to Nanomaterials”, RSC Publishing, Thomas Graham House, Cambridge, 2005.
3. P.C Jain & Monica Jain, Engineering Chemistry Dhanpatrai Publishing Company (P) Ltd., New Delhi (2013).
4. S S Umare & S S Dara, A text Book of Engineering Chemistry, S. Chand & Company Ltd, New Delhi, 2014.
5. G.D.Rai, “Non conventional energy sources,” Khanna Publishers, New Delhi, 2011.
6. John Twidell and Tony Weir, “Renewable Energy Resources, Taylor & Francis Ltd, London, United Kingdom, 2005
7. Principles of molecular photochemistry: An introduction, Nicholas J. Turro, V.Ramamurthy and Juan C. Scaiano, University Science Books, Sausalito, CA, 2009.

OUTCOMES:

The students will be able to

- solve problems related to hardness, alkalinity, dissolved oxygen associated with the water and

describe the treatment processes.

- classify nanomaterials and apply the nanochemistry approach to synthesize the nanomaterials.
- explain the principle and enumerate the advantages and disadvantages of various renewable energy sources.
- state the principle and illustrate the instrumentation of various analytical techniques.
- apply the concepts of photochemistry to elaborate various photo-physical and photochemical reactions.
- construct a electrochemical cell and describe the various types of electrodes and determine the fluoride content.

ENC1183	COMMUNICATION SKILLS	L	T	P	C
		2	0	0	2

OBJECTIVES:

• To help the students acquire efficiency in Spoken English with due importance to Stress, Accent and Pronunciation

• To enable them to make Presentation effectively

• To prepare them for Interviews and Group Discussions

• To train them in writing official letters , resume'writing and reports.

MODULE I **8**

Theory: Oral and Written Communication – implications in real life and workplace situations

Lab: Listening to ESL Podcast- Viewing Multimedia- Listening to BBC News- Received Pronunciation (RP/VOA/NDTV) – exposure to paralinguistic features.

MODULE II **8**

Theory:

(i) One–minute Presentations (JAM) on concrete and abstract topics that test their creative thinking

(ii) Prepared presentations and extempore presentations

Lab: viewing Presentation Tips, Interviews Skills

(iii) Group project – presentation on any social issue. The group will have to research on the history of the problem, its cause, impact and outcome hoped for and then make a presentation

MODULE III **8**

Theory: Developing persuasive skills – establishing a point of view – convincing some one on social issues such as preservation of water, fuel, protection of environment, gender discrimination.

Lab: Negotiating Skills, Expressing Opinion

MODULE IV **8**

Theory: Brainstorming – Think, pair and share activity – Discussion etiquette

63 – Assigning different roles in a GD (Note-taker, Manager, Leader and Reporter)

Lab: Viewing Group Discussion

MODULE V **13**

Theory: Written correspondence - Letter of Application and CV - e-mail writing - writing instructions and recommendations – Lab reports
Lab: Resume' writing – viewing different types – Functional, Chronological- Writing one's resume using wiki, viewing e-mail etiquette, format and style.
Theory: Technical Writing –Writing a technical Proposal – format- cover page, executive summary, time line chart, budget estimate, drafting, conclusion.

TOTAL HOURS – 45

REFERENCES:

1. Anderson, Kenneth & et.al. "Study Speaking : A Course in Spoken English for Academic Purposes" (Second Edition). Cambridge University Press, UK. 2004.
2. Sharma, R.C. & Krishna Mohan, "Business Correspondence and Report Writing". Tata MacGraw – Hill Publishing Company Limited, New Delhi. 2002.
3. Hurlock, B. Elizabeth. "Personality Development". Tata McGraw Hill, New York. 2004.
4. M. Ashraf Rizvi 'Effective Technical Communication". Tata McGraw – Hill Education, 2005.
5. 6.Gerson, Sharon & Steven M. Gerson, " Technical Writing : Process and Product" Pearson Education, New Delhi, 2004.
6. Riordan & Pauley. 'Report Writing Today'. 9th Edition. Wadsworth Cengage Learning, USA. 2005.

OUTCOMES:

On completion of the course, the students will have the ability to speak effectively and write official letters, reports and proposals.

SEMESTER II

ENC1282	**GENERAL ENGLISH II**	**L**	**T**	**P**	**C**
		3	**1**	**0**	**3**

OBJECTIVES:

- To prepare students for Interviews and Group Discussions
- To train them in writing official letters , resume' writing and reports.
- To train them in analysing different genre of literature.

MODULE 1 **7**

Filling Money Order Challan and Bank Challan Short Story :G.K.Chesterton – The Hammer of God (Extensive Reading) Essential English Grammar – 7-12 units

MODULE 2 **8**

Brainstorming – Think, pair and share activity Poetry : Walt Whitman- I Celebrate Myself

MODULE 3 **8**

Dialogue Writing- Discussion etiquette -Assigning different roles in a GD (Note-taker, Manager, Leader and Reporter) Prose: Environment

MODULE 4 **8**

Interview skills- SWOT Analysis Letter Writing- Letter to the Editor- Letter of Application and CV

MODULE 5 **8**

Report Writing- feasibility report and survey report Short Story : Katherine Mansfield—A Cup of Tea (Extensive Reading)

MODULE 6 **6**

Technical reports –Writing a technical report – format and content

TOTAL HOURS – 45

1. M. Ashraf Rizvi ‘Effective Technical Communication”. Tata McGraw – Hill Education, 2005. Gerson, Sharon & Steven M. Gerson, “ Technical Writing : Process and Product”
2. Pearson Education, New Delhi, 2004. 6. Riordan & Pauley. ‘Report Writing Today’. 9th Edition. Wadsworth Cengage Learning, USA. 2005.
3. Krishnaswamy. N, Sriraman T. Current English for Colleges. Hyderabad: Macmillan Indian Ltd, 2006.
4. Dahiya SPS. Ed. Vision in Verse- An Anthology of Poems. New Delhi: Oxford University Press, 2002.
5. Murphy, Raymond. Essential English Grammar. New Delhi: Cambridge University Press, 2009.
6. Seshadri, K G Ed. Stories for Colleges. Chennai: Macmillan India Ltd, 2003.

OUTCOMES:

After completing the course the students would be able to

- Take part in group discussions and interviews with confidence.
- Write official letters, their application letter with CV and reports.
- Analyse various genre of literature.

LNC 1284	TAMIL II	L	T	P	C
		3	1	0	3

OBJECTIVES:

- சமூக மாற்றச் சிந்தனைகளை உள்ளடக்கிய தற்கால இலக்கியங்களை அறிமுகம் செய்தல்
- புதுக்கவிதை, சிறுகதை, உரைநடை ஆகிய இலக்கியங்களின் நயம் பாராட்டுதல்
- சந்திப் பிழையின்றி எழுத மாணவர்களைப் பயிற்றுவித்தல்

MODULE I அற இலக்கியங்கள் 8

திருக்குறள் - சொல்வன்மை (65ஆம் அதிகாரம்), நாலடியார் - அவையறிதல் (5 பாடல்கள் - 32ஆம் அதிகாரம்), பழமொழி நானூறு - இன்னா செய்யாமை (5 பாடல்கள்), இனியவை நாற்பது - முதலைந்து பாடல்கள்

MODULE II பக்தி இலக்கியங்கள் 8

தேவாரம் - மூவர் தேவாரம் (15 பாடல்கள்) அப்பர் தேவாரம், திருஞானசம்பந்தர் தேவாரம், சுந்தரர் தேவாரம் (ஒவ்வொன்றிலிருந்தும் ஐந்து பாடல்கள்), காரைக்காலம்மையார் - மூன்று பாடல்கள் (அற்புதத் திருவந்தாதி), மாணிக்க வாசகர் - திருவெம்பாவை (தேர்ந்தெடுக்கப்பெற்ற 5 பாடல்கள்), ஆண்டாள் - திருப்பாவை (தேர்ந்தெடுக்கப்பெற்ற 5 பாடல்கள்), குலசேகராழ்வார் - திருவேங்கடத்தில் பிறத்தலும் இருத்தலும் போதுமெனல் (11 பாசுரம்)

MODULE III காப்பியங்கள் 8

மணிமேகலை - ஆதிரை பிச்சையிட்ட காதை (20 அடிகள் மட்டும்), கம்பராமாயணம் - பாலகாண்டம், நாட்டுப்படலகம் (10 பாடல்கள் மட்டும்), இரட்சணிய யாத்ரிகம் - சிலுவைப்பாடு (10 பாடல்கள்), சீறா புராணம் - மானுக்குப் பிணைநின்ற படலம் (6 பாடல்கள்)

MODULE IV கட்டுரைகள் 7

உ.வே.சாமிநாதையர்-தமிழ்நாட்டு வணிகர். வ.இராமசாமி ஐயங்கார்-மூதறிஞர் இராஜகோபாலாச்சாரியார், மா.இராசமாணிக்கனார்-சித்தன்னவாசல் ஓவியங்கள், பி.எல்.சாமி-சங்க இலக்கியத்தில் அறிவயல் கலை, க.கைலாசபதி - பாரதியும் மேனாட்டுக் கவிஞரும், தொ. பரமசிவன் - சொல்லும் பொருளும்.

MODULE V இலக்கிய வரலாறு 7

அற இலக்கியங்களின் தோற்றமும் வளர்ச்சியும், சைவ வைணவ இலக்கியங்கள் தோற்றமும் வளர்ச்சியும், காப்பியங்கள் தோற்றமும் வளர்ச்சியும், உரைநடை தோற்றமும் வளர்ச்சியும்

MODULE VI **மொழிப்பயிற்சி** **7**

இலக்கணக் குறிப்புத் தருதல், வல்லினம் மிகுமிடங்களும், மிகாவிடங்களும், மொழிபெயர்ப்பு (ஆங்கிலத்திலிருந்து தமிழில் பெயர்த்தல்), கடிதங்களும் வகைகளும்

L – 45; P – 30; TOTAL HOURS – 75

REFERENCES:

1. பொதுத்தமிழ் - செய்யுள்திரட்டு - தமிழ்த்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - சோம. இளவரசு
3. சிறுகதைத் தொகுப்பு (கட்டுரைக்களஞ்சியம்)

OUTCOMES:

- மாணவர்கள் சமூக மாற்றச் சிந்தனைகளை அறிந்துகொள்வர்
- சந்திப்பிழைகளை நீக்கி எழுதும் திறன் பெறுவர்
- புத்திலக்கியங்களைப் படைக்கும் திறனையும் திறனாய்வு செய்யும் திறனையும் பெறுவர்

LSC1201	MOLECULAR BIOLOGY	L	T	P	C
		4	0	0	4

OBJECTIVES:

The aim is to extend understanding of the molecular mechanisms via which genetic information is stored, expressed and transmitted among generations

MODULE I DNA REPLICATION **12**

Semiconservative mode of replication, Mechanism of Prokaryotic and Eukaryotic DNA replication, Enzymes and accessory proteins involved in DNA replication

MODULE II DNA DAMAGE AND REPAIR **12**

Chemical modifications of DNA, Ionizing radiations and DNA damage, DNA double strand breaks, DNA damage repair, Base excision repair and Nucleotide excision repair, NHEJ and homologous recombination in DNA double strand break repair

MODULE III TRANSCRIPTION **12**

Prokaryotic transcription, Eukaryotic transcription, RNA polymerase, Chain elongation models, Transcription termination in prokaryotes and eukaryotes General and specific transcription factors, Regulatory elements.

MODULE IV TRANSCRIPTION MODIFICATIONS IN RNA **12**

5'-cap formation, transcription termination, 3 '-end processing and polyadenylation, Splicing, Editing, Nuclear export of mRNA and mRNA stability.

MODULE V TRANSLATION **12**

Prokaryotic and Eukaryotic translation, the translation Machinery; Mechanisms of initiation, elongation and termination, regulation of translation

TOTAL HOURS –60

REFERENCES:

1. Molecular Biology of the Gene. James D Watson, 7Ed. Cold Spring Harbor Laboratory Press. 2014
2. Molecular Biology. Robert F Weaver, 5Ed, McGraw Hill, 2013
3. Molecular Biotechnology. Glick and Pasternak, 4Ed, ASM Press, 2010.

OUTCOMES:

Through completion of this course, the student will achieve,

- A basic understanding of the central dogma of molecular biology
- An exposure to the modern day techniques employed to study DNA and hence gene functions

LSC1202	MOLECULAR BIOLOGY LAB	L	T	P	C
		0	0	3	2

OBJECTIVES:

- To learn basic techniques in molecular biology
- To study and to differentiated the electrochemical properties of nucleic acids

LIST OF EXPERIMENTS

1. Agarose gel electrophoresis of chromosomal & plasmid DNA
2. Extraction of genomic DNA from bacteria
3. Extraction of plasmid DNA from bacteria
4. Isolation of RNA from bacteria
5. Isolation of DNA fragment from agarose gel

TOTAL HOURS –45

REFERENCES:

1. Michel R. G and Sambrook J. Molecular Coning- A laboratory manual. Cold spring harbor laboratory press, 2012.

OUTCOMES:

On the completion of the above experiments students will be able to handle DNA samples and also to isolate, purify and visualize nucleic acid.

LSC1203 BIOINSTRUMENTATION L T P C

4 0 0 4

OBJECTIVES:

The students will be exposed to basic concepts related with techniques and instrumentation widely used in Biotechnology.

MODULE I COLORIMETRY AND SPECTROSCOPY 12

Principle and application of colorimeter, ultraviolet spectroscopy, Infra-red, Nuclear magnetic resonance spectroscopy and Mass Spectroscopy (GCMS, LCMS & MSMS).

MODULE II CENTRIFUGATION AND MICROSCOPY 12

Principle of centrifugation, rotors, different types of centrifuges, preparative and analytical centrifugation, ultra centrifugation. Optical microscopy, Bright field, Dark field, phase contrast and fluorescence microscopy. Electron microscopy: Transmission and scanning electron microscopy, Atomic force microscopy.

MODULE III ELECTROPHORESIS 12

General principle, support media. Agarose gels, polyacrylamide gels. SDS PAGE, 2D PAGE Pulsed field gel electrophoresis Iso-electric focusing Capillary electrophoresis

MODULE IV RADIOISOTOPE TECHNIQUES 12

Study of radioisotopes in biological samples, autoradiography- GM counter, scintillation counters, radio –immunoassay.

MODULE V CHROMATOGRAPHY 9

Introduction: Chromatography theory and practice. Paper chromatography. Thin layer chromatography. Ion exchange chromatography. Affinity chromatography. Partition chromatography. Adsorption chromatography. Introduction to gas chromatography and HPLC. Permeation.

TOTAL HOURS – 60

REFERENCES:

1. Pierre C. ORD and CD in chemistry and biochemistry: An Introduction. Academic Press, 1972.
2. Paddock S. W. Confocal Microscopy methods & protocols.1st Ed., Human Press, 1999.
3. Murphy D. B. Fundamental of Light Microscopy & Electron Imaging. 1st Ed., Wiley-Liss, 2001.

OUTCOMES:

At the end of the course, the students will have sufficient scientific understanding of the basic concepts in instrumentation used in Biotechnology.

LSC1204	BIOINSTRUMENTATION LABORATORY	L	T	P	C
		0	0	3	2

OBJECTIVES:

- Provides an opportunity to experimentally verify the theoretical concepts of bioenergetics and protein engineering already studied. It also helps in understanding the theoretical principles in a more explicit and concentrated manner.

LIST OF EXPERIMENTS:

1. Preparation of Acetate, Tris and Phosphate Buffer systems and validation of Henderson-Hasselbach equation.
2. Reactions of amino acids – Ninhydrin, Pthaldehyde, Dansyl chloride – measurement using colorimetric and fluorimetric methods.
3. Differential estimations of carbohydrates – reducing vs non-reducing, polymeric vs oligomeric, hexose vs pentose
4. DNA determination by UV-Vis Spectrophotometer – hyperchromic effect
5. Separation of lipids by TLC.
6. Enzyme Kinetics: Direct and indirect assays – determination of K_m, V_{max} and
7. Restriction enzyme – Enrichment and Module calculation
8. Ion-exchange Chromatagraphy – Purification of IgG and Albumin
9. Gel filtration – Size based separation of proteins
10. SDS-PAGE Gel Electrophoresis

TOTAL HOURS – 45

REFERENCES:

1. Biochemical Methods: A Concise Guide for Students and Researchers, Alfred Pingoud, Claus Urbanke, Jim Hoggett, Albert Jeltsch, 2002 John Wiley & Sons Publishers, Inc,

2. Biochemical Calculations: How to Solve Mathematical Problems in General Biochemistry, 2nd Edition, Irwin H. Segel, 1976 John Wiley & Sons Publishers, Inc,

3. Principles and Techniques of Practical Biochemistry- Wilson, K. and Walker, J. Cambridge Press.

OUTCOMES:

On the completion of the above objectives student will be able to perform biochemical assays, electrochemical techniques, spectrophotometry and chromatography.

LSC 1205 BASICS OF COMPUTERS

L	T	P	C
3	1	0	4

OBJECTIVES:

To know about computer and to operate the computer.
To familiarize the office suite.

MODULE I INTRODUCTION TO COMPUTER **12**

What is Computer – Evolution – Basic Components – Memory – Software Components - Input / Output Devices - External Storage Devices – Personal Computer – Work Station - Mainframes.

MODULE II MS - WORD **12**

Introduction – User Interface – Themes and Quick Styles - Server Components Word Basics: Parts of Word Window – Formatting Features – Menus, Commands, Toolbars and their Icons – MS Word menus in focus - Word Exercise I – Word Exercise II.

MODULE III MS-EXCEL **12**

Introduction – Entering and Editing Text - Menus, Commands and Toolbars – MS Excel Menus in Focus - Excel Exercise-I – Alternate method - Entering formulas – Formatting Cells, Date Range – Inserting Headers & Footers – Saving a file and opening a file.

MODULE IV MS-POWER POINT **12**

Creating a new presentation and new slide– Opening a presentation – Deleting a slide, Copying a slide – Numbering the Slides – Saving a presentation – Changing the default directory – Printing a presentation – Working with Power Point – MS Power Point Menus in focus – Formatting in Power Point.

MODULE V MS-ACCESS **12**

Parts of an Access Window – MS Access Menus in Focus – Starting Microsoft Access – Creating a New Database – Creating Table using Table Wizard – Saving the Database - Creating Tables in design view – Query – Forms – Reports.

TOTAL HOURS – 60

REFERENCES:

1. Sanjay Saxena, “MS Office for Everyone”, Vikas Publishing House Pvt. Ltd., New Delhi, 2010, Reprinted 2010,.
2. Sinha P.K., “Computer Fundamentals”, BPB Publications, 6th Edition, New

Delhi, 2004.

OUTCOMES:

On the completion of the above objectives student will be able to operate the computer.

LSC1206	CONFIDENCE BUILDING BEHAVIOURAL SKILLS	L	T	P	C
		2	0	0	2

OBJECTIVES:

To enable the students to develop communication skills for verbal communication in the work place.

MODULE I **8**

This course is practical oriented one and exercises will be given to the students group users /individually depending upon the aspect considered. The following aspect will form the broad outline content of the syllabi. The exercises will be designed by the faculty member and coordinated by the overall course coordinator.

LAB ACTIVITIES:

- Introduction: Soft skills definition, examples
- Verbal communication: Case study, communication and discussion
- Prepared speech
- Impromptu speech
- Debate: Case studies - Attitude and Behavior: role play and exploration
- Ability to ask for help – communication and team work
- Manners and etiquette
- Organization and Planning
- Time keeping
- Conduct in workplace
- Conscientiousness
- Work output
- Professionalism
- Motivation
- Ownership of tasks
- Adaptability/flexibility

ASSESSMENT:

The assessment will be continuous and portfolio based. The students must produce the record of the work done through the course of the semester in the individual classes. The portfolio may consist of a) the individual task outline and activities, b) worked out activities c) Pre-designed sheets which may be provided by the Faculty member. The portfolio will be used by the Faculty member for

assessment. The course coordinator in consultation with the course committee shall decide at the beginning of the semester, the number of exercises, method of assessment of each and the weightage for the end semester assessment.

TOTAL HOURS – 45

OUTCOMES:

The students should be able to:

- develop verbal communication skills
- debate with other students confidently
- communicate effectively their ideas