

RCS – 2024



NEHRU ARTS AND SCIENCE COLLEGE

An Autonomous Institution affiliated to Bharathiar University
(Reaccredited with “A+” Grade by NAAC, ISO 9001:2015 & 14001:2004 Certified
Recognized by UGC with 2(f) & 12 B, Under Star College Scheme by DBT, Govt. of India)
Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105, Tamil Nadu.



REGULATIONS, CURRICULUM & SYLLABUS

UMB

B. Sc. MICROBIOLOGY



Effective from 2024 – 2025

REGULATIONS

NEHRU ARTS AND SCIENCE COLLEGE
(AUTONOMOUS)
REGULATIONS FOR UNDERGRADUATE DEGREE COURSES

Choice Based Credit System blended with Outcome Based Education

Regulations with effect from the Academic Year 2024 - 2025

Definition

- a) Programme – A course of study leading to the award of a degree in a discipline.
(E.g.: B. Sc. / B. Com.)
- b) Branch – Discipline of study (e.g. B.Sc. Computer Science)
- c) Curriculum – The various courses (subjects) a student must study in a particular branch.
- d) Course – The Theory & Practical subject offered under each curriculum.
- e) Credit – A unit of measurement based on the duration of the contact hours, content and quality of the subject matter.

1. UG Curriculum

The UG Curriculum follows CBCS pattern and the medium of instruction is English.

2. Eligibility for Admission to the Course

Candidates for admission to the first year of the UG degree programmes are required to **have passed the higher secondary examination** (Academic or Vocational) conducted by the Govt. of Tamil Nadu in the relevant subjects or other examinations accepted as equivalent thereto by the Parent University, subject to such other conditions as may be prescribed thereof.

3. Duration of the Programme

The UG programme will comprise six semesters with two semesters per academic year, extending over a total duration of three years. Examination shall be conducted at the end of every semester for the respective courses. Each semester has 90 instructional days consisting of 5 teaching hours per working day. Thus, each semester has 450 teaching hours and the whole programme has 2700 teaching hours. In addition to 5 Academic hours per day, sixth hour is used for Training the Students with Skill oriented Courses which includes Career Enhancement Courses, Value added Courses, Industrial Visits, Internships etc. Thus 90 hours in a Semester is used to enhance the skill component of the Students.

4. Choice Based Credit System (CBCS)

All Undergraduate Programmes offered by the University shall be under Choice Based Credit System (CBCS). Choice based credit system is introduced with the aim of offering flexibility in the choice of courses to the students.

Objectives of the Choice Based Credit System

- To facilitate the students to have greater flexibility in their choice of courses.
- To widen the spectrum of knowledge of students by means of Core, Allied, Project / Electives, Value Education, Environmental Studies and Skill Based Subjects.
- To revamp the curriculum which enables to impart entrepreneurial skills and placement potentials qualities.
- To incorporate need based knowledge in tune with the location and neighborhood of the Institution.
- To allocate credit points to each paper of the study based on the weightage of the contact hours, content and quality.
- To extend opportunities to fast learners in order to earn additional credit from advanced as well as additional courses.
- To maintain the total credit points of each programme on par with international standards.

5. Outcome Based Education (OBE)

OBE is an **educational** theory that bases each part of an **educational** system around goals (**outcomes**). By the end of the **educational** experience, each student should have achieved the goal.

Objectives of Outcome based curriculum

- The Programme Outcomes and Programme Specific Outcomes are clearly identified and unambiguously specified regarding the content, context and competence.
- The expected outcome should be defined by setting bench marks for each level of the programme. Benchmark should tackle and define specifically, the goals of the curriculum and verify ways to access whether the students have reached these goals at the level of study;

- OBE is driven by assessments that focus on well defined learning outcomes and not by other factors such as what is taught, the duration taken by the student to achieve the outcomes or which path the students take to achieve their targets. In OBE, assessment techniques must be with clear description of expected performance.

Definitions

Outcome: An outcome of an educational Programme is what the student should be able to do at the end of a Programme / Course / Instructional Unit.

Levels of Outcomes

- **Programme Educational Objectives:** PEOs outline the expected achievements of graduates, emphasizing long-term goals, industry relevance, societal impact, and ongoing growth.
- **Programme Outcomes:** POs are statements that describe what the students graduating from any of the educational Programmes should be able to do.
- **Programme Specific Outcomes:** PSOs are statements that describe what the graduates of a specific educational Programme should be able to do.
- **Course Outcomes:** COs are statements that describe what students should be able to do at the end of a course

Learning Outcomes: It describes levels of achievement that can be attained across the domains of learning. Here **K1** representing Remember; **K2** – Understanding; **K3** – Apply; **K4** – Analyze; **K5** – Evaluate, **K6** – Create are used to measure the levels of achievement in learning.

6. Course of Study

The Course of Study for the UG degree courses of all branches shall consist of the following:

6.1. Part I : Language : Tamil or any one of the modern / Classical languages i.e. Malayalam, French and Hindi.

It is absolutely obligatory for all the UG students to study a language under part I. A student can select and study any one of the languages offered under part I. The syllabus drafted would enable the students to communicate with the ease and effectiveness in that language. It shall be offered during the Semesters I to IV with one examination at the end of each semester.

6.2. Part II : Language : English

The study of English has been made mandatory for all UG students under part II. English being the window to the outer world in the context of the globalization scenario, the contents of the syllabus is tailored in a fashion suitable for imparting the classical and the modern facets of the language and literature, besides conferring a mastery of fluency and command over the language, providing a clout to compete for employment opportunities. The subject shall be offered during the Semesters I to IV with one examination at the end of each semester.

6.3. Part III : Core Subjects, Allied Subjects and Project or Elective Courses:

1) **Core Subjects :** Each programme has a group of Core courses arranged semester wise. The syllabi of the core courses will enlighten the students in the acquisition of the basic concepts of their respective disciplines, besides getting focused on to the recent trends. The core courses will span over six semesters and examination shall be conducted in the core subjects at the end of every semester.

2) **Allied Subjects :** In all disciplines, the UG students must study Allied courses along with the core courses, which would supplement, suit and support the major course of study. The Allied Subjects is to be studied during the first four semesters of the UG programmes and examination shall be conducted at the end of every semester.

3) **Project, Internships and Electives with three Courses :** In all disciplines, the UG student shall undergo a Project and Internships and he / she must study three Elective Courses.

Three Elective courses are to be offered one in the V semester and two in the VI Semester. Elective subjects are to be selected from the list of electives prescribed by the concerned Board of Studies during the fifth and Sixth Semester along with the Core Subjects.

A student shall take up a project work in addition to his elective subjects. The report of the study should be submitted at the end of course duly certified by the supervisor and forwarded by the Head of the Department / Principal of the College. The Head of the Department of the programme concerned shall assign a project supervisor, who in turn shall assign the topic and monitor the project work of the student.

A student shall complete Internship as per the recommendations of BoS concerned.

6.4. Part IV :

1. a) Those who have not studied Tamil up to XII std and taken a Non-Tamil language under Part-I shall take 'Basic Tamil' Comprising of two Courses. The course content of which shall be equivalent to that prescribed for the 6th Standard by the Board of Secondary Education and they shall be offered in the third and fourth semesters.
- b) Those who have studied Tamil up to XII std and taken a Non-Tamil language under Part-I shall take 'Advanced Tamil' comprising of two Courses in the third and fourth semesters.

(OR)

- c) Others who do not come under the above a + b categories can choose the following Non-major electives (NME) comprising of two courses with 2 credits each (4 credits) in the **third and fourth semesters.**
 - 1) Consumer Affairs / Gender Sensitization / Women's Rights (**III semester.**)
 - 2) General Awareness (**IV semester.**)

Note: The assessment for the category in Part IV – 1 b and 1 c subjects shall be through End Semester examination (ESE) for the total marks prescribed. There shall be no Continuous Internal Assessment (CIA).

2. Skill Based Subjects : For UG degree, ten Skill Enhancement Courses are to be offered between Semesters II and VI which includes 4 Skill based Subjects, 3 placement Trainings, One Value Added Course, One Industrial visit, One Open Elective Subject. The examination shall be conducted in the skill based subjects at the end of the semesters where they are offered.

3. Ability Enhancement Compulsory Course – Human Rights and Constitution of India:

It is a course to impart the knowledge about the basic Human rights, Classification of human rights, Human Rights Commission and Constitution of India. The total mark is 50 for 2 credits. One Internal Examination shall be conducted for 25 marks in the II semester during CIA II and there is no ESE. The learning outcomes are further measured by various assessment criteria for 25 marks by the Course Teacher concerned.

4. Ability Enhancement Compulsory Course – Environmental Studies : It is a course on Environmental Science which underlines the importance of environment apart from sensitizing students to the dimensions of Environmental problems. The total mark is 50 for 2 credits. One Internal Examination shall be conducted for 25 marks in I semester during CIA II and there

is no ESE. The learning outcomes are further measured by various assessment criteria for 25 marks by the course teacher concerned.

- 5. Human Values and Yoga Practice:** It is a course to inculcate human values among students to develop physical, mental, social and spiritual health which will enhance personality of the students and also improve the institutional climate in the campus. Human Values and Yoga Practice is offered during Semesters I and II with one hour of Yoga and one hour of Human values to be handled alternatively in a week. This course carries a total of 50 marks comprising 25 marks of Internal Practical Assessment for Yoga and 25 marks of written Examination for Human values during CIA II of Semester II.
- 6. Skill Based Open Elective Courses (Extra Departmental Courses):** Any student studying any programme can do course except the course offered by his / her Department. All the UG programmes shall offer two skill based courses as **Extra department Courses**, during semester III with 2 credits each. The students can choose one among the courses offered by other departments. The examination will be conducted at the end of the semester. There shall be no continuous Internal Assessment (CIA).
- 7. Value Based Open Elective Courses (Intra School Courses) :** During Semester IV, list of Open Elective Courses are offered to Students. These Courses are value based and help to inculcate the values and positive attitude among the Students. Each School will offer a list of courses and the Students shall choose any one open Elective Course they prefer and appear for the Examination to earn 2 mandatory credits. The examination will be conducted at the end of the Semester. There shall be no continuous Internal Assessment (CIA). However the NCC Cadets will appear for theory paper in NCC to earn these credits.
- 8. Career Enhancement Courses:** UG students shall undergo 3 Placement Training Courses offered by Nehru Corporate and Industrial Relations to enhance their employability skills. These Courses will be conducted between the semesters I and V. The training will include sessions on Resume writing, interview skills, Communication skills, Aptitude Training, and other relevant areas. One Course will be conducted for 36 hours including the Assessment with a credit weightage of one. Each student will undergo 03 placement Training Courses for 108 hours to earn 3 credits during the entire programme. The assessment will be based on Personal introduction Round, Public Speaking Skill, Group Discussion, attendance, and a Computer Based Test at the end of the course.

Each student is expected to score 75% attendance to gain marks for attendance component. However those who gain attendance between 55% and 74% are eligible for other Assessments except attendance marks.

Those who gain attendance below 55% or have not attained minimum pass mark should redo the course with other batches in the same Semester or along with Junior Batches during next Academic year. Students in the V Semester who missed the training and Assessment will be given a chance during Semester VI based on request.

9. Add-on Course

Each Department shall conduct a Value Added Course to their students during III and IV Semesters for 60 hours with 2 credits. The MoU with the Industry / Association shall be signed and the Classes shall be conducted without affecting the regular class hours. The Examination and the Assessment shall be conducted by the Industry / Association. The HoD of concerned department shall forward the marks to the Examination section during the end of semester IV for awarding credits.

10. Industrial Exploration / Corporate connect

To bridge the gap between theoretical knowledge and practical application, students must participate in Industrial Visits organised by the Departments. The visit shall be between Semesters II to V where the students undergo an Assessment after the visit within a week. The Assessment for 25 marks includes involvement in the Industrial Visit (5), Group Discussion (10) and a Quiz (10). The Assessment shall be done by the Teacher Coordinator of the Industrial Visit in the presence of the HoD.

6.5. Part V : Extension Activities : Every student shall participate compulsorily for period of not less than two years (4 semesters) in any one of the programmes. **(NSS / Sports and Games / YRC / RRC)**

Each student must choose any one of the courses offered during the first four semesters. The object of the slot is to build- up the ethics, awareness and involvement in social service, acquisition of knowledge and training in discipline leading to national integration and patriotism, and feeling fit and fine through participation in games and athletics.

The student's performance shall be examined by the staff in-charge of Extension activities along with the Head of the respective departments and a senior member of the Department on the following parameters.

- 20% of marks for Regularity of attendance
- 60% of marks for Active Participation in classes / camps / games / special camps / programmes in the College / District / State / University activities.
- 10% of marks for Exemplary Awards / Certificates / Prizes.
- 10% of marks for other Social components such as Blood Donations, Fine Arts, etc.

The grades will be awarded at the end of the Fourth Semester. The mark sheet shall carry the gradation relevant to the marks awarded to the candidates. The marks shall be sent to the Controller of Examinations before the commencement of the final semester examinations.

Table 1 : Grades for Extension Activity

Range of Marks	Grade Point	Letter Grade	Description
90 – 100	9.0 – 10.0	O	OUTSTANDING
80 – 89	8.0 – 8.9	D+	EXCELLENT
75 – 79	7.5 – 7.9	D	DISTINCTION
70 – 74	7.0 – 7.4	A+	VERY GOOD
60 – 69	6.0 – 6.9	A	GOOD
50 – 59	5.0 – 5.9	B	AVERAGE
40-49	4.0-4.9	C	SATISFACTORY
00-39	0.0	U	RE-APPEAR
ABSENT	0.0	AAA	ABSENT

This grading shall be incorporated in the mark sheet to be issued at the end of the semester. (Handicapped students who are unable to participate in any of the above activities shall be required to take a test in the theoretical aspects of any one of the above fields and be graded and certified accordingly)

7. Additional Credit Course

Students are given the opportunity to undertake optional papers, additional to their compulsory papers, in order to gain additional credit that would boost their grades. These are not mandatory. Students can earn to a maximum of 10 credits.

Table 2: Regulations for Additional Credits

S. No.	Subject	Credit / course	Total credits
1	Presentation / Publication of Research papers in International Conferences / Journals.	1	1
2	Completion of Diploma / Certificate Courses	1	1
3	Self Study Papers	1	2
4	MOOC Courses prescribed by the Departments	1	2
5	Achievements - Sports / Social Activities / Co curricular / Extracurricular Activities at University / District / State / National / International levels	1	1
6	Swachh Bharath Summer Internship Programme	2	2
7	Visits Abroad for Participation in International Academic events	1	1
		Total	10

Rules: The Students can earn additional credits only if they complete the above during the course period (II to V Sem.) and based on the following criteria. Proof of Completion must be submitted to the Office of Controller of Examinations to award additional credits.

1. Students can earn an additional credit if they present / publish research papers in International conferences / reputed Journals
2. Students can complete Diploma / Certificate Courses for a minimum of 30 hrs (II to V Sem. only) from reputed centres and the same certificate shall be produced to earn a credit. They shall be guided by the Department if needed.
3. Students can earn one credit, if they complete One Self Study Paper prescribed by the Department. The Departments shall offer two Self Study Papers.
4. Students can earn one Credit, if they complete any one MOOC courses prescribed by the Department. Students shall earn a maximum of 2 Additional Credits by completing 2 online courses.
5. Award Winners in Sports / Social Activities / Co curricular / Extra Curricular Activities at University / District / State / National / International levels can earn one Extra Credit by producing the Certificate.
6. As per the direction of Ministry of Human Resource Development, Swachh Bharath Summer Internship Programme is introduced to the students as an optional paper. Students interested to join the internship programme are required to register and report

the activities conducted during the internship period on the website <https://sbsi.mygov.in>. They shall gain 2 credits if they produce Swachh Bharath Internship Certificate provided by MHRD on completion of their internship.

7. **Extra Credit for NCC Cadets** : NCC Cadets shall gain Extra credits as mandated by UGC and Bharathiar University apart from 2 credits to be added for Part V-Extension Activity during Semester VI. The regulations for the Extra credits shall be communicated to the Cadets through the NCC Officer of the College.

8. Regulations for Awarding credits to NCC Cadets

Semester	Credits Allocated		Remarks
	Camp	Theory	
III	2		Credits if 1st camp merged with 3 rd Semester
IV		2	Under Value based Open Elective course (Mandatory credit)
V	2		Credits if 2 nd camp merged with 5 th Semester
Total	6 credits		

9. Scheme of Examination

Table 3: Summary: CBCS for Undergraduate programmes with language for Four Semesters

Components of Study	No. of Subjects	Credit per Subject #	Total Credits	Marks	Total Marks
Part-I: Tamil / Other Languages	2 + 2 = 4	3	12	75	300
Part-II : English	2 + 2 = 4	3	12	75	300
Part-III					
Core subjects	16 -20	2/ 3 / 4	64-66	50 / 75 / 100	2300
Allied subjects	4 – 6	2/ 3 / 4	14 -16	50 / 75 / 100	
Electives	3	4	12	100	
Part-IV 1. (a) Those who have not studied Tamil up to XII std. and taken a non-Tamil language under part-I shall take Basic Tamil comprising of two courses(level will be at 6 th std.) (b) Those who have studied Tamil up to XII std and taken a non –Tamil language under part-I shall take Advanced Tamil comprising of two courses.	2	2	4	50	100

I others who do not come under a + b can choose non-major Elective comprising of three courses.(NME)					
2. Skill Enhancement Course (Discipline Specific)	4	3	12	75	300
3. Human Rights and Constitution of India	1	2	2	50	50
4. Environmental Studies	1	2	2	50	50
5. Human Values and Yoga Practice	1	2	2	50	50
6. Value Added Course	1	2	2	50	50
7. Open Elective Courses	2	2	4	50	100
8. Skill Enhancement Course : Career Enhancement Courses	3	1	3	25	75
9. Skill Enhancement Course : Industry Exploration / Corporate Visit	1	1	1	25	25
Part V: Extension activities	1	2	2	50	50
		Total	150		3750
Additional Credits	II – V Semesters			10 credits	

- No CIA marks for Additional Credit
- No CIA Tests or ESE for Extension Activities.
- For Value Added course, Examination shall be conducted by the Industry for a duration of 3 hours and the marks out of 50 shall be forwarded to the CoE.
- For Career Enhancement Courses, Assessment / Examination shall be conducted by NCPIR.

10. Requirement to appear for the Examinations

Attendance Requirements for the Students appearing for ESE

- The guidelines of attendance requirement issued by Bharathiar University are adopted by the College. Attendance shall be considered semester- wise (not annually).
- A candidate shall be permitted to appear for the Semester Examinations in any semester, if he / she secures not less than 75% of attendance in the total number of working days during the semester and if his / her progress has been satisfactory, and his / her conduct has been satisfactory.

- Those who have obtained below 75% and above 65% of attendance shall pay condonation fee and shall write the examination in the same semester with due permission from the Principal.
- Those who have below 65% and above 50% of attendance are not eligible to write the examination in current semester subjects but are permitted to continue their studies in the next semester provided that this is the first time that the candidate earned attendance between 50% and 65%. Else the candidates have to discontinue the course and re-join in the same semester subjects in the next year with proper approval of the Principal. However, the candidates are eligible to write arrear subjects if any.
- Those who have below 50% of attendance have to redo the semester.

11. Restrictions to appear for the examinations

- a) Any candidate having arrear paper(s) shall have the option to appear in any arrear paper along with the regular semester papers.
- b) Candidates who fail in any of the course of Part I, II, III, IV & V of UG degree examinations shall complete the course concerned **within 5 years** from the date of admission to the said programme, and if they fail to do so, they shall take the examination in the texts / revised syllabus prescribed for the immediate next batch of candidates. If there is no change in the texts / syllabus they shall appear for the examination in that course with the syllabus in vogue until there is a change in the texts or syllabus. In the event of removal of that course consequent to change of regulation and / or curriculum after 5 year period, the candidates shall have to take up an equivalent course in the revised syllabus as suggested by the Chairman of the concerned board of studies and fulfill the requirements as per the regulations for the award of the degree.

12. Medium of Instruction and Examinations

The Medium of instruction and Examinations for the courses of Part I, II & IV shall be in the language concerned. For part III courses, the medium of instruction and the medium of Examination are English and / or bilingual in certain subjects.

13. Distribution of Marks

The following are the distribution of marks for Examination & Evaluation pattern:

Table 4 : Distribution of Marks between End Semester Exam (Theory) and Internal Assessment is 75 : 25

Total Marks	External		Internal	Overall Passing Minimum for Total Marks (Internal + External)
	Max. Marks	Passing Minimum for External alone	Max. Marks	
100	75	30	25	40
75	55	22	20	30
50	40	16	10	20

Table 5 : The following are the Distribution of marks for the Continuous Internal Assessment in the theory papers of UG programmes

S. No.	For Theory - UG courses	Distribution of Marks		
01.	CIA I	5	4	2
02.	CIA II (Online Test)	5	4	2
03.	CIA III	6	5	4
04.	OBE Evaluation – Tool 01	3	2	1
05.	OBE Evaluation – Tool 02	3	2	1
06.	OBE Evaluation – Tool 03	3	3	-
	TOTAL MARKS	25	20	10

14. Continuous Internal Assessment (CIA)

Three CIA's shall be conducted at regular Intervals. CIA I shall be a 2 hours written test for a maximum of 50 marks and CIA II shall be conducted as Computer Based test (MCQ's) for 50 marks. CIA III shall be conducted as Model Examination for ESE.

15. OBE Evaluation - Assignment / Seminar / Role play, etc.

Three OBE Assessment parameters are decided for each course to evaluate the achievement of course outcomes which shall be assessed by the concerned course teacher. The marks allotted to this component will be awarded based on the performance of the candidate. The Rubrics for awarding the marks shall be maintained by the Course Teacher concerned.

Table 6 : Distribution of Marks between End Semester Exam (Practical) and Internal Assessment is 60:40.

Total Marks	External		Internal	Overall Passing Minimum for total marks (Internal + External)
	Max. Marks	Passing Minimum for External alone	Max. Marks	
100	60	24	40	40
75	45	18	30	30
50	30	12	20	20

Table 7 : Distribution of marks for the Continuous Internal Assessment in UG practical courses

S. No.	For - UG practical Courses	Distribution of Marks		
01.	Laboratory Performance - Assessment Tool 01*	5	4	3
02.	Laboratory Performance - Assessment Tool 02*	5	4	3
03.	Laboratory Performance - Assessment Tool 03*	5	4	3
04.	Test 1 : During Mid semester	10	7	4
05.	Test 2 : As model test at the end of the semester	10	7	4
06.	Observation Note Book	5	4	3
Total Marks		40	30	20

* For measuring the Course Outcomes

16. Observation Notebook & Regularity

The marks allotted for observation notebook & regularity are awarded based on the performance of students in writing procedure, results of the practical done during every practical class, regularity in attending practical class, which will be accounted based on the attendance maintained separately for practical class, and punctuality in the submission of observation notebook.

Table 8 : Distribution of marks for the External Assessment in UG Practical courses

S. No.	For - UG practical courses	Distribution of Marks		
		1.	Experiment – I	20
2.	Experiment – II	20	15	10
3.	Record	10	10	5
4.	Viva Voce	10	5	5
	TOTAL MARKS	60	45	30

**Table 9 : Distribution of marks for Project and Viva Voce examinations /
Industrial Training of UG programmes**

Total Marks	External		Internal	Overall Passing Minimum for Total Marks (Internal + External)
	Max. Marks	Passing Minimum for External alone	Max. Marks	
100	60	24	40	40
75	45	18	30	30

**Table 10 : Distribution of marks for the Continuous Internal Assessment in UG Project /
Industrial Training Courses.**

S. No.	For - UG Project courses / Industrial Training	Distribution of Marks	
		1.	Review – I
2.	Review – II	10	7
3.	Review – III	10	7
4.	Document, Preparation and Implementation	10	9
	TOTAL MARKS	40	30

**Table 11 : Distribution of marks for the External Examination in UG Project /
Industrial Training courses**

S. No.	For - UG Project / Industrial Training courses	Distribution of Marks	
		1.	Record Work and Presentation
2.	Viva Voce	20	15
	TOTAL MARKS	60	45

Table 12 : The courses which have only Continuous Internal Assessment and no End Semester Examinations (ESE)

S. No.	Subject	Total Marks
1.	Environmental Studies	50
2.	Human Rights and Constitution of India	50
3.	Basic Tamil I	50
4.	Basic Tamil II	50
5.	Human Values and Yoga Practice	50
7.	Career Enhancement Courses	75
8.	Industry Exploration	25
	TOTAL	350

For the above mentioned subjects, the examinations shall be only Continuous Internal Assessment (CIA) as prescribed in the syllabus. The marks shall be furnished to the CoE.

Table 13 : The courses which have only End Semester Examinations (ESE) and no Continuous Internal Assessment

S. No.	Subject	Total Marks
1.	Non – Major Electives / Advanced Tamil I	50
2.	General Awareness / Advanced Tamil II	50
3.	Skill Based Open Elective Courses	50
4.	Value Based Open Elective Courses	50
	TOTAL	200

17. Passing Minimum

A candidate who secures **not less than 40%** in the End Semester Examination and 40% marks in the External Examination and Continuous Internal Assessment put together in any theory course of Part I, II, III & IV shall be declared to have passed the examination in the subject (Theory and Practical). Thus the minimum pass mark for theory subject is 30 out of 75 in ESE and also 40 marks out of 100 (CIA+ESE).

A candidate who passes the examination in all the courses of Part I, II, III, and IV & V shall be declared to have passed, the whole examination. Thus to obtain UG degree a student should pass in all the courses prescribed in the concerned programme and also he / she should earn 144 credits.

18. Marks & Grade

Once the marks of the CIA and End Semester Examinations for each of the course are available, they shall be added. The mark thus obtained shall then be converted to the relevant letter grade as per the details given below to indicate the performance of the candidate.

Table 14 : Conversion of Marks to Grade Points & Letter Grade(Performance in a course / paper)

Range of Marks	Grade Point	Letter Grade	Description
90-100	9.0-10.0	O	Outstanding
80-89	8.0-8.9	D+	Excellent
75-79	7.5-7.9	D	Distinction
70-74	7.0-7.4	A+	Very Good
60-69	6.0-6.9	A	Good
50-59	5.0-5.9	B	Average
40-49	4.0-4.9	C	Satisfactory
00-39	0.0	U	Re-Appear
ABSENT	0.0	AAA	Absent

19. Grade Point Average (GPA)

Grade point average (GPA) is calculated for each part taking into account all the courses studied under each part. Calculation of grade point average semester-wise and part-wise is as follows:

$$\text{GPA} = \frac{\text{Sum of the multiplication of grade points by the credits of the courses}}{\text{Sum of the credits of the courses in a semester}}$$

$$\text{GPA} = \frac{\sum_i (C_i * G_i)}{\sum_i C_i}$$

Where C_i = Credit earned for course i in any semester.

G_i = Grade points obtained for course i in any semester.

20. Cumulative Grade Point Average (CGPA)

For the entire program CGPA is calculated in the following manner:

$$\text{CGPA} = \frac{\sum_n \sum_i C_{ni} * G_{ni}}{\sum_n \sum_i C_{ni}}$$

$$\text{CGPA} = \frac{\text{Sum of the multiplication of grade points by the credits of the entire programme under each part}}{\text{Sum of the Credits of the Courses of the entire programme under each part}}$$

21. Classification of CGPA

A candidate who has passed all the examinations under different parts (Part-I to Part V) is eligible for the following part wise computed final grades based on the range of CGPA.

Table 15 : Classification of performance of Students based on the Cumulative Grade Points Average

CGPA	Grade	Classification of Final Result
9.5-10.0	O+	First Class - Exemplary
9.0 and above but below 9.5	O	
8.5 and above but below 9.0	D++	First Class with Distinction
8.0 and above but below 8.5	D+	
7.5 and above but below 8.0	D	
7.0 and above but below 7.5	A++	First Class
6.5 and above but below 7.0	A+	
6.0 and above but below 6.5	A	
5.5 and above but below 6.0	B+	Second Class
5.0 and above but below 5.5	B	
4.5 and above but below 5.0	C+	Third Class
4.0 and above but below 4.5	C	
0.0 and above but below 4.0	U	Re-appear

A candidate who passes all the examinations in Part I to Part V securing following CGPA and Grades shall be declared as follows **for Part I or Part II or Part III:**

- a) A candidate who has passed all the Part-III subjects examination in the first appearance within the prescribed duration of the UG programmes and secured a CGPA of 9 to 10 and equivalent grades “O” or “O+” in part III comprising Core, Electives and Allied subjects shall be placed in the category of “**First Class – Exemplary**”.
- b) A candidate who has passed all the Part-III subjects examination in the first appearance within the prescribed duration of the UG programmes and secured a CGPA of 7.5 to 9 and equivalent grades “D” or “D+” or “D++” in part III comprising Core, Electives and Allied subjects shall be placed in the category of “**First Class with Distinction**”.
- c) A candidate who has passed all Part-III subjects examination of the UG programmes and secured a CGPA of 6 to 7.5 and equivalent grades “A” or “A+” or “A++” shall be declared to have passed that part in “**First Class**”.
- d) A candidate who has passed all Part-I or Part-II subjects examination of the UG programmes and secured a CGPA of 6 and above and equivalent grades “A” or “A+” or “A++” shall be declared to have passed that parts in “**First Class**”.
- e) A candidate who has passed all the Part-I or Part-II or Part-III subjects examination of the UG programmes and secured a CGPA of 5.0 to 6 and equivalent grades “B” or “B+” shall be declared to have passed that parts in “**Second Class**”.
- f) A candidate who has passed all the Part-I or Part-II or Part-III subjects examination of the UG programmes and secured a CGPA of 4.0 to 5 and equivalent grades “C” or “C+” shall be declared to have passed that parts in “**Third Class**”.
- g) There shall be no classifications of final results for Part IV and Part V. However, those parts shall be awarded with final grades in the End semester statements of marks and in the Consolidated statement of marks.

22. Improvement of Marks in the subjects already passed

Candidates desirous of improving the marks awarded in a passed subject in their first attempt shall reappear in the subsequent semester only. The improved marks shall be considered for classification but not for ranking. When there is no improvement, there shall not be any change in the original marks already awarded.

23. Conferment of the Degree

No candidate shall be eligible for conferment of the Degree unless he / she

- i. Has undergone the prescribed course of study for a period of not less than six semesters in an institution approved by / affiliated to the University or has been exempted from in the manner prescribed and has passed the examinations as have been prescribed therefore.
- ii. Has completed all the components prescribed under Parts I to Part V in the CBCS pattern to earn 144 credits.
- iii. Has successfully completed the prescribed Field Work/ Institutional Training (if any) as evidenced by certificate issued by the concerned authorities.

24. Ranking

A candidate who qualifies for the UG degree course passing all the examinations in the first attempt, within the minimum period prescribed for the course of study from the date of admission to the course and secures I or II class shall be eligible for ranking and such ranking shall be confined to 10 % of the total number of candidates qualified in that particular branch of study or maximum of Three Ranks whichever is lower. However the Programmes will be considered for ranking only when there are minimum of 10 students completing that Programme. The improved marks shall not be taken into consideration for ranking.

25. Question Paper Pattern

The question paper pattern for CBCS pattern syllabi for the candidates admitted from the Academic year 2023-24 are as follows:

A. Question Paper Pattern for Part I/Part II/Core /Allied/Elective/Skill Based Subjects

Time : 3hrs

Marks : 75

Knowledge Level		Section	Marks	Description
K1, K2, K3	1 – 10	A (Answer all the questions)	10 x 1 = 10	MCQ
K2, K3	11 – 15	B (Either or pattern)	5 x 5 = 25	Short Answers
K3, K4	16 – 21	C (Answer 3 out of 6)	3 x 10 = 30	Descriptive/ Detailed
K3, K4	22	D (Compulsory Question)	1 x 10 = 10	Application Based/ HOTS

B. Question Paper Pattern for Part I/Part II/Core /Allied/Elective/Skill Based Subjects**Time : 3hrs****Marks : 55**

Knowledge Level		Section	Marks	Description
K1, K2, K3	1– 10	A(Answer all the questions)	10 x 1 = 10	MCQ
K2, K3	11 – 15	B (Either or pattern)	5 x 4 = 20	Short Answers
K3 , K4	16 – 21	C (Answer 3 out of 6)	3 x 6= 18	Descriptive/ Detailed
K3, K4	22	D (Compulsory Question)	1 x 7 = 7	Application Based/ HOTS

C. Question Paper Pattern –Advanced Tamil , Open Elective Courses and Self Study Papers**Time: 3 Hours****Max Marks: 50**

Knowledge Level		Section	Marks	Description
K2, K3	1 – 10	A (Answer all the questions)	10 x 2 = 20	Short Answers / Define
K3 , K4	11 – 15	B (Either or pattern)	5 x 6 = 30	Descriptive/ Detailed

For self study papers, Open Book Examination will be followed.**D. Question Paper Pattern for Part IV subjects**

For Part IV papers like Environmental Studies, Human Rights and Constitution of India, Human Values & Yoga Practice, Examination time shall be **2 hours with maximum of 25 marks**. The pattern shall be 5 out of 10 Questions each carrying 5 marks.

NOTE: The questions should be numbered continuously running through the Sections A, B and C.

Questions should be evenly distributed among the unit in the syllabus in all the sections of the question paper. While framing questions with internal choice, the questions must be identified as (a) or (b).(e.g. 11. a or b). Further, the internal choice must be from the same unit.

ESE for General Awareness shall be conducted online with 100 multiple choice questions (with four options) to be evaluated online. (100 x 0.5 = 50 marks)

For other courses in Part IV of UG programmes namely, **Consumer Affairs, Gender Sensitization, and Women's Rights** the question paper pattern shall be 5 out of 10.

The Controller of the Examinations shall arrange for the setting of question papers on the basis the syllabus and the pattern of question paper duly certified by the Chairpersons of the respective Board of Studies.

26. Syllabus

The syllabus for various courses shall be clearly demarcated into five viable units in each course.

27. Revision of Regulations and Curriculum

The above Regulation and Scheme of Examinations shall be in vogue without any change for a minimum period of three years from the date of approval. The College may revise / amend / change the Regulations and Scheme of Examinations, if found necessary.

§ § § § § §

CURRICULUM



NEHRU ARTS AND SCIENCE COLLEGE

(An Autonomous Institution affiliated to Bharathiar University)
(Reaccredited with "A" Grade by NAAC, ISO 9001:2015 & 14001:2004 Certified
Recognized by UGC with 2(f) & 12(B), Under Star College Scheme by DBT, Govt. of India)
Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105, Tamil Nadu.



UG MICROBIOLOGY PROGRAMME OUTCOMES

PO1	Critical Thinking	Develop in depth knowledge of scientific and analytical fundamentals, leading to a holistic understanding of biological Sciences.
PO2	Usage of Technology	Acquire eligibility to be technical, solve real time problems, develop and evaluate a wide range of potential solutions for those problems.
PO3	Effective Communication	Student will communicate scientific concept, experimental result, skills through effective understanding of scientific literature.
PO4	Environment and Sustainability	Experiencing the impact of scientific processes with the focus on sustainable development goals.
PO5	Individual and Team Work	Function effectively as a team, interpersonal, leadership skills to think critically and work independently to get the best outcomes.
PO6	Ethics and Values	Apply ethical principles, commit to specialized ethics, responsibilities and norms of the science practice.
PO7	Social Interactions	Apply reasoning up to date by the appropriate knowledge to assess societal, legal, cultural issues and the subsequent tasks relevant to the science observation.
PO8	Life Long Learning	Recognize the need, have the preparation ability to engage in independent, life-long learning in the broadest context of technological changes with the application of Microbiology.



NEHRU ARTS AND SCIENCE COLLEGE

An Autonomous Institution affiliated to Bharathiar University
(Reaccredited with “A+” Grade by NAAC, ISO 9001:2015 & 14001:2004 Certified
Recognized by UGC with 2(f) & 12 B, Under Star College Scheme by DBT, Govt. of India)
Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105, Tamil Nadu.



Programme: Microbiology

PROGRAM EDUCATIONAL OBJECTIVES

After 3 years of the programme, the graduates are expected to attain

- PEO 1** Impart basic knowledge and skills to integrate principles of microbiology to achieve academic excellence
- PEO 2** Train the students for industrial need and to pursue higher education
- PEO 3** Develop the research skills to conduct research in the thrust areas of microbiology to benefit the society
- PEO 4** Emphasize hands on training
Inculcate entrepreneurship among the students so as to start their own ventures in the field
- PEO 5** of microbiology, be able to develop networking, entrepreneurship skills and establish links with industry



NEHRU ARTS AND SCIENCE COLLEGE

An Autonomous Institution affiliated to Bharathiar University
(Reaccredited with “A+” Grade by NAAC, ISO 9001:2015 & 14001:2004 Certified
Recognized by UGC with 2(f) & 12 B, Under Star College Scheme by DBT, Govt. of India)
Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105, Tamil Nadu.



PROGRAM SPECIFIC OUTCOME:

B. Sc. (Microbiology)

Upon completion of B. Sc. Microbiology programme, the students will be able to

- PSO 1** Perform the basic techniques related to screening, isolation and cultivation of microorganisms from various sources.
- PSO 2** Study the microorganism with regard to morphology, cultural, and biochemical characters. It will help to classify the microbes to certain extent.
- PSO 3** Follow the aseptic techniques and conduct the process of sterilization as well as perform the techniques to control the microorganism
- PSO 4** Study of the innate and adaptive immune system regulating the defense against microbial infections, microbial strategies to evade the immune response of the host organism.
- PSO 5** Understand microorganisms and their relationship with the environment and their genetic principles with basic mechanism of biological processes.

SCHEME



NEHRU ARTS AND SCIENCE COLLEGE

An Autonomous Institution affiliated to Bharathiar University

(Reaccredited with "A+" Grade by NAAC, ISO 9001:2015 & 14001:2004 Certified)

Recognized by UGC with 2(f) & 12 B, Under Star College Scheme by DBT, Govt. of India)

Nehru Gardens, Thirumalayampalayam, Coimbatore - 641 105, Tamil Nadu.



Scheme of Examination

B. Sc. Microbiology

Programme Code: UMB

(Applicable to the students admitted during the academic year 2024-2025 onwards)

Semester	Part	Course Code	Name of the Course	Instruction hours / week	Duration of Examination	Examination Marks			Credits
						CIA	ESE	Total	
I	I	23U1TAM101	Elanthamizh	4	3	20	55	75	3
		24U1HIN101	Rachnathmak Hindi						
		24U1MAL101	Kadha, Samskaaram, Vivarthanam						
		24U1FRN101	Français general - I						
	II	24U2ENG101	Professional English – I	4	3	20	55	75	3
	III	23U3MBC101	Core Paper I – Fundamentals of Microbiology	5	3	25	75	100	4
		23U3MBC102	Core Paper II – Cell Biology	5	3	25	75	100	4
		24U3MBP103	Core Paper III – Basic Techniques in Microbiology Practical	5	6	40	60	100	4
		23U3BYA101	Allied Paper I – Biochemistry	4	3	20	55	75	3
	IV	21U4ENV101	@Ability Enhancement Compulsory Course – Environmental Studies	2	3	50	-	50	2
22U4HVY201		Value Education – Human Values and Yoga Practice	1	-	-	-	-	-	
				30				575	23
II	I	23U1TAM202	Pynthamizh	4	3	20	55	75	3
		24U1HIN202	Sanchar Hindi						
		23U1MAL202	Noalum Bhashaapadanavum						
		24U1FRN202	Français general - II						
	II	24U2ENG202	Professional English – II	4	3	20	55	75	3
	III	24U3MBC204	Core Paper IV – Microbial Diversity	5	3	25	75	100	4
		24U3MBC205	Core Paper V – Microbial Genetics	5	3	25	75	100	4
		24U3MBP206	Core Paper VI – Cell Biology and Genetics Practical	5	6	30	45	75	3
		23U3BYR202	Allied Paper II – Biochemistry Practical	4	3	30	45	75	3
	IV	21U4HRC202	@Ability Enhancement Compulsory Course – Human Rights and Constitution of India	2	3	50	-	50	2
22U4HVY201		Value Education – Human Values and Yoga Practice	1	2	50	-	50	2	
24U4SEC201		Skill Enhancement Course I – Career Foundation Skills	2	2	25	-	25	1	
				32				625	25
III	I	23U1TAM303	Arunthamizh	4	3	20	55	75	3
		24U1HIN303	Sahityak Hindi						
		24U1MAL303	Kavithayum Smaranayum						
		24U1FRN303	Français general - III						
	II	24U2ENG303	Communicative English Practical – I	4	3	30	45	75	3

	III	23U3MBC307	Core Paper VII – Microbial Physiology and Metabolism	4	3	20	55	75	3
		24U3MBC308	Core Paper VIII – Molecular Biology	4	3	20	55	75	3
		24U3MBP309	Core Paper IX – Microbial Physiology and Molecular Biology Practical	4	6	30	45	75	3
		23U3CNA303	Allied Paper III – Fundamentals of Computer Applications	3	3	20	55	75	3
	IV	23U4MBS301	Skill Enhancement Course II – Fundamentals of Bioinformatics	3	3	20	55	75	3
		22U4NM3BT1/ 22U4NM3AT1/ 22U4NM3CAF/ 22U4NM3GST/ 22U4NM3WRT	# @Basic Tamil – I ##Advanced Tamil – I * NME: Consumer Affairs Gender Sensitization Women’s Rights	2	2	50		50	2
		SBOEC	Skill Enhancement Course – III Extra Departmental Elective Course	2	3	-	50	50	2
		24U4SEC302	Skill Enhancement Course – IV Employability Enhancement Training	2	2	25	-	25	1
					30				650
	IV	I	23U1TAM404	Muththamizh	4	3	20	55	75
24U1HIN404			Prayogik Hindi						
24U1MAL404			Drisyakalaa Saahithyam						
24U1FRN404			Français general - IV						
II		24U2ENG404	Communicative English Practical – II	4	3	30	45	75	3
III		24U3MBC410	Core Paper X - Environmental and Agricultural Microbiology	3	3	20	55	75	3
		24U3MBP411	Core Paper XI – Environmental and Agricultural Microbiology Practical	4	3	30	45	75	3
		23U3MTA404	Allied Paper – IV Biostatistics	3	3	20	55	75	3
		23U3CNR405	Allied Paper V – MS Office Practical	2	3	20	30	50	2
IV		23U4MBS402	Skill Enhancement Course V – Bio fertilizers and Bio pesticides	2	3	20	55	75	3
		22U4NM4BT2/ 22U4NM4AT2/ 22U4NM4GEN	# @Basic Tamil - II ##Advanced Tamil - II General Awareness	2	3	50		50	2
		VBOE	Value Based Open Elective Course – Intra School Course	2	3	-	50	50	2
		24U4MBVALC	Skill Enhancement Course VI Add on course – Institute Industry Linkage	4	-	50		50	2
			30				650	26	
V	III	23U3MBC512	Core Paper XII – Immunology	5	3	20	55	75	3
		23U3MBC513	Core Paper XIII – Medical Microbiology	5	3	20	55	75	3
		24U3MBC514	Core Paper XIV – Industrial Microbiology	5	3	20	55	75	3
		24U3MBP515	Core Paper XV – Immunology and Medical Microbiology Practical	5	9	40	60	100	4
		23U3MBE501/ 23U3MBE502/ 23U3MBE503	Discipline Specific Elective Paper I	4	3	25	75	100	4
		24U3MBT501	Internship	-	3	50	-	50	2
	IV	24U4MBS503	Skill Enhancement Course VII – Medical Heritage of Ancient India	2	3	20	55	75	3
		24U4SEC503	Skill Enhancement Course VIII – Campus to Corporate	2	2	25	-	25	1
		24U4SEC504	Skill Enhancement Course IX – Industrial Exploration	2	2	25	-	25	1

			30				600	24	
VI	III	23U3MBC616	Core Paper XVI – Recombinant DNA Technology	4	3	20	55	75	3
		23U3MBC617	Core Paper XVII – Food and Dairy Microbiology	4	3	20	55	75	3
		24U3MBP618	Core Paper XVIII – Industrial and Food Microbiology Practical	5	9	30	45	75	3
		24U3MBV619	Project and Viva voce	4	3	40	60	100	4
		23U3MBE604/ 23U3MBE605/ 23U3MBE606	Discipline Specific Elective Paper II	4	3	25	75	100	4
		23U3MBE607 / 23U3MBE608/ 23U3MBE609	Discipline Specific Elective Paper III	4	3	25	75	100	4
	IV	23U4MBS604	Skill Enhancement course – X Techniques in Clinical Diagnosis	5	3	20	55	75	3
	V	22U5EXT601	Extension Activities	-	-	50	-	50	2
				30				650	26
	Total							3750	150
Additional Credit (Optional)			Semester II - VI					10\$	

Basic Tamil -Students who have not studied Tamil up to 12th standard.

##**Advance Tamil** – Students who have studied Tamil language up to 12th standard and chosen other languages under part I of the programme but would like to advance their Tamil language skills.

* **NME** – Student shall choose any one course out of three courses.

@ No End Semester Examinations. Only Continuous Internal Assessment (CIA)

\$ - Not included in Total marks & CGPA Calculation

LIST OF DISCIPLINE SPECIFIC ELECTIVE PAPERS:

Discipline Specific Elective Papers	Course code	Group	Name of the Course
Discipline Specific Elective Paper I / Sem. V	23U3MBE501	A	Microbial Biotechnology
	23U3MBE502	B	Soil Microbiology
	23U3MBE503	C	Management of Human Microbial Diseases
Discipline Specific Elective Papers II / Sem. VI	23U3MBE604	A	Biosafety and Intellectual Property Rights
	23U3MBE605	B	Plant Pathology
	23U3MBE606	C	Microbial Quality Control in Food and Pharmaceutical Industries
Discipline Specific Elective Papers III / Sem. VI	23U3MBE607	A	Nano biotechnology
	23U3MBE608	B	Microbiology and Entrepreneurship
	23U3MBE609	C	Microbial Diagnosis in Health Clinics

Extra Departmental Course

S. No.	Course Code	Name of the Course
1	24U4MB3ED1	Mushroom Cultivation Technology Practical
2	24U4MB3ED2	Vermitechnology Practical

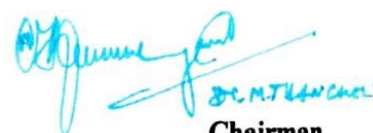
Intra School course offered by the department to other Department Students
(Within the School).

S. No.	Course Code	Name of the Course
1.	22U4VBOE01	Design Ecosystem
2.	22U4VBOE02	Design Thinking
3.	23U4VBOE03	Disaster Management
4.	22U4VBOE04	Environmental Pollution and Waste Management
5.	22U4VBOE05	History of Ancient India
6.	22U4VBOE06	Indian Knowledge System
7.	22U4VBOE07	Principles of Intellectual Property Rights
8.	22U4VBOE08	Science, Society and Culture
9.	22U4VBOE09	Creativity and Problem Solving
10.	22U4VBOE10	Emotional Intelligence
11.	22U4VBOE11	Fundamentals of Tourism
12.	22U4VBOE12	Health, Education and Sports
13.	22U4VBOE13	Politics and Media
14.	22U4VBOE14	Positive Psychology and Work Life
15.	22U4VBOE15	Professional Ethics
16.	22U4VBOE16	The Science of Happiness
17.		NCC

- Students shall opt any course within their Schools.
- NCC – Students who qualify NCC B Certificate Examination need not appear for these open Electives. The Credits Shall be transferred.

Self-Study Paper offered by Microbiology Department

S. No.	Semester	Course code	Course Title
1	Semester II to V	23UMBSS01	Solid Waste Management
2		23UMBSS02	Human Anatomy and Physiology

Chairman
Board of Studies in Microbiology
Nehru Arts and Science College
Coimbatore

BoS - Chairman
Microbiology
Nehru Arts and Science College (Autonomous)
Thirumalayampalayam, Coimbatore - 641 105

SEMESTER – I

Course Code	Title		
23U1TAM101	Part - I : Elanthamizh (இளந்தமிழ்)		
Semester: I	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	மொழி இலக்கியத்தின் வாயிலாக அறம் சார் பண்பு மற்றும் ஆளுமைமிக்க மாணவர்களை உருவாக்குதல்.		
Course Category	Skill Development (மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்)		
Development Needs	Regional (உலக அளவில் தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்)		
Course Description	மாணவர்களின் மொழித்திறனை ஊக்குவித்தல் மற்றும் உலக அளவில் தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	சங்க இலக்கியங்கள் வாயிலாக சமூகச் சீர்திருத்தச் சிந்தனைகள் பெறப்படும்.	விரிவுரை/ காணொளிப்பட விளக்கம்	ஒப்படைவு
CO 2	அற இலக்கியங்களின் வழி தமிழர்களின் வாழ்வியல் பண்புகளைக் கற்று அறிதல்.	விரிவுரை	குழுத்திட்டம்
CO 3	பெண்ணியக் கவிஞர்களின் படைப்புத்திறனை மாணவர்களுக்கு உணர்த்துதல்	விரிவுரை/ காணொளிப்பட விளக்கம்	கருத்தரங்கு
CO 4	சிறுகதைகளின் வழி சமூக கருத்துகளை மாணவர்களுக்கு அறிவுறுத்தல்	விரிவுரை / குழு விவாதம்	ஒப்படைவு
CO 5	தமிழ் இலக்கிய வரலாற்றுத் திறனை வளர்த்தல்	விரிவுரை/ குழு விவாதம்	கருத்தரங்கு
Offered by தமிழ்த்துறை			
Course Content : Elanthamizh (இளந்தமிழ்)			Instructional Hours / Week : 4
Unit	Description	Text Book	Chapters
I	சங்க இலக்கியம்	1. ஐங்குறுநாறு 2. பதிற்றுப்பத்து 3. பத்துப்பாட்டு - முல்லைப்பாட்டு 4. சிறுபாணாற்றுப்படை	கிள்ளைப்பத்து (281-290) பாடல்கள் இரண்டாம் பத்து (11-15 ஐந்து பாடல்கள்) முல்லைப்பாட்டு முழுவதும் (1-103 வரிகள்) சேரநாட்டின் வளமை
Instructional Hours			12 Hours
Suggested Learning Methods: நாடக முறையில் கலந்துரையாடல்			
II	அற இலக்கியம் நீதிநூல்கள்	1. அறன் வலியுறுத்தல் 2. புகழ் 3. வாய்மை 4. நாலடியார்-பொருட்பால் 5. நான்மணிக்கடிகை	31 - 40 குறட்பாக்கள் 231 - 240 குறட்பாக்கள் 291 - 300 குறட்பாக்கள் 11 ஆவது அதிகாரம் (கூடா நட்பு 1-10) முதல் ஐந்து பாடல்கள்
Instructional Hours			12 Hours
Suggested Learning Methods : கலந்துரையாடல்			
III	பெண்ணியக் கவிதைகள்	1. ஆண்டாள் பிரியதர்ஷினி 2. கவிஞர் இளம்பிறை 3. சுகிர்தராணி 4. அ. வெண்ணிலா	பூச்சி வாழ்க்கை- சுயம் பேசும் கிளி தொட்டிச்செடி அம்மா நீரில் அலையும் முகம்
Instructional Hours			12 Hours
Suggested Learning Methods : புதுக்கவிதை எழுதும் திறன் பெற்றமை			

IV	சிறுகதைகள்	1. குட்டி ரேவதி 2. ஜெயமோகன் 3. ச.தமிழ்ச்செல்வன் 4. வண்ணநிலவன் 5. உமாமகேஸ்வரி	நிறைய அறைகள் உள்ள வீடு யானை டாக்டர் வெயிலோடு போய் எஸ்தர் மரப்பாச்சி										
Instructional Hours			12 Hours										
Suggested Learning Methods : சிறுகதை படைக்கும் திறன் பெற்றமை													
V	தமிழ் இலக்கிய வரலாறு	1. புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் 2. சிறுகதையின் தோற்றமும் வளர்ச்சியும் 3. படிமம், குறியீடு பற்றிய – விளக்கம்	தமிழ் இலக்கிய வரலாறு										
Instructional Hours			12 Hours										
Suggested Learning Methods : குழு விவாதம்													
Total Hours			60 Hours										
Text Books	இளங்கலை முதலாம் ஆண்டுத்தமிழ் மாணவர்களுக்குரிய பாடநூல்”இளந்தமிழ்” தொகுப்பு: தமிழ்த்துறை ,நேரு கலை மற்றும் அறிவியல் கல்லூரி, கோயம்புத்தூர்.												
Reference Books	சங்க இலக்கியம் - உரையாசிரியர் ஒளவை. துரைசாமிப்பிள்ளை, பதிப்பாசிரியர்கள் இரா.இளங்குமரனார், முனைவர்.பி.தமிழ்மகன், தமிழ்மண் அறக்கட்டளை, சென்னை.17. நிறைய அறைகள் உள்ள வீடு - குட்டிரேவதி எழுத்து பிரசுரம், 11மாடல் நகர், 10-ஆவது வீதி, சென்னை.												
Web. URLs	https://youtu.be/2SMM5LvZYo0												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Seminar	Assignment	Group Project	Total							
4	4	5	2	2	3	20							
Mapping													
PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	-	H	-	H	H	M	H					
CO2	-	-	M	-	H	L	H	H					
CO3	-	-	L	-	M	M	H	H					
CO4	-	-	H	-	H	M	M	L					
CO5	-	-	H	-	H	L	H	H					
H-High; M-Medium; L-Low													
Course designed by							Verified by						
Dr. S. Satheesh kumar							Dr. A. Sridevi						

Course Code			
24U1HIN101	Part - 1 - Rachnathmak Hindi (रचनात्मक हिंदी)		
Semester: I	Credits:3	CIA: 20 Marks	ESE: 55Marks
(Common to all UG Programmes)			
Course Objective	हिंदी भाषा का अच्छा ज्ञान प्राप्त करने के लिए।		
Course Category	Skill Development		
Development Needs	Regional		
Course Description	Improves Accuracy & Quality, Improves Communication Skills		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	नाटक से रचनात्मकता का विकास होता है। यह हमारे आसपास की दुनिया को समझने में भी मदद करता है।	Lecture / Video Methods	Assignment
CO 2	कहानियां छात्रों की कल्पना और जिज्ञासा को जगाने में मदद करती हैं।	Case Studies	Group Project
CO 3	व्याकरण हिंदी भाषा को सही ढंग से बोलने, लिखने और समझने में मदद करता है। विज्ञापन लेखन और कहानी लेखन छात्रों को उनके रचनात्मक लेखन और कल्पना शक्ति को विकसित करने में मदद करेगा।	Lectures / Video Lessons	Seminar
CO 4	अनुवाद सभी लोगों के बीच प्रभावी संचार को सक्षम बनाता है।	Lecture / Video Methods	Assignment
CO 5	गद्यांश लेखन लिखित पाठ के सार को समझने और संदर्भ के आधार पर आपके निष्कर्षों का अनुमान लगाने में आपकी बुद्धिमत्ता का आकलन करता है।	Lecture / Dumb Charades	Seminar
Offered by	Hindi		
Course Content	Instructional Hours / Week : 4		
Unit	Description	Text Book	Chapters
I	नाटक लड़ाई- 1979 - सर्वेश्वर दयाल सक्सेना(भाग - 1)	1	All
Instructional Hours			12
Suggested Learning Methods: Visual Learning			
II	नाटक लड़ाई - 1979 - सर्वेश्वर दयाल सक्सेना (भाग- 2)	1	4
Instructional Hours			12
Suggested Learning Methods: Visual Learning			
III	कहानियाँ : ठाकुर का कुआँ - मुंशी प्रेमचंद मजबूरी - मन्नू भंडारी चीफ की दावत - भीष्म साहनी भोलाराम का जीव - हरिशंकर परसाई	1	3
Instructional Hours			12

Suggested Learning Methods : Comprehensive writing														
IV	1. अनुप्रयुक्त व्याकरण - संज्ञा, सर्वनाम, क्रिया और विशेषण की पहचान करना। 2. विज्ञापन लेखन। 3. दिए गए संकेतों से कहानी लेखन।									3	2			
Instructional Hours												12		
Suggested Learning Methods : Auditory, Visual														
V	अनुवाद : अंग्रेज़ी से हिंदी (अनुवाद अभ्यास - 3) 1 - 10 अनुच्छेद।									5	2			
Instructional Hours												12		
Suggested Learning Methods : Comprehensive writing														
Total Hours												60		
Text Books				1. नाटक लड़ाई - 1979 - सर्वेश्वर दयाल सक्सेना 2. कहानी संग्रह 3. अनुवाद अभ्यास - 3 दक्षिण भारत हिंदी प्रचार सभा , चेन्नई -17 4. Bharatdarshan.co.nz 5. भाषा शास्त्र का पारिभाषिक शब्द कोश - राजेंद्र द्विवेदी 6. श्री रामदेव , व्याकरण प्रदीप, लोक भारती प्रकाशन, इलाहाबाद										
Reference Books				संदर्भ ग्रंथ 1. हिंदी नाटक और रंगमंच - डॉ राम कुमार वर्मा 2. हिन्दी अलोचना की पारिभाषिक शब्दावली - पेपरबैंक 3. आधुनिक हिंदी व्याकरण और रचना - डॉ. वासुदेव नंदन प्रसाद										
Web. URLs														
Tools for Assessment (20 Marks)														
CIA I	CIA II			CIA III			Assignment	Seminar	Group project			Total		
4	4			5			2	2	3			20		
Mapping														
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	H	M	H	M	M	M	H	H						
CO2	M	M	H	L	M	H	M	M						
CO3	H	M	M	M	M	H	M	H						
CO4	M	M	M	M	H	L	H	H						
CO5	H	H	M	M	H	M	M	M						
H-High; M-Medium; L-Low														
Course designed by								Verified by						
Ms. Krishnendu P.M								Ms. Heera P.K						

Course Code			
24U1MAL101		Part - 1 KADHA, SAMSKAARAM, VIVARTHANAM (കഥ, സംസ്കാരം, വിവർത്തനം)	
Semester: I		Credits: 3	CIA: 20 Marks
		ESE: 55 Marks	
Course Objective		ആധുനികകാലത്തെ മലയാളകഥകളെ കുറിച്ചും സംസ്കാരത്തെ കുറിച്ചും അവബോധം ഉണ്ടാക്കുന്നു	
Course Category		Skill Development	
Development Needs		Regional	
Course Description		Improved accuracy & quality, improved communication	
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	കഥയുടെ സംവേദനം ആസ്വാദകന്റെ അഭിരുചിയെ പൂർത്തിയാക്കുന്നു	Lecture / Video Methods	Assignment
CO 2	പ്രകൃതിയുമായി ബന്ധപ്പെടുന്ന കഥാപരിസരം	Case studies	Group Project
CO 3	കേരളസംസ്കാരത്തിന്റെ ഉള്ളറകളിലേക്ക് വിദ്യാർത്ഥിയുടെ ശ്രദ്ധ ക്ഷണിക്കുന്നു	Lectures / Video Lessons	Seminar
CO 4	സംസ്കാരപഠനത്തിന്റെ ആവശ്യകത ബോധ്യപ്പെടുത്തുന്നു	Lecture / Video Methods	Assignment
CO 5	വിവർത്തനം- പ്രായോഗികപരിശീലനം	Lecture /Writing Practice	Seminar
Offered by	Malayalam		
Course Content		Instructional Hours / Week : 4	
Unit	Description	Text Book	Chapters
I	ചെറുകഥകൾ - സമകാലിക കഥകൾ	1	1 to 5
	1 പരുന്ത് - ഇ.സന്തോഷ്കുമാർ		
	2 പാലാഴിമഥനം - കെ.രേഖ		
	3 കുളവാഴ - വി.എം. ദേവദാസ്		
	4 കക്കുകളി - ഫ്രാൻസിസ് നൊറോണ		
	5 ബിരിയാണി - സന്തോഷ് ഏച്ചിക്കാനം		
		Instructional Hours	12
Suggested Learning Methods : Visual Learning			
II	നവോത്ഥാനകഥകൾ	1	6 to 10
	1 വെള്ളപ്പൊക്കത്തിൽ - തകഴി		
	2 പ്രതിജ്ഞ - പി. കേശവദേവ്		
	3 മരപ്പാവകൾ - കാത്രൂർ		
	4 മാണിക്കൻ - ലളിതാംബിക അന്തർജനം		
	5 ജന്മദിനം - ബഷീർ		
		Instructional Hours	12
Suggested Learning Methods : Visual Learning			
III	1 നാട്ടറിവുകളുടെ ഉള്ളറകളിലേക്ക്	1	1,2,3
	2 കാവ്യാംശം കടംകഥകളിൽ		
	3 ഗ്രാമ്യഭാഷയിലെ അർത്ഥതലങ്ങൾ		
	4 നാട്ടറിവുകളിലെ മൊഴിയഴകുകൾ		
		Instructional Hours	12

Suggested Learning Methods : Auditory, Visual													
IV	1 ഓണവും നാട്ടറിവുകളും										1	4,5	
	2 നാടൻ കളിക്കളങ്ങളിൽ അൽപ്പനേരം												
	3 കാർഷിക സംസ്കാരം നാടോടിപ്പാട്ടുകളിൽ												
Instructional Hours											12		
Suggested Learning Methods : Auditory, Visual													
V	നവമാധ്യമങ്ങൾ - വിവർത്തനം										1	1,2,3	
	Instructional Hours												12
Suggested Learning Methods : Comprehensive writing													
Total Hours											60		
Text Books	1 ചെറുകഥകൾ - (10 ചെറുകഥകൾ)												
	2 സംസ്കാര പഠനം - നാട്ടറിവുകളുടെ ഉള്ളറകളിലേക്ക്- വട്ടപ്പറമ്പിൽ പീതാംബരൻ - കേരള ഭാഷാ ഇൻസ്റ്റിറ്റ്യൂട്ട് , തിരുവനന്തപുരം.												
	3 നവമാധ്യമങ്ങൾ - ടി.കെ .സന്തോഷ്കുമാർ ഡി.സി.ബുക്ക്സ് കോട്ടയം.												
Reference Books	1 എം. അച്യുതൻ - ചെറുകഥ ഇന്നലെ ഇന്ന് - ഡി.സി.ബുക്ക്സ് കോട്ടയം												
	2 ചെറുകഥയുടെ ചരന്ദ്രം- വി. രാജകൃഷ്ണൻ മാതൃഭൂമി ബുക്ക്സ് കോഴിക്കോട്												
	3 പുതിയ കഥ പുതിയ വായന - എഡി : ഡോ.ഷീബാ ദിവാകരൻ പുസ്തകലോകം പ്രസദ്ധീകരണം കോഴിക്കോട്												
	4 കേരള സംസ്കാരം - എ .ശ്രീധര മേനോൻ നാഷണൽ ബുക്ക്സ് കോട്ടയം												
	5 ന്യൂസ് റൂമിന്റെ അകവും പുറവും - ബി.ആർ .പി.ഭാസ്കർ ഗ്രീൻ ബുക്ക്സ് തൃശ്ശൂർ												
Web. URLs	http://www.keralaculture.org >literature												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Group project	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	H	M	H	H							
CO2	M	H	H	L	H	M							
CO3	H	M	H	M	M	H							
CO4	H	M	L	M	L	H							
CO5	N	H	L	H	H	M							
H-High; M-Medium; L-Low													
Course designed by						Verified by Chairman							
Ms. N. RAJANI						Dr. SMITHA C. R.							

Course Code	Title		
24U1FRN101	Part-I: Français général - I		
Semester :I	Credits : 3	CIA: 20Marks	ESE : 55 Marks
Common to All UG Programmes			
Course Objective	To understand speak, write and read simple, standard speech which is very slow and is carefully articulated and can recognize familiar words and very basic phrases		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Improved accuracy & quality, improved communication		
Course Outcomes		Teaching Methods	Assessment Methods
CO1	Comprehend Basic Vocabulary	Lecture	Assignment
CO2	Understand basic syntax and grammar patterns	Word game/Lecture	Spelling Test
CO3	Converse slowly in known situations	Lecture/ Video Lessons	Verbal Test
CO4	Translate small basic sentences	Role play/ Tutorial	Assignment
CO5	To develop the ability to understand and communicate	Role SSSSplay/Lecture	Group project
Offered by	Department of French		
Course Content	Instructional Hours/Week: 4		
Unit	Description	Text Book	Chapters
I	<ul style="list-style-type: none"> • Testons nos connaissances • Disons et épelons nos noms et prénoms • Entrons en contact • Donnons des informations personnelles • Entraînement 	1	1
Instructional Hours			12
Suggested Learning Methods : Worksheet			
II	<ul style="list-style-type: none"> • Echangeons sur nos préférences musicales • Parlons de nos goûts et de nos activités • Posons des questions personnelles • Entraînement 	1	2
Instructional Hours			12
Suggested Learning Methods: Kahoot App			
III	<ul style="list-style-type: none"> • Echangeons sur nos différences • Présentons notre famille 	1	3
Instructional Hours			12

Suggested Learning Methods: Audio& Visual															
IV	<ul style="list-style-type: none"> • Parlons de notre nationalité • Entraînement • Parlons de sport 									1	4				
Instructional Hours											12				
Suggested Learning Methods: Comprehensive Writing															
V	<ul style="list-style-type: none"> • Echangeons sur nos activités sportives • Décrivons des personnes • Entraînement 									1	5				
Instructional Hours											12				
Suggested Learning Methods: Translating simple sentences															
Pages 11 to 62											Total Hours			60	
Text Books		Adomania 1 – Méthode de Français													
Reference Books		Latitudes 1													
Web. URLs		Lingua.com, Duolingo App, You Tube Videos													
Tools for Assessment (20Marks)															
CIAI		CIAII		CIAIII		Assignment		Spelling Test		Verbal Test		Total			
4		4		5		2		2		3		20			
Mapping															
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	-	-	H	H	H	H	-	-	-	-	-	-	-		
CO2	-	-	H	M	H	M	-	-	-	-	-	-	-		
CO3	-	-	M	M	M	H	-	-	-	-	-	-	-		
CO4	-	-	L	H	L	H	-	-	-	-	-	-	-		
CO5	-	-	L	M	H	H	-	-	-	-	-	-	-		
H-High; M-Medium; L-Low															
Course designed by							Verified by Chairman								
Mr. D. Balaji							Mr. D. Balaji								

Course Code	Title		
24U2ENG101	Part II - Professional English I		
Semester: I	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
(Common to all UG Programmes)			
Course Objective	To help students to imbibe, develop, practice and use the LSRW skills and fine tune their productive skills.		
Course Category	Skill Development		
Development Needs	Global/ National/ Regional		
Course Description	SD: Helps to enhance LSRW skill		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Recognize listening, and reading proficiency through the prose discourses.	Lecture	Assignment
CO 2	Use and interpret imaginative, and creative skills through the poetic genre.	Tutorial	Assignment
CO 3	Enhance the students to use English effectively through short story.	Tutorial	Speaking
CO 4	Execute and exercise grammatical skills in academics and career.	Lecture	Reading
CO 5	Evaluate the LSRW skills through literature.	Lecture	Writing
Offered by	Department of English		
Course Content		Instructional Hours / Week : 5	
Unit	Description	Text Book	Chapters
I	Prose Rajagopalachari – Tree Speaks A.G. Gardiner – On the Rule of the Road Listening Activity – Comprehension practice from Prose. Speaking Activity – Self Introduction, Expressing Opinion	1	1-3
Instructional Hours			12
Suggested Learning Methods : Flipped Learning			
II	Poetry John Milton – On His Blindness A. K. Ramanujan – A River Speaking Activity: Group Discussion, Review of the poem Reading Activity: Reading the Poem, Article & NEWS	1	4-6
Instructional Hours			12
Suggested Learning Methods : Scaffolding			

III	Short Stories O. Henry – The Last Leaf Oscar Wilde – The Happy Prince Listening Activity: Listening to Hints & Develop the story Reading Activity – Pronunciation Practice and Enhancement from Short – stories		1	7-9									
	Instructional Hours			12									
Suggested Learning Methods : Pre- Reading													
IV	Grammar Parts of Speech – Tenses - Kinds of Sentences – Abbreviation & Acronyms, Modal Verbs, Sentence Pattern		1	10-13									
	Instructional Hours			12									
Suggested Learning Methods : Task Based													
V	Writing Skills Letter Writing (Formal & Informal) – Notice, Writing Circular Memo, Advertisement, Note Making, Mind Mapping.		1	14-17									
	Instructional Hours			12									
Suggested Learning Methods : Task Based													
Total Hours			60 Hrs										
Text Books		Compiled by the Department of English, NASC.											
Reference Books		CLIL (Content & Language Integrated Learning) – Module by TANSCHENOTE: (Text: Prescribed chapters or pages will be given to the students by the department and the college)											
Web. URLs		<ol style="list-style-type: none"> https://youtu.be/CEh3OQPgvK4?si=bO5mL_kaorGZQ77X https://litmarked.com/on-the-rule-of-the-road-summary-and-analysis/#:~:text=On%20The%20Rule%20of%20The%20Road%20by%20A.G.%20Gardiner%20is,the%20liberty%20enjoyed%20by%20all. https://englishsummary.com/summary-on_his-blindness-milton/ https://en.wikipedia.org/wiki/The_Last_Leaf https://englishliteraturezone.com/a-river-by-a-k-ramanujan-summary/ https://byjus.com/english/english-grammar/ 											
Tools for Assessment (20 Marks)													
CIA I		CIA II		CIA III		Assignment		Speaking		Reading		Total	
4		4		5		2		2		3		20	
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	H	L	M	M	H	M	H	H	M	H	M
CO2	M	L	H	L	H	M	H	M	H	H	M	H	M
CO3	M	L	H	L	H	H	H	H	H	H	M	H	M
CO4	M	L	H	L	H	L	H	H	H	H	M	H	H
CO5	H	M	H	L	H	H	H	H	H	H	H	H	M
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
S. Kavitha							Dr. R. Malathi						

Course Code	Title		
23U3MBC101	Core Paper I – Fundamentals of Microbiology		
Semester: I	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	This subject aims to introduce the history and development of Microbiology. The contents of this course will help students understand history, biology of microorganisms, growth and control of microbes. Thus, the beginners are rightly exposed to foundation of Microbiology which would lead them towards progressive advancement of the subject.		
Course Category	Employability		
Development Needs	Global		
Course Description	Students will be able to explain the processes used by microorganisms for their replication, survival, interaction with their environment, hosts and host populations.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Get an idea about the historical events and diversity in Microbiology	Lecture	Assignment
CO 2	Acquaint with various sterilization techniques and use various method to control microbes	Lecture / Demonstration	Seminar
CO 3	Understand different types and principle techniques in Microscopy	Lectures / Video Lessons	Quiz
CO 4	Understand different methods of staining and culture techniques	Tutorial / Videos	Seminar
CO 5	Describe the Estimation, Maintenance and Preservation	Lecture / Group Discussion	Quiz
Offered by	Microbiology		
Course Content	Instructional Hours / Week: 5		
Unit	Description	Text Book	Chapters
I	History and Scope of Microbiology: Spontaneous generation theory- conflict. Contribution of Leuwenhoek, Louis Pasteur, Robert Koch, Edward Jenner, Joseph Lister, John Tyndall.	1	1
Instructional Hours			15
Suggested Learning Methods: Comics Preparation / You tube Videos			
II	Sterilization and Disinfection: Principles- Methods of Sterilization – Physical methods – Dry heat- Moist heat, Filtration (Membrane & HEPA) - Radiation – Chemical Sterilization -Chemical agents Mode of action. Sterility testing. Phenol coefficient test	1	22-24
Instructional Hours			15
Suggested Learning Methods: Demonstration			
III	Microscopy: Bright field: - Dark Field - Phase contrast and Fluorescence microscope. Electron Microscope - Specimen preparation -TEM and SEM. Atomic Force Microscope	3	2
Instructional Hours			15

Suggested Learning Methods: Demonstration														
IV	Culture media & Staining techniques: Media preparation: Media and its Types, Pure culture technique – Tube dilution, Pour, Spread, Streak plate. Anaerobic culture technique – Wright’s tube, Roll tube, McIntostfildes jar method. Staining Technique - Simple, Gram, Negative, Acid Fast, Endospore, LCB.								2 & 3	3 & 2, 5, 6				
Instructional Hours												15		
Suggested Learning Methods: Videos and Hands on training														
V	Direct Microscopic count, Turbidometric assay, TVC- Indirect Method- CO ₂ liberation. Maintenance and Preservation - Short term – Slant, Stab, Mineral oil overlay - Long term – Lyophilization, Cryopreservation, Storage in sterile soil, Storage in silica gel.								3	6				
Instructional Hours												15		
Suggested Learning Methods: Laboratory practice / You tube Videos														
Total Hours												75		
Text Books	<ol style="list-style-type: none"> 1. Pelczar MJ, Chan ECS and Kreig NR. Microbiology, 5th edition, Tata McGraw Hill- Hill Education Pvt. Ltd., New Delhi, 2012. 2. Dubey RC and Maheswari D K. A Textbook of Microbiology, Revised Multicolour Edition. S Chand and Company Limited, New Delhi, 1999. 3. Prescott, Harley, and Klein’s. Microbiology, 7thedition McGraw-Hill, 2008. 													
Reference Books	<ol style="list-style-type: none"> 1. Presscott, L.M., J.P. Harley and D.A. Klein. Microbiology, 6th edition, TATA McGraw Hill, New Delhi.2005. 2. Alcamo, E. Fundamentals of Microbiology, 6th edition. Jones and Bartlett Publishers, New Delhi. 2001 3. Salle, A.J. Fundamentals and Principles of Bacteriology, 7th edition. Tata MC Graw Hill, New Delhi.2001. 4. Brooks, G.F., E. Jawetz, J.L. Melnick and E.A. Adelberg. Medical Microbiology. 26thedition, New York: McGraw Hill Medical. 2013. 5. Patricia, M.T. Bailey and Scott’s Diagnostic Microbiology, 13thEedition, Mosby, Inc. Publishers, China. 2014. 													
Web. URLs	http://www.nptel.ac.in/courses/102103015/pdf/mod3.pdf													
Tools for Assessment (25 Marks)														
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total								
5	5	6	3	3	3	25								
Mapping														
CO \ PO	PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PSO 1	PSO2	PSO 3	PSO 4	PSO 5	
CO1	M	L	M	M	M	M	L	H	H	H	M	L	L	
CO2	H	H	M	L	H	H	L	H	H	H	M	L	L	
CO3	H	H	M	L	H	H	L	H	H	H	M	L	H	
CO4	H	H	L	H	L	H	L	H	H	H	H	L	L	
CO5	M	H	L	H	H	L	L	H	H	H	H	H	H	
H-High; M-Medium; L-Low														
Course designed by								Verified by Chairman						
Dr. Dinesh M. D								Dr. M. Thangavel						

Course Code	Title		
23U3MBC102	Core paper II – Cell Biology		
Semester: I	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	To introduce the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, organelles, transport mechanisms and cellular components underlying mitotic cell division.		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Students can able to explain prokaryotic cell, eukaryotic cell, transport mechanism, cell division and cell cycle of bacteria.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Know characteristics and basic structure of prokaryotic cell.	Lecture	Assignment
CO 2	Understand organization and structure of eukaryotic cell.	Videos, Tutorial	Seminar
CO 3	Distinguish transport mechanisms of cell.	Lectures	Quiz
CO 4	Identify concepts of cell division in bacteria.	Lectures	Assignment
CO 5	Explain basic concepts of cell cycle, death mechanism and stem cells.	Lectures, Videos	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 5	
Unit	Description	Text Book	Chapters
I	Ultrastructure of Eubacteria: Cell membrane- Extra mural layer - Slime – Capsule. Cytoplasmic inclusions – Mesosomes – Nuclear material, Reserve materials. Capsule, slime layer, flagella and pili. Ultra structure of algae, Cyanobacteria, protozoa, fungi	1	1,2
Instructional Hours			15
Suggested Learning Methods: Video lectures			
II	Ultrastructure and functions of cells: Cell wall – Cell membrane -Mitochondria – Chloroplast – Endoplasmic reticulum –Golgi complex – Nucleus –Ribosomes, Other cell inclusions and Flagella	1,2	3,4,5,9
Instructional Hours			15
Suggested Learning Methods: You tube videos			
III	Transport mechanisms: Diffusion - Facilitated diffusion. Active transport-Group translocation–phagocytosis–Pinocytosis–Sodium Potassium and Osmosis Regulations of cell	1	6,7,8
Instructional Hours			15
Suggested Learning Methods: Animations and Videos			

IV	Cell division in Bacteria: Binary fission– Mitosis and Meiosis. Cell division in Fungi and Eukaryotes						2	8					
Instructional Hours							15						
Suggested Learning Methods: Videos													
V	Cell Cycle: Eukaryotic cell cycle and its regulation. Development of cancer, causes and types Programmed cell death, Stem cells - Embryonic stem cells induced pluripotent stem cells						1	13,17					
Instructional Hours							15						
Suggested Learning Methods: Lectures and Videos													
Total Hours							75						
Text Books	<ol style="list-style-type: none"> 1. Pelczar MJ, Chan ECS and Kreig NR. Microbiology, 5th edition, Tata McGraw Hill-Hill Education Pvt., Ltd., New Delhi, 2008. 2. Joanne M.Willey, Linda M. Sherwood, Christopher J. Woolverton, Prescott, Harley and Klein's Microbiology, 7th Edition, McGraw Hill Edition, 2008. 3. Ivan M.Roitt's & Peter J Delves. Essential of Immunology, 10th edition, Blackwell Science, UK, 2011. 												
Reference Books	<ol style="list-style-type: none"> 1. Stainer R.Y. Ingraham J.L. Wheelis H.H and Painter P.R., The Microbial World, 5th edition, Eagle Works Cliffs N.J. Prentice Hall, 1986. 2. Jain V.K. Fundamentals of Plant Physiology, 5th edition, S. Chand & Co Ltd., New Delhi, 2000. 												
Web. URLs	https://microbiologyinfo.com/												
Tools for Assessment (25 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
5	5	6	3	3	3	25							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	L	M	M	L	M	M	H	H	M	M
CO2	M	M	M	M	H	M	M	M	H	H	H	M	H
CO3	H	L	M	H	M	M	L	H	M	H	H	M	M
CO4	M	H	L	M	L	L	H	M	H	M	H	H	M
CO5	M	M	H	H	M	H	M	H	H	H	M	H	H
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. Thulasi Sivaraman							Dr. M. Thangavel						

Course Code		Title		
24U3MBP103		Core Paper – III Basic Techniques in Microbiology Practical		
Semester: I		Credits: 4	CIA: 40 Marks	ESE: 60 Marks
Course Objective		To gain knowledge on the laboratory skills, control of infectious sources		
Course Category		Skill Development / Employability / Entrepreneurship		
Development Needs		Global, Local and Regional needs		
Course Description		This is a skill-oriented course that will help the student to acquire the practical skills that will enable them to get employment in hospitals or to start their own laboratories and become an entrepreneur		
Course Outcomes		Teaching Methods	Assessment Methods	
CO 1	Develop knowledge on laboratory guidelines and on various instruments and sterilization methods	Lecture / Hands on	Performance	
CO 2	Understand different types staining of microorganisms	Lecture / Hands on	Observation	
CO 3	Understand media preparation, culture techniques and preservation of microbes	Lecture / Hands on	Performance	
CO 4	To study on the cell biology and cell division	Lecture / Hands on	Performance	
CO 5	To acquire knowledge on the microbial genetics	Lecture / Hands on	Observation	
Offered by	Microbiology			
Course Content			Instructional Hours / Week: 5	
Exp No	Experiments			
FUNDAMENTALS OF MICROBIOLOGY-INSTRUMENTATION				
1.	Laboratory Precautions, Basic lab glass wares.			
2.	Microscopic techniques – Bright field and Dark field Basic			
3.	Lab Instruments: Autoclave, Hot Air Oven, pH meter, Centrifuge, Laminar Air flow			
4.	Methods of Sterilization – Dry Heat-Hot Air oven, Moist Heat- Autoclave, Chemical Methods- Alcohols and Aldehydes			
STAINING				
5.	Bacterial Staining – Simple, Grams, Acid Fast, Spore and Capsule			
6.	Fungal Staining-KoH Mount and Lacto phenol cotton blue			
MEDIA PREPARATION				
7.	Types of media- Simple, Defined, Complex, Enriched, Enrichment, Differential, Selective Transport and Anaerobic media			
8.	Culture media preparation – Liquid and Solid media			
9.	Pure culture techniques – Pour plate, Spread plate and Streak plate			
10.	Cultural characteristics of microorganisms			
11.	Cultivation of anaerobic bacteria – Wrights tube and Anaerobic jar method			
Total Hours				75

Text Books		1. James G. Cappucino – Microbiology – a Laboratory manual 2. Rajan and Selvi Christy - Experimental Procedures in Life											
Reference Books		1. Dubey and Maheswari – Practical Microbiology											
Web. URLs		https://microbnotes.com											
Tools for Assessment (40 Marks)													
Laboratory Performance							Test - I	Test - II	Observation notebook	Total			
Level of engagement in lab	Preparation		Result										
5	5		5		10	10	5	40					
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	M	M	M	M	H	M	L	M	M	M
CO2	H	H	H	H	M	M	H	H	H	L	L	M	H
CO3	H	H	M	M	H	H	H	H	H	M	L	L	H
CO4	H	H	H	M	M	H	M	H	H	L	L	L	H
CO5	H	H	H	H	M	H	H	H	M	M	M	L	H
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. Dinesh M D							Dr. M. Thangavel						

Course code	Title		
23U3BYA101	Allied Paper I – Biochemistry		
Semester: I	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	Understand the concept of Biochemistry regarding Biomolecules- Carbohydrates, proteins, lipids, Enzymes		
Course Category	Skill Development / Employability		
Development Needs	Global		
Course Description	Study of proteins, enzymes, carbohydrates, lipids and nucleic acids in relationship to biological and metabolic processes		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Know about the basic Biomolecules present inside the body.	Lecture / Flipped Classroom	Assignment
CO 2	Understand the basic structure of lipids and its importance.	Lecture / Tutorial	Seminar
CO 3	Recognize the basic structure of amino acid and proteins and their role in metabolic pathways.	Lecture / Video Lessons	Quiz
CO 4	Gain knowledge on Nucleic acids, vitamins and vitamin deficiency diseases.	Tutorial / Case Studies	Quiz
CO 5	Explain the Principle, operation and applications (Biochemical) of various laboratory instruments.	Lecture / Demonstration	Assignment
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 4	
Unit	Description	Text Book	Chapters
I	pH and Buffers: Concept of acid base indicators, Concept of pH and components of the pH meter. Buffer systems of Blood. Laws of thermodynamics. Carbohydrates: Introduction, classification, Structure and importance of monosaccharide, disaccharides, polysaccharides. Homopolysaccharides and heteropolysaccharides.	1	5 - 8
Instructional Hours			12
Suggested Learning Methods: Group Learning			
II	Lipids: Introduction, classification, physical properties and chemical properties of fats and oils. Structure and importance of saturated and unsaturated fatty acids. Classification and Significance of lipoproteins and phospholipids.	1	12 - 14
Instructional Hours			12
Suggested Learning Methods: Chart Preparation			
III	Amino acids and Proteins: Amino acids-classification and properties. Protein– classification, Structure and properties. Enzymes: Classification, General properties of enzymes (pH, Temperature, Substrate concentrations)	1 2	9 – 114 21 - 22
Instructional Hours			12
Suggested Learning Methods: You tube Videos			

IV	Nucleic acids – Components, Types of nucleic acids, Double helical structure of DNA- Nucleic acid denaturation.						2	5					
	Vitamins: Introduction, properties, functions. Deficiency diseases of fat soluble and water-soluble vitamins, biochemical roles, Daily requirement.												
Instructional Hours							12						
Suggested Learning Methods: Lecture / You tube Videos													
V	Colorimetry and spectrophotometry: Beer-Lambert's law, light absorption and its transmittance.						1	35					
	Centrifugation: Basic principles of sedimentation, types of centrifugations, types of centrifuges.												
Chromatography: Paper and TLC, their applications.						1	40						
Electrophoresis: Principle, technique, AGE, SDS -PAGE.													
Instructional Hours							12						
Suggested Learning Methods: Group Discussion / Demonstration													
Total Hours							60						
Text Books		<ol style="list-style-type: none"> Jain, J.L. Fundamentals of Biochemistry. New Delhi: S. Chand, 2004. Shanmugam, A. Ambika Shanmugam's Fundamentals of Biochemistry for Medical Students. New Delhi: Wolters Kluwer Health/Lippincott Williams & Wilkins, 2016. 											
Reference Books		<ol style="list-style-type: none"> Lehninger, A.L Nelson, D. L & Cox, M. M. Principles of Biochemistry. New York: W.H. Freeman, 2013. Murray. R.K. Harper's Biochemistry. New York: McGraw-Hill, 2003. Chatterjee. M. N & Shinde, R. Textbook of Medical Biochemistry. New Delhi: Jaypee Brothers Medical (P). 2013. Deb, A. C. Fundamentals of Biochemistry. London: New Central Book Agency, 2011. 											
Web. URLs		https://themedicalbiochemistypage.org/category/foundational-biochemistry/											
Tools for Assessment (20 Marks)													
CIA I		CIA II		CIA III		Assignment	Seminar	Quiz	Total				
4		4		6		2	2	2	20				
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	M	M	M	H	L	L	L	H	M	M
CO2	M	H	M	H	H	H	H	M	M	L	M	H	M
CO3	H	H	H	M	M	H	L	M	H	M	M	H	L
CO4	H	M	L	M	H	H	H	M	M	H	L	H	M
CO5	M	H	H	H	H	M	L	H	H	H	H	M	L
H-High; M-Medium; L-Low													
Course designed by							Verified by						
Dr. Dinesh. M. D							Dr. M. Thangavel						

Course Code	Title	
21U4ENV101	Ability Enhancement Compulsory Course - Environmental Studies	
Semester: I	Credits: 2	CIA: 50 Marks

(Common to all UG Programmes)

Course Objective:

This course enables the students to recognize the interconnectedness of multiple factors in environmental challenges and communicate clearly and competently matters of environment concern.

Course Outcomes:

On completion of course the students will be able to

CO 1	Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
CO 2	Understand concepts and methods from ecological and physical sciences and their application in environmental problem solving.
CO 3	Solve the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
CO 4	Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
CO 5	Apply systems concepts and methodologies to analyse and understand interactions between social and environmental processes.

Course Content**Instructional Hours / Week : 2**

Unit	Description	Text Book	Chapter
I	Natural Resources: Forest resources, Water resources, Mineral resources, Food resources, Energy resources and Land resources.	1	2
Instructional Hours			6
II	Ecosystems: Concept of an ecosystem, Structure and function; Introduction, types, characteristic features, structure and function of ecosystem - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Activity: Prepare an album on types of Ecosystem.	1	3
Instructional Hours			6
III	Environmental Pollution: Definition Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution and Noise pollution, Solid waste management. Activity: Discuss the solutions for water pollution	1	5
Instructional Hours			6
IV	Social Issues and the Environment: Water conservation, rain water harvesting, watershed management, Environmental ethics - Issue summits' and possible solutions and Public awareness. Activity: Identify and analyse a Social Issue and an Environment issue in your locality.	1	6
Instructional Hours			6

V	Disaster Management: Floods, Earthquakes, Cyclones, Landslides: From management to mitigation of disasters: The main elements of a mitigation and measures of strategy: Floods, Earthquakes, Cyclones and Landslides	2	16
Instructional Hours			6
Field Work: Visit to local area to document Environmental assets (River / Forest / Grass land / Mountain), Visit to local polluted site (Urban / Rural / industrial / Agricultural), Study of common plants, insects, birds, Study of simple ecosystem: Pond, River, Hill slopes.			
Total Hours			30

Text Book(s):

1. Shashi Chawla. A Text Book of Environmental Studies, Tata McGraw-Hill, 2012.
2. From UGC website: <https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf>

Reference Book(s):

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd., Bikaner.
2. Jadhav, H & Bhosale, V.M. 1995 Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.
3. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions
4. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574 p
5. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt. Ltd., 345 p.

Tools for Assessment (50 Marks)

Ecosystem Album Preparation	Field visit and report submission	Group discussions about issues related to their locality / about Disaster Management	CIA	Total
10	10	5	25	50

Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	-	L	H	H	H	H	L	L	H	H	H	H
CO2	L	-	L	H	H	H	H	L	L	H	H	H	H
CO3	L	-	L	H	H	H	H	L	L	H	H	H	H
CO4	L	-	L	H	H	H	H	L	L	H	H	H	H
CO5	L	-	L	H	H	H	H	L	L	H	H	H	H

H-High; M-Medium; L-Low

Course designed by	Verified by	Checked by	Approved by Chairman
			Dr. M. Thangavel

SEMESTER – II

Course Code	Title		
23U1TAM202	Part - I : Pynthamizh (பைந்தமிழ்)		
Semester: II	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	மொழி இலக்கியத்தின் வாயிலாக அறம் சார் பண்பு மற்றும் ஆளுமை மிக்க மாணவர்களை உருவாக்குதல்.		
Course Category	Skill Development (மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்)		
Development Needs	Global /Regional(உலக அளவில் தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்)		
Course Description	மாணவர்களின் மொழித்திறனை ஊக்குவித்தல் மற்றும் உலக அளவில் தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	பக்தி இலக்கியங்கள் வழி வாழ்வியல் நெறிகளை மாணவர்களுக்கு எடுத்துரைத்தல்	விரிவுரை/காணொளிப்பட விளக்கம்	ஒப்படைவு
CO 2	சிற்றிலக்கியங்களின் மூலம் தமிழர்களின் வாழ்க்கை கூறுகளை எடுத்துரைத்தல்	விரிவுரை	குழுத்திட்டம்
CO 3	தமிழ் நாவல்களின் வழி சமுதாயச் சிந்தனைகளைக் கூறுதல்	விரிவுரை/காணொளிப்பட விளக்கம்	கருத்தரங்கு
CO 4	இலக்கண அறிவை வளர்த்தல்	விரிவுரை	ஒப்படைவு
CO 5	தமிழ் இலக்கிய வரலாற்றுத்திறனை மேம்பாடு அடையச் செய்தல்	விரிவுரை/ குழு விவாதம்	கருத்தரங்கு
Offered by	தமிழ்த்துறை		
Course Content: Pynthamizh (பைந்தமிழ்)		Instructional Hours / Week : 4	
Unit	Description	Text Book & Chapters	
I	பக்தி இலக்கியங்கள்	<ol style="list-style-type: none"> திருமந்திரம் - மூன்றாம் தந்திரம் (அதிகாரம் 2) நாலாயிரத் திவ்வியப்பிரபந்தம்- பெரியாழ்வார் மாணிக்கவாசகர்-எட்டாம் திருமுறை திருநாவுக்கரசர்- திருவரங்கமாலை 	
Instructional Hours		12 Hours	
Suggested Learning Methods: ஆன்மிக சிந்தனைத்திறன் பெற்றமை			
II	சிற்றிலக்கியங்கள்	<ol style="list-style-type: none"> கலம்பகம் - நந்திக்கலம்பகம் பள்ளா - முக்கூடற்பள்ளா குறவஞ்சி - திருக்குற்றாலக்குறவஞ்சி பிள்ளைத்தமிழ் - மீனாட்சியம்மை பிள்ளைத்தமிழ் பட்டினத்தார் பாடல்கள் 	
Instructional Hours		12 Hours	
Suggested Learning Methods : கலந்துரையாடல்			
III	நாவல்	<ol style="list-style-type: none"> இமையம் (வெ.அண்ணாமலை) 	
Instructional Hours		12 Hours	
Suggested Learning Methods : நாவல் எழுதும் திறன் பெற்றமை			

IV	இலக்கணம்	1. வல்லினம் மிகும் இடங்கள் 2. வல்லினம் மிகா இடங்கள் 3. யாப்பின் உறுப்புகள் (எழுத்து முதல் தொடை வரை) 4. பாவின் வகைகள்	தமிழ் இலக்கணம்										
Instructional Hours			12 Hours										
Suggested Learning Methods : பிழையின்றி தமிழ் எழுதுதல்													
V	தமிழ் இலக்கிய வரலாறு	1. சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும் 2. புதினத்தின் தோற்றமும் வளர்ச்சியும் 3. பக்தி இலக்கியத்தின் தோற்றமும் வளர்ச்சியும் 4. விண்ணப்பங்கள், மடல்கள் எழுதச்செய்தல்	தமிழ் இலக்கிய வரலாறு										
Instructional Hours			12 Hours										
Suggested Learning Methods : குழு விவாதம்													
Total Hours			60 Hours										
Text Books	1. இளங்கலை முதலாம் ஆண்டுத்தமிழ் மாணவர்களுக்குரிய பாடநூல் “பைந்தமிழ்” தொகுப்பு: தமிழ்த்துறை, நேரு கலை மற்றும் அறிவியல் கல்லூரி, கோயம்புத்தூர்.												
Reference Books	1. திருமந்திரம் - மாணிக்கவாசகர் அருளிய திருவாசகம் - சித்தாந்த பண்டிதர் திரு.ப.இராமநாத பிள்ளை விளக்க உரையுடன் கழக வெளியீடு, திருநெல்வேலி, 2. தமிழண்ணல - புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சிப் புத்தக நிலையம் மதுரை.												
Web. URLs	https://youtu.be/cL89sSZq_FI												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Seminar	Assignment	Group Project	Total							
4	4	5	2	2	3	20							
Mapping													
PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	H	L	H	H	M	H					
CO2	H	L	M	L	H	L	H	H					
CO3	H	L	L	L	M	M	H	H					
CO4	H	L	H	L	H	M	M	L					
CO5	H	L	H	L	H	L	H	H					
H-High; M-Medium; L-Low													
Course designed by							Verified by						
Dr. S. Satheesh kumar							Dr. A.Sridevi						

Course Code	Title		
24U1HIN202	Part - 1 Sanchar Hindi (संचार हिन्दी)		
Semester: II	Credits:3	CIA: 20 Marks	ESE: 55 Marks
(Common to all UG Programmes)			
Course Objective	पाठ्यक्रम संवादी हिंदी में पारंगत होने में मदद करता है।		
Course Category	Skill Development		
Development Needs	National		
Course Description	Improves Reading and Translation Skills.		
Course Outcomes	Teaching Methods	Assessment Methods	
CO 1	कविता की मूल शब्दावली और व्यावहारिक तत्वों को समझें। मुक्त छंद और कविता के पारंपरिक रूपों में अंतर्निहित सामान्य तकनीकों को समझें।	Lecture / Video Methods	Assignment
CO 2	छात्र विभिन्न प्रकार की संवादात्मक स्थितियों में हिंदी में प्रदर्शित करने, चित्रित करने, नाटक करने और व्याख्या करने के लिए अर्जित कौशल को लागू करने में सक्षम होंगे	Case Studies	Group Project
CO 3	छात्र औपचारिक और अनौपचारिक पत्र लिखने में सक्षम होंगे।	Lectures / Video Lessons	Seminar
CO 4	अनुवाद सभी लोगों के बीच प्रभावी संचार को सक्षम बनाता है।	Lecture / Video Methods	Assignment
CO 5	छात्र हिंदी भाषा के वक्ता के साथ किसी भी सामान्य विषय पर विभिन्न स्तरों पर बातचीत करने में सक्षम होंगे।	Lecture / Dumb Charades	Seminar
Offered by	Hindi		
Course Content	Instructional Hours / Week : 4		
Unit	Description	Text Book	Chapters
I	आधुनिक हिंदी काव्य : पंचवटी- मैथिली शरण गुप्त	1	All
Instructional Hours			12
Suggested Learning Methods: Visual Learning			02 Hrs
II	एकांकी संग्रह : 1. तौलिया - उपेन्द्र नाथ अशक 2. रीढ़ की हड्डी - जगदीश चंद्र माथुर 3. सिपाही की माँ - मोहन राकेश	1	3
Instructional Hours			12
Suggested Learning Methods: Auditory			02 Hrs
III	पत्र लेखन : छुट्टी पत्र संपादक को पत्र पुस्तकों के लिए आदेश पत्र नौकरी के लिए आवेदन पत्र	1	5

	निजी पत्र।												
Instructional Hours			12										
Suggested Learning Methods : Comprehensive writing			02 Hrs										
IV	अनुवाद : हिंदी से अंग्रेजी (अनुवाद अभ्यास 1 – 10 passages)	3	2										
Instructional Hours			12										
Suggested Learning Methods : Auditory, Visual			02 Hrs										
V	बोलचाल की हिन्दी : शिक्षक- विद्यार्थी, ग्राहक-दुकानदार, डॉक्टर - रोगी, साक्षात्कार, दो यात्री, माँ - बेटा	5	6										
Instructional Hours			12										
Suggested Learning Methods : Comprehensive writing			02 Hrs										
Total Hours			60										
Reference Books	1. आधुनिक हिंदी काव्य : पंचवटी - मैथिली शरण गुप्त- कविता कोश 2. सरस एकांकी नाटक : डॉ. रामकुमार वर्मा 3. अनुवाद अभ्यास - 3 दक्षिण भारत हिंदी प्रचार सभा , चेन्नई -1												
Reference Books	1. श्रेष्ठ हिन्दी एकांकी -डॉ विजय पाल सिंह 2. बोलचाल : पं० अयोध्या सिंह उपाध्याय 3. हिंदी व्याकरण निबंध और पत्र लेखन -डॉ. एन. एल. माथुर												
Web. URLs	www.webdunia.com												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Group project	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	M	L	M	H	M					
CO2	M	M	H	M	H	H	H	M					
CO3	H	L	M	H	M	H	M	M					
CO4	H	M	M	H	H	M	H	H					
CO5	M	H	M	M	M	M	M	M					
H-High; M-Medium; L-Low													
Course designed by							Verified by						
Ms. Krishnenedu P.M							Ms. Heera P.K						

Course Code			
23U1MAL202		Part – I : Novalum Bhashaapadanavum	
Semester : II		Credits : 3	CIA : 20 Marks
		ESE : 55 Marks	
(Common to all UG Programmes)			
Course Objective	വിദ്യാർത്ഥികളിൽ മലയാള ഭാഷയുടെ വികാസവും മലയാള സാഹിത്യത്തിൽ നോവലുകൾക്കുള്ള സ്ഥാനവും വായനാശീലവും വർദ്ധിപ്പിക്കുന്നു		
Course Category	Skill Development		
Development Needs	Regional		
Course Description	Proper guidance, opportunities and encouragement that help them achieve their ambitions		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	സമൂഹത്തിലെ ഒരു വിഭാഗത്തിന്റെ ജീവിതം	Lecture / Video Methods	Assignment
CO 2	പ്രകൃതിയുടെയും മറ്റു ജീവജാലങ്ങളുടെയും മാറ്റങ്ങൾ	Case studies	Group Project
CO 3	പ്രകൃതി നാശത്തിനെതിരായി ഒന്നിച്ചു പ്രവർത്തിക്കുന്നു	Lectures / Video Lessons	Seminar
CO 4	സമൂഹത്തിലെ ഭാഷാസങ്കല്പം തിരിച്ചറിയുന്നു	Lecture / Video Methods	Assignment
CO 5	നല്ല ഭാഷ എങ്ങനെ സൃഷ്ടിക്കാമെന്ന് മനസ്സിലാക്കുന്നു	Lecture / Dumb Charades	Seminar
Offered by	Malayalam		
Course Content		Instructional Hours / Week : 4	
Unit	Description	Text Book	Chapters
I	നോവൽ - എൻമകജെ	1	1 to 16
Instructional Hours			12
Suggested Learning Methods : Visual Learning			
II	നോവൽ - എൻമകജെ	1	17 to 34
Instructional Hours			12
Suggested Learning Methods : Auditory			
III	നോവൽ - എൻമകജെ	1	35 to 51
Instructional Hours			12
Suggested Learning Methods : Comprehensive writing			
IV	ഭാഷാപഠനം - തെളിമലയാളം	1	1,2,3
Instructional Hours			12
Suggested Learning Methods : Auditory, Visual			

V	ഭാഷാപഠനം - തെളിമലയാളം						1	4,5					
Instructional Hours							12						
Suggested Learning Methods : Comprehensive writing													
Total Hours							60						
Text Books	1. അംബികാസുതൻ മാങ്ങാട് - എൻമകജെ - ഡി.സി.ബുക്സ് കോട്ടയം 2. എം.എൻ.കാരശ്ശേരി - തെളിമലയാളം - ഡി.സി.ബുക്സ് കോട്ടയം												
Reference Books	1. പ്രൊഫ.എൻ.കൃഷ്ണപ്പിള്ള - കൈരളിയുടെ കഥ - ഡി.സി.ബുക്സ് കോട്ടയം 2. ഡോ. പത്മന രാമചന്ദ്രൻ നായർ - സമ്പൂർണ്ണമലയാള സാഹിത്യ ചരിത്രം - ഡി.സി.ബുക്സ് കോട്ടയം 3. ഡോ.കെ.എം. ജോർജ്ജ് - ആധുനിക മലയാള സാഹിത്യ ചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ - ഡി.സി.ബുക്സ് കോട്ടയം 4. എരുമേലി - മലയാള സാഹിത്യം കാലഘട്ടത്തിലൂടെ - ഡി.സി.ബുക്സ് കോട്ടയം												
Web. URLs	literature">http://www.keralaculture.org>literature http://www.manoramaonline.com												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Group project	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO 8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	-	H	H	H	H							
CO2	-	-	H	M	H	M							
CO3	-	-	M	M	M	H							
CO4	-	-	L	H	L	H							
CO5	-	-	L	M	L	H							
H-High; M-Medium; L-Low													
Course designed by								Verified by Chairman					
Ms. N. Rajini								Dr. Smitha. C. R					

Course Code	Title		
24U1FRN202	Part-I: Français général - II		
Semester : II	Credits : 3	CIA:20Marks	ESE : 55 Marks
Common to all UG Programmes			
Course Objective	To understand speak, write and read simple, standard speech which is very slow and is carefully articulated and can recognize familiar words and very basic phrases		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Improved accuracy & quality, improved communication		
Course Outcomes		Teaching Methods	Assessment Methods
CO1	Comprehend day to day conversations	Lecture	Assignment
CO2	Understand basic culture and literature of France	Word game/Lecture	Spelling Test
CO3	Converse slowly in known situations	Lecture/Video Lessons	Verbal Test
CO4	Translate small paragraph of known texts	Role play/ Tutorial	Assignment
CO5	To develop the ability to understand and communicate	Role play/Lecture	Group project
Offered by	Department of French		
Course Content	Instructional Hours/Week: 4		
Unit	Description	Text Book	Chapters
I	<ul style="list-style-type: none"> • Parlons de la vie au collègue • Parlons de notre emploi du temps • Fixons un rendez-vous • Entraînement 	1	1
Instructional Hours			12
Suggested Learning Methods : Worksheet			
II	<ul style="list-style-type: none"> • Parlons de la mode • Parlons de nos achats • Décrivons notre style • Entraînement 	1	2
Instructional Hours			12
Suggested Learning Methods: Kahoot App			
III	<ul style="list-style-type: none"> • Décrivons notre logement • Organisons notre chambre 	1	3
Instructional Hours			12
Suggested Learning Methods: Audio & Visual			

IV	<ul style="list-style-type: none"> • Parlons de nos activités quotidiennes • Entraînement • Parlons de destinations de rêve 	1	4
Instructional Hours			12
Suggested Learning Methods: Comprehensive Writing			
V	<ul style="list-style-type: none"> • Faisons des projets de vacances • Racontons un voyage • Entraînement 	1	5
Instructional Hours			12
Suggested Learning Methods: Translating simple sentences			
Total Hours			60

Text Books	Adomania 1 – Méthode de Français
Reference Books	Latitudes 1
Web.URLs	Lingua.com, Duolingo App, You Tube Videos

Tools for Assessment (20Marks)

CIAI	CIAII	CIAIII	Assignment	Spelling Test	Verbal Test	Total
4	4	5	2	2	3	20

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	-	H	H	H	H	-	-	-	-	-	-	-
CO2	-	-	H	M	H	M	-	-	-	-	-	-	-
CO3	-	-	M	M	M	H	-	-	-	-	-	-	-
CO4	-	-	L	H	L	H	-	-	-	-	-	-	-
CO5	-	-	L	M	H	H	-	-	-	-	-	-	-

H-High; M-Medium; L-Low

Course designed by Mr. D. Balaji	Verified by Chairman Mr. D. Balaji
--	--

Course Code	Title		
24U2ENG202	Part II - Professional English II		
Semester: II	Credits : 3	CIA: 20 Marks	ESE: 55 Marks
(Common to all UG Programmes)			
Course Objective	To equip the students with the language skills and its functional usage. Facilitate the insight and taste of Literature.		
Course Category	Skill Development		
Development Needs	Global/ National/ Regional		
Course Description	SD: Helps to develop LSRW skill		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Mastering life skills through prose discourse.	Lecture	Assignment
CO 2	Acquire ethics and values through poetic genre.	Lecture	Assignment
CO 3	Recognise the nuances of English language through short stories.	Tutorial	Speaking
CO 4	Enhance fluency over language with self-confidence.	Tutorial	Reading
CO 5	Examine how the language is used in literature and develop LSRW Skills	Tutorial	Writing
Offered by	Department of English		
Course Content		Instructional Hours / Week : 4	
Unit	Description	Text Book	Chapters
I	Prose Mahatma Gandhi - Women Not the Weaker Sex Issac Asimov - The Fun They had Listening Activity – Comprehension practice from Prose.	1	1-3
Instructional Hours			12
Suggested Learning Methods : Cooperative Learning			
II	Poetry Robert Frost - Stopping by Woods on a Snowy Evening Alexander Pope – Ode on Solitude Speaking Activity – Group Discussion Forum	1	4-6
Instructional Hours			12
Suggested Learning Methods : Inquiry Based Learning			
III	Short Stories Mark Twain - The Cat and the Painkiller Hector Hugh Munro (Saki) – The Open Window Reading Activity – Pronunciation practice and enhancement from Short-stories	1	7-9
Instructional Hours			12

Suggested Learning Methods : Classroom Activity													
IV	Grammar Articles Concord Active and Passive Voices Direct and Indirect Speech Writing Activity – Paragraph Writing using grammar Components								1	10-13			
	Instructional Hours											12	
Suggested Learning Methods : Direct Method													
V	Writing Skills Resume Writing Email Writing Dialogue Writing Testimonial Writing Creative Writing								1	14-17			
	Instructional Hours											12	
Suggested Learning Methods : Activity Based Learning													
Total Hours											60 Hrs		
Text Books			Compiled by the Department of English NASC.										
Reference Books			CLIL (Content & Language Integrated Learning) – Module by TANSCHENOTE: (Text: Prescribed chapters or pages will be given to the students by the department and the college)										
Web. URLs			<ol style="list-style-type: none"> https://sujarithasaravanan.blogspot.com/2020/05/women-not-weaker-sex-summary.html https://interestingliterature.com/2022/05/isaac-asimov-the-fun-they-had-summary-analysis/ https://www.poetryfoundation.org/poems/42891/stopping-by-woods-on-a-snowy-evening https://www.reddit.com/r/Poetry/comments/1duiqpe/ode_on_solitude_by_alexander_pope_poem/?rdt=59291 https://tnpsc.academy/unit/the-cat-and-the-painkiller/ 										
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Speaking	Reading	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	H	L	M	M	H	M					
CO2	M	L	H	L	H	M	H	M					
CO3	M	L	H	L	H	H	H	H					
CO4	M	L	H	L	H	L	H	H					
CO5	H	M	H	L	H	H	H	H					
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Mr. D. Pradeek							Dr. R. Malathi						

Course Code	Title		
24U3MBC204	Core Paper IV – Microbial Diversity		
Semester: II	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	The objective of this course is to make students understand the diversity of microbial world and systematic classification systems. The course will provide insights into study of microbes and distinguishing features associated with them based on morphological, chemical, structural and metabolic characteristics		
Course Category	Skill Development		
Development Needs	Global		
Course Description	This course will study the diversity of Bacteria and Archaea in selected ecosystems at an organismal level, investigate the metabolic and enzymatic diversity in microbes that contribute to and thrive within these environments.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Learn criteria used for bacterial classification.	Lecture	Assignment
CO 2	Describe classification of eubacteria and actinomycetes.	Flipped Classroom	Seminar
CO 3	Understand the characters and significance of eubacteria and actinomycetes.	Video Lessons	Quiz
CO 4	Know the characters and significance of fungi.	Tutorial	Seminar
CO 5	Explain characters and significance of algae.	Lecture / Case Studies	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 5	
Unit	Description	Text Book	Chapters
I	Taxonomy: Principles – Modern approaches - Numerical-Genetic, Serotaxonomy and Chemotaxonomy. Whittaker's five kingdom concept. Haeckel's three kingdom concept	1	19
Instructional Hours			15
Suggested Learning Methods: Comics Preparation / You tube Videos			
II	Taxonomy of Eubacteria and Actinomycetes: Detailed classification upto genus level with general characters of each group – Bergey's Manual and its importance.	1	20
Instructional Hours			15
Suggested Learning Methods: Chart Preparation			
III	Eubacteria and Archaeobacteria: Taxonomy of Photosynthetic Eubacteria and Archaeobacteria- General characteristics.	1	20
Instructional Hours			15
Suggested Learning Methods: Videos			
IV	Taxonomy of Fungi (Alexopolous): General Characteristics- Life Cycles of Mucor, Neurospora, Agaricus, Dictyostelium.	2	4

Instructional Hours													15
Suggested Learning Methods: You tube videos													
V	Taxonomy of Algae and Protozoa: General Characters and its importance – Cholorophyta- Euglenophyta – Chrysophyta - Phaeophyta - Rhodophyta – Pyrrophyta-Taxonomy of Protozoa – General characters and its importance – Mastigophora, Rhizopoda, Ciliata, Sporozoa.										3	2	
Instructional Hours													15
Suggested Learning Methods: Videos / Chart Preparation													
Total Hours													75
Text Books		<ol style="list-style-type: none"> Joanne M.Willey, Linda M. Sherwood, Christopher J. Woolverton, Prescott, Harley, and Klein's Microbiology, 7th Edition, McGraw Hill Edition, 2008. Sullia S.B., Shantharam S., General Microbiology, 2nd Edition (Revised), Oxford University Press.2019. Ashok Kumar Aswasthi, Text Book of Algae, Vikas Publishing house, 2015. 											
Reference Books		<ol style="list-style-type: none"> Stainer R.Y. Ingraham J.L. Wheolis H.H and Painter P.R. The Microbial World,5thedition. Eagle Works Cliffs N.J. Prentica Hall, 1986. Gerard J. Tortora, Berdell R. Funke, Christine L. Case, Derek Weber, Warner Bair, Microbiology: An Introduction, 4th edition, Pearson Education, 2019. Willey, J.M., Sherwood, L and Wool Verton C.J. Prescott's Microbiology. 8thedition,McGraw Hill, New York, 2011. 											
Web. URLs		https://www.edx.org/course/the-extremes-of-life-microbes-and-their-diversity											
Tools for Assessment (25 Marks)													
CIA I		CIA II		CIA III		Assignment		Seminar		Quiz		Total	
5		5		6		3		3		3		25	
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	L	M	L	M	H	H	H	H	L	H
CO2	M	H	M	H	M	L	M	H	H	H	H	H	H
CO3	H	H	M	H	M	L	M	H	H	H	H	L	H
CO4	M	L	L	L	H	L	M	H	H	H	H	H	H
CO5	M	L	L	L	H	L	M	H	H	H	H	H	H
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. K. E. Vivekanandan							Dr. M. Thangavel						

Course Code	Title		
24U3MBC205	Core Paper V – Microbial Genetics		
Semester: II	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	To make the students to understand on Historical introduction to Genetics and genetic materials, understanding the concept and principles of genetics exchanges and its expression in host and to provide an idea about gene regulations and its control		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Genetics of bacteria and phage, focusing on replication, repair, transcription, translation, gene regulation, genetic networks, plasmids, conjugation, transformation, microbial and phage interactions and Mutations.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Acquire knowledge on historical overview of microbial genetics and genetic materials	Lecture	Assignment
CO 2	Understand the concept of replication of genetic materials	Flipped Classroom	Seminar
CO 3	Understand about regulation of gene expression and mutation	Video Lessons	Quiz
CO 4	Demonstrate the genetic exchange mechanism in microorganisms	Tutorial	Seminar
CO 5	Gain knowledge on Oncogenes	Lecture / Case Studies	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 5	
Unit	Description	Text Book	Chapters
I	Genetics – Historical introduction – Mendelian Principles DNA as genetic material: Griffith, Avery, MacLeod and McCarthy experiment. RNA as a genetic material: Fraenkel, Conrat & Singer experiment, Hershey and Chase. Structure DNA and RNA - Types of RNA.	3	7
Instructional Hours			15
Suggested Learning Methods: Comics Preparation / You tube Videos			
II	Replication of DNA: Replication in Prokaryotes and Eukaryotes - Mechanism and Enzymology. Methods of DNA replication: Semi conservative, conservative, dispersive. Plasmid: Structure, Properties and types - Rolling circle mechanism, θ mode of replication.	2	9
Instructional Hours			15
Suggested Learning Methods: Chart Preparation			
III	Bacterial Genetics: Concepts of haploid genomes Genetic exchange: Transformation, Transduction and Conjugation Transposons.	1, 4	14,16
Instructional Hours			15
Suggested Learning Methods: Videos			
IV	Organization of genes and Chromosomes: Gene expression in Prokaryotes and Eukaryotes. Transcription and Translation in	4	12

	Prokaryotes and Eukaryotes. Genetic code - Operon concept: lac & trp Operon												
Instructional Hours			15										
Suggested Learning Methods: You tube videos													
V	Mutation: Spontaneous and Induced Mutation, DNA repair mechanism, Oncogenes: Proto-oncogenes and viral oncogenes		4	12									
Instructional Hours			15										
Suggested Learning Methods: Videos / Chart Preparation													
Total Hours			75										
Text Books	<ol style="list-style-type: none"> 1. Daniel, L. Hartl., W. Elizabeth and Jones. (2001). Genetics-Analysis of Genes and Genomes, Jones and Bartlett publishers, UK. 2. David Frifelder. (1990). Microbial Genetics, Narosa publishing house, New Delhi. 3. Gardner, E.J., Simmons, M.J., and Snustad, D.P. (2006). Principles of Genetics. John Wiley & sons. 4. Old, R.S. and Primrose, S.B. (1989). Principles of Gene Manipulation, Blackwell Scientific Publications, London. 												
Reference Books	<ol style="list-style-type: none"> 1. Larry Synder and Wendy Champness. (2003). Molecular Genetics of Bacteria. American Society for Microbiology, Washington. 2. Lodish, H., Baltimore, D. Berk, A. Zipsury, S.L., Matsudaira, P. Darnell, J. (1995). Molecular Cell Biology. Scientific American Books. 3. Malor, Sr, Cronan Jr. JE. Freifelds D. (2003). Microbial Genetics. Jones and Bartlett Publishers 												
Web. URLs	https://www.edx.org/course/the-extremes-of-life-microbes-and-their-diversity												
Tools for Assessment (25 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
5	5	6	3	3	3	25							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	L	M	L	M	H	H	H	H	L	H
CO2	M	H	M	H	M	L	M	H	H	H	H	H	H
CO3	H	H	M	H	M	L	M	H	H	H	H	L	H
CO4	M	L	L	L	H	L	M	H	H	H	H	H	H
CO5	M	L	L	L	H	L	M	H	H	H	H	H	H
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. R. Kasimani							Dr. M. Thangavel						

Course Code		Title	
24U3MBP206		Core Paper – VI Cell Biology and Genetics Practical	
Semester: II		Credits: 3	CIA: 30 Marks
		ESE: 45 Marks	
Course Objective		To gain knowledge on the laboratory skills, control of infectious sources	
Course Category		Skill Development / Employability / Entrepreneurship	
Development Needs		Global, Local and Regional needs	
Course Description		This is a skill-oriented course that will help the student to acquire the practical skills that will enable them to get employment in hospitals or to start their own laboratories and become an entrepreneur	
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Relate the knowledge on different types of cells	Lecture / Hands on	Performance
CO 2	To study on the cell biology and cell division	Lecture / Hands on	Observation
CO 3	Outline the key concept of Microbial growth and its parameters.	Lecture / Hands on	Performance
CO 4	Apply the knowledge on techniques in isolation of DNA	Lecture / Hands on	Performance
CO 5	To acquire knowledge on the microbial genetics	Lecture / Hands on	Observation
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 5	
Exp No	Experiments		
1.	Cell motility- Cilia, Flagella of Prokaryotes		
2.	Cellular basis of differentiation and development – Mitosis		
3.	Different types of cells –Parenchyma, Collenchyma, Epithelial cells. Mitosis		
4.	Different types of cells –Parenchyma, Collenchyma, Epithelial cells Meiosis (Demonstration)		
5.	Bacterial Growth Curve		
6.	Effect on pH on Microbial growth		
7.	Effect on Temperature on Microbial growth		
8.	Effect on Salinity (High Salt Concentration) on growth.		
9.	Isolation of Chromosomal DNA from Bacteria		
10.	Principles and Applications of Agarose gel Electrophoresis (Demonstration)		
11.	Gene Transfer by Conjugation		
		Total Hours	75

Text Books		1. 1.James G. Cappucino – Microbiology – a Laboratory manual 2. Rajan and Selvi Christy - Experimental Procedures in Life													
Reference Books		1.Dubey and Maheswari – Practical Microbiology													
Web. URLs		https://microbnotes.com													
Tools for Assessment (30 Marks)															
Laboratory Performance							Test - I	Test - II	Observatio n notebook	Total					
Level of engagement in lab	Preparation		Result												
4	4		4		7		7		4		30				
Mapping															
CO \ PO	PO 1	PO 2	PO3	PO 4	PO 5	PO 6	PO7	PO 8	PSO 1	PSO2	PS O3	PSO 4	PSO 5		
CO1	H	M	M	M	M	M	M	H	M	L	M	M	M		
CO2	H	H	H	H	M	M	H	H	H	L	L	M	H		
CO3	H	H	M	M	H	H	H	H	H	M	L	L	H		
CO4	H	H	H	M	M	H	M	H	H	L	L	L	H		
CO5	H	H	H	H	M	H	H	H	M	M	M	L	H		
H-High; M-Medium; L-Low															
Course designed by							Verified by Chairman								
Dr. Dinesh M D							Dr. M. Thangavel								

Course Code	Title		
23U3BYR202	Allied Paper II – Biochemistry Practical		
Semester: II	Credits: 2	CIA: 30 Marks	ESE: 45 Marks
Course Objective	The lab aims to develop the skills in biochemical analysis and to develop the skills of the students in Qualitative and Quantitative Analysis of biomolecules. The student is able to quantify the biochemical molecules. The students equip themselves with the basic biochemical tools and standard operation procedures		
Course Category	Skill Development / Employability		
Development Needs	Global		
Course Description	This course provides familiarization with protein and enzyme techniques in the laboratory, and properties of amino acids and sugars. There is some material dealing with DNA and very basic molecular biology		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Determine the absorption Maxima of different molecules and verify Beer's law.	Lecture / Hands on	Behaviour
CO 2	Identify carbohydrates and amino acids present in the given unknown sample.	Lecture / Hands on	Observation
CO 3	Asses DNA and Proteins in the specified sample.	Lecture / Hands on	Performance
CO 4	Familiarize paper and thin layer chromatography techniques.	Lecture / Hands on	Performance
CO 5	Separate macromolecules using column chromatography.	Lecture / Hands on	Observation
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 4	
Exp No	Experiments		
1.	Determination of absorption maxima (λ max) of small molecules and macromolecules		
2.	Verification of Beer's Law		
3.	Calculation, preparation of normal, molar and percentage solutions		
4.	Determination of Acid number		
5.	Determination of Iodine number		
6.	Determination of molar extinction coefficient.		
7.	Qualitative analysis of carbohydrates		
8.	Qualitative analysis of amino acids		
9.	Colorimetric estimation DNA by diphenylamine method		
10.	Colorimetric estimation of proteins by Biuret/Lowry method		
11.	Paper chromatographic separation of amino acids		
12.	Thin layer chromatographic separation of amino acids		
13.	Column Chromatography		
Total Hours			60

Text Books	Sadasivam S., Manickam A. Biochemical Methods , New Age International Pvt. Ltd., 2018. Jayaraman J. Laboratory Manual in Biochemistry , New Age International Pvt. Ltd., 2011													
Reference Books	David Plummer. An Introduction to Practical Biochemistry , 3 rd edition, McGrawHill Education, 2017. Sharma DC., Manminder Riyat, Practical Medical Biochemistry , Wolters KluwerIndia Pvt. Ltd. 2018													
Web. URLs	https://www.classcentral.com/course/swayam-experimental-biochemistry-12909													
Tools for Assessment (30 Marks)														
Laboratory Performance			Test - I	Test - II	Observation Note Book	Total								
Level of engagement in lab	Preparation	Result												
4	4	4	7	7	4	30								
Mapping														
CO \ PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO2	PSO3	PSO4	PSO 5	
CO1	M	H	L	L	L	L	L	H	L	L	M	L	L	
CO2	H	M	L	L	M	M	L	M	L	M	L	L	L	
CO3	H	H	L	H	L	M	L	H	H	H	L	L	M	
CO4	M	L	L	L	L	L	L	M	L	M	L	L	L	
CO5	H	H	M	L	M	M	M	H	L	L	L	L	L	
H-High; M-Medium; L-Low														
Course designed by								Verified by Chairman						
Dr. Dinesh M. D								Dr. M. Thangavel						

Course Code	Title	
21U4HRC202	Ability Enhancement Compulsory Course - Human Rights and Constitution of India	
Semester : II	Credits : 2	CIA : 50 Marks

(Common to all UG Programmes)

Course Objective:

Understand the concept of human rights and the importance of Indian Constitution.

Course Outcomes:

CO1	Understand the principal aspects of human rights and duties in a broad sweep.
CO2	Acquire the knowledge about the Fundamental Duties and Rights of Indian Citizen
CO3	To know the rights of women and Children in India
CO4	Understand the structure and importance of Indian Constitution
CO5	Know the functions of Government and Election Commission of India

Course Content**Instructional Hours / Week : 2**

Unit	Description	Instructional Hours	6
I	An Introduction to Human Rights :Values – Dignity, Liberty, Equality, Justice, Unity in Diversity - Human Rights – Meaning and features; Significance of the study - Classification of Human Rights - Rights and Duties – Correlation	Instructional Hours	6
II	Human Rights and Fundamental Rights - Fundamental Rights and Fundamental Duties- Directive Principles - Role of Judiciary in the protection of Human Rights- National Human Rights Commission <i>Activity : Case Study related to Human Rights</i>	Instructional Hours	6
III	Human Rights of Women and Children- Social Practice and Constitutional Safeguards – Female foeticide and infanticide-Physical assault and Harassment- Domestic violence- Conditions of Working Women <i>Activity : Conduct a Group Discussion on the above topics</i>	Instructional Hours	6
IV	Constitution – Structure and Principles - Meaning and importance of Constitution - Making of Indian Constitution –Sources - Salient features of Indian Constitution- Government of Union- Government of State-Features of judicial system in India	Instructional Hours	6
V	Federalism in India – Features - Local Government -Panchayat –Powers and functions -Election Commission –Organisation and functions-Citizen oriented measures – RTI – Provisions and significance <i>Activity : Seminar/ Role play related to Indian Constitution</i>	Instructional Hours	6
		Total Hours	30

Text Book:

1. “**Human Rights and Constitution of India**”, Compiled by Curriculum Development Cell, Nehru Arts and Science College.

Tools for Assessment (50 Marks)

Case Study and Report submission	Seminar / Role play	Group Discussion	Comprehensive test for 5×5 = 25 marks	Total
10	10	5	25	50

Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	-	-	L	H	H	H	H					
CO2	-	-	-	L	H	H	H	H					
CO3	-	-	-	L	H	H	H	H					
CO4	-	-	-	L	H	H	H	H					
CO5	-	-	-	L	H	H	H	H					

H-High; M-Medium; L-Low

Course Designed by	Verified by	Checked by	Approved by Chairman
Dr. E. Vijaya Gowri	Dr. E. Vijaya Gowri	Dr. N. Saranya	Dr. N. Saranya

Course Code	Title	
22U4HVVY201	Value Education : Human Values and Yoga Practice	
Semesters : I & II	Credits : 2	CIA : 50 Marks

(Common to all UG Programmes)

Course Objective:

- To help the students appreciate the essential complementarity between 'values' and 'skills' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
- To prepare and distribute standardized Yoga teaching and training material with reference to institute health.

Course Outcomes:

CO1	To know the importance of Ethics to be followed in the Human life.
CO2	To inculcate a sense of respect towards harnessing values of life and spirit of fulfilling social responsibilities.
CO3	To gain knowledge about the values that develops life skills.
CO4	To understand and Practice Meditation & Surya Namaskar.
CO5	To understand and apply the knowledge for physical health and well being through Asanas

Course Content**Instructional Hours / Week : 1 (For Semesters I and II)**

Unit	Description	Instructional Hours
I	Human Values – Introduction - Definition of Ethics and Values - Character and Conduct - Nature and Scope of Ethics. Individual and Society - Theories of Society - Social Relationships and Society - Empathy: Compassion towards other beings.	4
II	Self-realization and Human Values -Self-realization and Harmony-Rules and Regulations- Rights and Duties-Good and Obligation-Integrity and Conscience. Obligation to Family - Trust and Respect-Codes of Conduct.	5
III	Character Formation Towards Positive Personality: Truthfulness, Constructivity, Sacrifice, Sincerity, Self Control, Altruism, Tolerance, Scientific Vision. Refinement of worries: Neutralization of anger-Intelligent quotient(IQ),Emotional quotient(EQ),Spiritual Quotient (SQ)	5
IV	Power of Meditation - Development of mind in stages - Mental Frequencies Methods for Concentration. Meditation Practices - Surya Namaskar. Physical Exercises -Kayakalpa Practices Training for Potentialising the Mind.	6

V	ASANAS	
	Standing Posture: Tadasana, Utkattasana, arthaKadi Chakrasana, Trikonasana, Artha Chandrarasana, Padahastasana, Virabhadrasana, Vrikshasana, Artha, Natarajasana.	
	Sitting posture: Padmasana, Gomukasana, Ustrasana, ArdhaMatsyendrasana, Patchimottanasana.	
	Prone posture: Bhujangasana, shalabhasana, Dhanurasana, Chakrasana.	
	Supine posture: Sarvangasana, Halasana, Matsyasana, Shanti asana	
	Pranayama: Bhastrika, Bhramari, NadiShodhan	
	Instructional Hours	10
	Total Hours	30

Text book:

1. “Value Education”, compiled by Curriculum Development cell, Nehru Arts and Science College.

Tools for Assessment

25 marks	25 marks
Comprehensive test in Units I to III for 25 marks during CIA III of Sem. II	Perform 02 Yoga postures for Practical exam to be conducted during the mid. of Sem. II

Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	-	-	H	L	M	H	H					
CO2	-	-	-	L	M	H	M	H					
CO3	-	-	-	L	M	H	S	H					
CO4	-	-	-	L	L	H	M	H					
CO5	-	-	-	L	L	H	M	H					

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by Chairman
Dr. Karthi. M	Dr. N. Kavitha		

Course Code	Title	
24U4SEC201	Skill Enhancement Course I - Career Foundation Skills	
Semester: II	Credit: 1	CIA: 25 Marks
Course Objective	The objective of this course is to foster the students' comfort in English Communication. To familiarise students in solving basic quantitative aptitude problems.	
Course Category	Skill Development, Employability, Entrepreneurship	
Development Needs	Global	
Course Description	This course is a part of series of 3 courses aimed at enhancing the industry readiness of the students. This series aims at honing their multiple intelligence like Numerical, Linguistic, and Logical, spatial and interpersonal intelligence.	
Course Outcomes		
CO 1	Students will be able to participate in any learning activity without any reservations. They shall be ready to move beyond their comfort zone to acquire new skills throughout their life.	
CO 2	Students shall understand and appreciate the importance of English in the current global scenario and make efforts towards up skilling the same.	
CO 3	Students shall make a conscious effort toward speaking in English, they shall prepare and try the same team and paired activities in the given context. – Level 1	
CO 4	They shall demonstrate a good understanding of basic mathematical concepts required to learn engineering. To use appropriate strategies and shortcuts to improve speed and accuracy in solving aptitude problems during recruitment processes	
CO 5	Demonstrate good logical thinking and thought process in approaching various Business scenarios.	
Offered by	NCPIR	
Course Content		
Unit	Description	
I	Introduction & Orientation Introduction about the training – NCPIR - Course Introduction - Overcoming the shyness- Training expectations - Communication Pre-assessments APR101	
		Instructional Hours 6
II	Speaking Skills Communication Skills - Importance of English - Challenges faced in English communication - Pronunciation - Fluency-Vocabulary- Grammar - Developing a globally comprehensible accent- How to develop a neutral accent - Overcoming MTI. Speech Craft Activities - Chart Presentation – My Buddy, APO101, APO102	
		Instructional Hours 12
III	Verbal Ability Tenses- usage of tenses - common errors in English - Avoiding common mistakes in spoken communication- Synonyms & Antonyms - Assessments - AUA101, AUA102	
		Instructional Hours 6
IV	Numerical Aptitude Introduction - Divisibility Test -Problems on Numbers, Average, Percentage, Profit & Loss –Unit Assessment AUA103, AUA104, AUA105, AUA106	
		Instructional Hours 8
V	Logical Reasoning Number Series, Letter Series, Coding & Decoding - Assessment AUA107, AUA108	
		Instructional Hours 4

		Total Hours	36 Hrs										
Session	Topics	Unit											
1	Introduction & Orientation –Shy Barrier	1											
2	Communication Pre Assessment APR101	1											
3	Communication Pre Assessment APR101	1											
4	Communication Pre Assessment APR101	1											
5	Speaking Skills - Communication skills	2											
6	Speech Craft - My Buddy – APO101	2											
7	Speech Craft - My Buddy – APO101	2											
8	Speech Craft - My Buddy – APO101	2											
9	Speech Craft -Chart Presentation-APO102	2											
10	Speech Craft -Chart Presentation-APO102	2											
11	Speech Craft -Chart Presentation-APO102	2											
12	Speech Craft -Chart Presentation-APO102	2											
13	Tenses - Introduction	3											
14	Usage of Tenses - Common Error in English	3											
15	Common Errors in Spoken communication	3											
16	Synonyms & Antonyms	3											
17	Numerical Aptitude - Introduction	4											
18	Numerical Aptitude - Problems on Divisibility Test	4											
19	Numerical Aptitude – Problems on Numbers	4											
20	Numerical Aptitude - Average	4											
21	Numerical Aptitude - Percentage	4											
22	Logical Reasoning – Number & Letter Series	5											
23	Logical Reasoning – Coding & Decoding	5											
24	APO103, APO104 – Post Evaluation Assessment	3,4,5											
Tools for Assessment (25 Marks)													
Communication Assessments - Novice	Proctored Online Assessments in Quantitative & Verbal Aptitude – Level I					Attendance	Total						
10	10					5	25						
Mapping													
PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1													
CO2													
CO3													
CO4													
CO5													
H-High; M-Medium; L-Low													
Course designed by					Verified by Chairman								

SEMESTER – III

Course Code	Title		
23U1TAM303	Part -I : Arunthamizh (அருந்தமிழ்)		
Semester: III	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	தமிழ்க் காப்பியங்களின் வழி அறம் சார்ந்த சிந்தனைகளை உருவாக்குதல்		
Course Category	Skill Development (மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்)		
Development Needs	Global/Regional (உலக அளவில் தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்)		
Course Description	மாணவர்களின் மொழித்திறனை ஊக்குவித்தல் மற்றும் உலக அளவில் தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்		
Course Outcomes	Teaching Methods	Assessment Methods	
CO 1	தமிழ் நூல்களில் அணிநலம் அறிதல், அறம் சார்ந்த சிந்தனைகளை வளர்த்தல்.	விரிவுரை/ காணொளிப்பட விளக்கம்	ஒப்படைவு
CO 2	தமிழ் இலக்கிய வகைகளைக் கூறுவதன் மூலம் தமிழின் இலக்கிய வளத்தை உணர்ச்செய்தல்.	விரிவுரை	குழுத்திட்டம்
CO 3	மாணவர்களிடையே காலத்திற்கேற்ப மொழிவளர்ச்சியை உருவாக்குதல்.	விரிவுரை/ காணொளிப்பட விளக்கம்	ஒப்படைவு
CO 4	நாட்டின் சிறந்த குடிமக்களாக மாணவர்களை உருவாக்குதல்.	விரிவுரை// குழு விவாதம்	கருத்தரங்கு
CO 5	மாணவர்களின் மனநலத்தை வளர்த்தல்.	விரிவுரை/ குழு விவாதம்	கருத்தரங்கு
Offered by	தமிழ்த்துறை		
Course Content : Arunthamizh (அருந்தமிழ்)		Instructional Hours / Week : 4	
Unit	Description	Text Book	Chapters
I	காப்பியங்கள்	1.சிலப்பதிகாரம் 2.மணிமேகலை 3.சீவகசிந்தாமணி 4.கம்பராமாயணம்	1.1அடைக்கலக்காதை (மதுரைக்காண்டம்-பகுதி- 15) 1.2.பீடிகைக் கண்டுபிறப்புணர்ந்தக் காதை-பகுதி-9) 1.3.பூமகள் இலம்பகம் (பகுதி- 11-2347-2377 பாடல்கள்) 1.4சுந்தரகாண்டம்(கடல் தாவுப்படலம் 1-10பாடல்கள்)
Instructional Hours		12 Hours	
Suggested Learning Methods: நாடக முறையில் கலந்துரையாடல்			
II	சைவ,வைணவ, சுவடியியல்	1. தேவாரம் 2..நாலாயிரத்திவ்வியப் பிரபந்தம் 3.சுவடியியல்	2.1.திருநல்லூர்ப் பெருமணம் (பாடல் எண்-4137-4146) 2.2.ஆண்டாள் திருப்பாவை - (பாடல் எண்- 474-483) 2.3.சுவடியியல் - அறிமுகம் 2.4 சைவம் தமிழுக்குச் செய்த தொண்டு 2.5 வைணவம் தமிழுக்குச் செய்த தொண்டு
Instructional Hours		12 Hours	
Suggested Learning Methods : பக்தி பாசுரங்கள் கலந்துரையாடல்			

III	மொழித்திறன் (இலக்கணம்)	1.நன்னூல் 2.தொல்காப்பியம்	3.1 நூல் வரலாறு (முதல் நூல், வழி நூல், சார்பு நூல்) 3.2 மாணாக்கர் வரலாறு 3.3 ஆசிரியர் வரலாறு 3.4 எண்வகை மெய்ப்பாடுகள்										
Instructional Hours			12 Hours										
Suggested Learning Methods :		மொழித்திறன் வாயிலாக பிழையின்றி எழுதும் திறன் பெற்றமை											
IV	நாட்டுப்புற வழக்காறுகள்	நாட்டுப்புறவியல்	4.1. பழமொழிகள் 4.2. விடுகதைகள் 4.3 தமிழர்க்கலைகள் 4.4 சிறுதெய்வ வழிபாடு மட்டும் 4.5 விளையாட்டுகள் (சிறுவர்,சிறுமியர் மட்டும்)										
Instructional Hours			12 Hours										
Suggested Learning Methods :		நாட்டுப்புறவியல் வழி நாட்டுப்புற மக்களின் வாழ்வியலை அறியச்செய்தல்											
V	இலக்கிய வரலாற்றுத் திறன்	தமிழ் இலக்கிய வரலாறு	1. காப்பியத்தின் தோற்றமும் வளர்ச்சியும் 2. பக்தி இலக்கியத்தின் தோற்றமும் வளர்ச்சியும் 3. தமிழக நாட்டுப்புறவியல் வரலாறு										
Instructional Hours			12 Hours										
Suggested Learning Methods:		பாடத்திட்டத்தில் கொடுக்கப்பட்டுள்ள இலக்கிய வரலாற்றினை உணர்த்துதல்											
Total Hours		60 Hours											
Text Books	இளங்கலை இரண்டாம் ஆண்டு தமிழ் மாணவர்களுக்குரிய பாடநூல் “அருந்தமீம்” தொகுப்பு: தமிழ்த்துறை, நேரு கலை மற்றும் அறிவியல் கல்லூரி, கோயம்புத்தூர்.												
Reference Books	நாட்டுப்புறவியல் ஓர் ஆய்வு: டாக்டர் ச. சக்திவேல் விஜயா பதிப்பகம் சென்னை. தமிழண்ணல் - புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, மீனாட்சிப் புத்தக நிலையம், மதுரை- 625 001.												
Web. URLs	https://youtu.be/EJcYgyw7e94 , https://youtu.be/Mgtwmerl4yw												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Seminar	Assignment	Group Project	Total							
4	4	5	2	2	3	20							
Mapping													
PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	H	L	L	H	M	L					
CO2	M	L	H	L	H	L	M	H					
CO3	H	L	L	L	H	M	H	M					
CO4	M	L	H	L	M	M	H	L					
CO5	H	L	M	L	H	L	M	H					
H-High; M-Medium; L-Low													
Course designed by							Verified by						
Dr. S. Sathesh Kumar							Dr. A. Sridevi						

Course Code	Title		
24U1HIN303	Part I- Sahityak Hindi (साहित्यिक हिंदी)		
Semester: III	Credits:3	CIA:20Marks	ESE:55Marks
(Common to all UG Programmes)			
Course Objective	चुनिंदा कविताओं के माध्यम से हिंदी कविता का उत्पत्ति और विकास को समझना। संकलन में उपलब्ध कराए गए सर्वोत्तम नमूनों का उपयोग करते हुए कविता की सराहना।		
Course Category	Skill Development		
Development Needs	National		
Course Description	Improves Writing Skills.		
Course Outcomes		Teaching Methods	Assessment Methods
CO1	छात्र हिंदी भाषा से अच्छी तरह वाकिफ हो सकेंगे।	Role play	Assignment
CO2	व्यक्तिगत अनुभवों को पहचान करे जिनका उपयोग कविताएं लिखते समय किया जा सकता है।	Group learning Acting	Seminar
CO3	कविता के मूल शब्दावली और व्यावहारिक तत्वों को समझें।	Story Narration	Assignment
CO4	छात्रों को रचनात्मक लेखन में अच्छा अभ्यास मिलेगा।	Group learning And Worksheets	Group Project
CO5	पाठ्यक्रम संवादी हिंदी में पारंगत होने में मदद करता है।	Worksheets and Exercises	Seminar
Offered by	Hindi		
Course Content	Instructional Hours/ Week :4		
Unit	Description	Text Book	Chapters
I	नाटक -अंधेर नगरी:(भारतेन्दु हरिश्चन्द्र)।	1	3
Instructional Hours			12
Suggested Learning Methods: Visual Learning			02Hrs
II	प्राचीन काव्य : कबीर के दोहे (10दोहा)। सूरदास के पद (4पद)(काव्य तरंग)।	1	2
Instructional Hours			12
Suggested Learning Methods: Auditory			02Hrs
III	1. आधुनिक काव्य:साथ भाइयों के बीच चंपा - कात्यायनी, मेरा नया बचपन-सुभद्राकुमारी चौहान। 2.अलंकार : अर्थालंकार और शब्दालंकार ।	1	3
Instructional Hours			12

Suggested Learning Methods: Comprehensive Writing										02Hrs			
IV	1.संक्षिप्तीकरण । 2.दिए गए चित्र पर कुछ वाक्य लिखना।								1	2			
Instructional Hours										12			
Suggested Learning Methods: Auditory, Visual, Comprehensive										02Hrs			
V	1. गद्यांश लेखन, वाक्य शुद्धि, शब्द शुद्धि। 2. अनेक शब्द के लिए एक शब्द।								1	4			
Instructional Hours										12			
Suggested Learning Methods: comprehensive writing										02Hrs			
Total Hours										60Hrs			
Text Books		1.नाटक - अंधेर नगरी - (भारतेन्दु हरिश्चन्द्र)। 2.साथ भाइयों के बीच चंपा - कात्यायनी, 3. मेरा नया बचपन - सुभद्राकुमारी चौहान।											
Reference Books		1.हिंदी नाटक और रंगमंच - डॉ राम कुमार वर्मा। 2.ओंकार नाथ वर्मा,सामान्य हिंदी अरिहंत प्रकाशन इंडिया लिमिटेड।											
Web.URLs		1. www.webdunia.com 2. https://www.hindikunj.com 3. www.bhashaindia 4. www.hindisamay.com											
Tools for Assessment (20 Marks)													
CIAI		CIAII		CIAIII		Assignment		Seminar		Group Project		Total	
4		4		5		2		2		3		20	
Mapping													
CO\PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	M	L	H	M					
CO2	H	H	H	L	L	H	M	H					
CO3	L	M	L	L	M	H	M	L					
CO4	M	M	M	M	H	L	L	L					
CO5	M	L	L	M	H	L	L	H					
H-High ;M-Medium; L-Low													
Course designed by							Verified by						
Ms. Krishnendu P.M							Ms. Heera P.K						

Course Code		Title		
24U1MAL303		Part 1 – Kavithayum Smaranayum (കവിതയും സ്മരണയും)		
Semester: III		Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective		കവിതാ സാഹിത്യ പരിചയത്തോടൊപ്പം പുതുകവിതകളെ കുറിച്ച് അവബോധവും ആസ്വാദനവും ഉയർത്തുക. വിദ്യാർത്ഥികൾക്ക് മാതൃകയാവുന്ന സമൂഹത്തിലെ ഉന്നത വ്യക്തിത്വങ്ങളെ പരിചയപ്പെടുത്തുക		
Course Category		Skill Development		
Development Needs		Global		
Course Description		Creating Imagination and Self confidence		
Course Outcomes		Assessment Methods	Assessment Methods	
CO 1	കവിതയിലൂടെയുള്ള സംവേദനം	Smart boards/ chalk and Talk	Assignment	
CO 2	പുതുകവിതകളിലെ ലാളിത്യം , വിഷയ സ്വീകരണത്തിൽ വന്ന മാറ്റങ്ങൾ	Group learning	Seminar	
CO 3	ആധുനിക കവിതകളിലെ കാൽപനിക ഭാവം , പ്രമേയപരമായ സവിശേഷതകൾ	Peer Teaching	Assignment	
CO 4	പത്തൊമ്പതാം നൂറ്റാണ്ടിൽ നിലനിന്നിരുന്ന സാമൂഹികാവസ്ഥ ,കീഴാളവിഭാഗം അനുഭവിച്ചിരുന്ന അടിച്ചമർത്തൽ	Group learning	Group Project	
CO 5	പ്രകൃതിസംരക്ഷണത്തിന് നിസ്വാർത്ഥമായ പ്രവർത്തനങ്ങൾ	Smart boards/ chalk and Talk	Assignment	
Offered by		Malayalam		
Course Content			Instructional Hours / Week : 4	
Unit	Description	Text Book	Chapters	
I	പുതു കവിതകൾ	1	4	
	1. സ്റ്റാരകം - വീരാൻകുട്ടി			
	2. ആശ്വാസം - കല്ലറ്റ നാരായണൻ			
	3. തോരാമഴ - റഫീക്ക് അഹമ്മദ്			
	4. ഇഷ്ടമുടിക്കായൽ - കുര്യൻ ശ്രീകുമാർ			
Instructional Hours			12	
Suggested Learning Methods : Auditory			02 Hrs	
II	പുതു കവിതകൾ	1	3	
	1. മൃഗശിക്ഷകൻ - വിജയലക്ഷ്മി			
	2. ആനന്ദധാര - ബാലചന്ദ്രൻ ചുള്ളിക്കാട്			
	3. മനക്കോട്ട - എം.ആർ .രേണുകുമാർ			
	4. കളകൾ - പി മധു			
Instructional Hours			12	
Suggested Learning Methods : Auditory			02 Hrs	
III	ആധുനിക കവിതകൾ	1	3	
	1. സൂര്യകാന്തി - ജി. ശങ്കരക്കുറുപ്പ്			
	2. ഗോപികാദണ്ഡകം - അയ്യപ്പപ്പണിക്കർ			
	3. വഴി വെട്ടുന്നവരോട് - എൻ എൻ കക്കാട്			
Instructional Hours			12	

Suggested Learning Methods : Auditory			02 Hrs										
IV	കണ്ടൽക്കാടുകൾക്കിടയിൽ എന്റെ ജീവിതം - കല്ലേൻ പൊക്കടൻ	1	2										
Instructional Hours			12										
Suggested Learning Methods: Auditory, Visual			02 Hrs										
V	കണ്ടൽക്കാടുകൾക്കിടയിൽ എന്റെ ജീവിതം - കല്ലേൻ പൊക്കടൻ	1	3										
Instructional Hours			12										
Suggested Learning Methods : Comprehensive writing			02 Hrs										
Total Hours			60 Hrs										
Text Books	1. നവീന കവിത (പുതു കവിതകൾ) - നെഹ്റു കോളേജ് മലയാള വിഭാഗം എഡിറ്റു ചെയ്ത 10 കവിതകൾ . 2. കണ്ടൽക്കാടുകൾക്കിടയിൽ എന്റെ ജീവിതം - കല്ലേൻ പൊക്കടൻ - ഗ്രീൻ ബുക്സ്												
Reference Books	1. മലയാള കവിതാപഠനങ്ങൾ - സച്ചിദാനന്ദൻ ,മാതൃഭൂമി ബുക്സ്, കോഴിക്കോട് 2. കവിതാ സാഹിത്യ ചരിത്രം - ഡോ.എം.ലീലാവതി കേരള സാഹിത്യ അക്കാദമി, തൃശൂർ 3. ആധുനികത മലയാള കവിതയിൽ എൻ. അജയകുമാർ , പഠനസംഘം, ചങ്ങനാശ്ശേരി 4. സാഹിത്യം മലയാളത്തിൽ ആത്മകഥ - നടുവട്ടം ഗോപാലകൃഷ്ണൻ , ഭാഷാ ഇൻസ്റ്റിറ്റ്യൂട്ട് , തിരുവനന്തപുരം												
Web. URLs :	http://www.keralaculture.org >literature												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Group Project	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	H	M	H	H							
CO2	M	H	H	L	H	M							
CO3	H	M	H	M	M	H							
CO4	H	M	L	M	L	H							
CO5	N	H	L	H	H	M							
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Ms. RAJANI N.							Dr. SMITHA C. R.						

Course Code	Title		
24U1FRN303	Part– I: Français général - III		
Semester : III	Credits : 3	CIA:20Marks	ESE :55 Marks
Common to all UG Programmes			
Course Objective	To understand speak, write and read simple, standard speech which is very slow and is carefully articulated and can recognize familiar words and very basic phrases		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Improved accuracy & quality , improved communication		
Course Outcomes		Teaching Methods	Assesment Methods
CO1	Comprehend day to day conversations	Lecture	Assignment
CO2	Understand basic culture and literature of France	Word game /Lecture	Seminar
CO3	Converse slowly in known situations	Lecture/ Video Lessons	Quiz
CO4	Translate small paragraph of known texts	Role play/ Tutorial	Assignment
CO5	To develop the ability to understand and communicate	Role play/Lecture	Group project
Offeredby	Department of French		
Course Content		Instructional Hours /Week : 4	
Unit	Description	Text Book	Chapters
I	<ul style="list-style-type: none"> • Parlons de nos déplacements en ville • Suivons un itinéraire en ville • Organisons une sortie • Entraînement 	1	1
Instructional Hours			12
Suggested Learning Methods : Worksheet			
II	<ul style="list-style-type: none"> • Parlons de nos habitudes alimentaires • Préparons un anniversaire • Interrogeons – nous sur notre alimentation • Entraînement 	1	2
Instructional Hours			12
Suggested Learning Methods: Kahoot App			
III	<ul style="list-style-type: none"> • Parlons de l'amitié et de la personnalité • Parlons de nos relations et de nos émotions 	1	3

Instructional Hours										12			
Suggested Learning Methods: Audio & Visual													
IV	<ul style="list-style-type: none"> • Parlons de l'entraide et de la sante • Entraînement • Parlons de la presse et des médias 								1	4			
Instructional Hours										12			
Suggested Learning Methods: Comprehensive Writing													
V	<ul style="list-style-type: none"> • Racontons des faits divers • Faisons des recommandations • Entraînement 								1	5			
Instructional Hours										12			
Suggested Learning Methods: Translating simple sentences													
Pages 63 to 114										Total Hours		60	
Text Books		Adomania 2 – Méthode de Français											
Reference Books		Latitudes 1											
Web. URLs		Lingua.com, Duolingo App, You Tube Videos											
Tools for Assessment (20Marks)													
CIAI		CIAII		CIAIII		Assignment		Spelling Test		Quiz		Total	
4		4		5		2		2		3		20	
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	-	H	H	H	H	-	-	-	-	-	-	-
CO2	-	-	H	M	H	M	-	-	-	-	-	-	-
CO3	-	-	M	M	M	H	-	-	-	-	-	-	-
CO4	-	-	L	H	L	H	-	-	-	-	-	-	-
CO5	-	-	L	M	H	H	-	-	-	-	-	-	-
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Mr. D. Balaji							Mr. D. Balaji						

Course Code	Title		
24U2ENG303	Part II Communicative English Practical – I		
Semester: III	Credits: 3	CIA: 30 Marks	ESE: 45 Marks
(Common to all UG Programmes)			
Course Objective	To equip students with practical English language skills that enhance their ability to communicate effectively focusing on LSRW Skills		
Course Category	Skill Development		
Development Needs	Global		
Course Description	SD: Helps to develop LSRW skill		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Demonstrate improved listening skills, able to understand and analyze spoken English in various contexts	CALL	Reflective Journal
CO 2	Exhibit effective spoken English skills, with clarity in pronunciation and fluency	CILL	Reflective Journal
CO 3	Display reading comprehension skills by interpreting different types of English texts	CILL	Dialogue Creation
CO 4	Develop structured, coherent written communication for personal and professional use	CALL	Dialogue Creation
CO 5	Integrate all four language skills to communicate effectively in real-life scenarios	CALL	GD
Offered by	Department of English		
Course Content	Instructional Hours / Week : 4		
Unit	Description	Text Book	Chapters
I	Listening Skills: Types of Listening: Active, critical, and empathetic listening, Listening for gist and specific information, Note-taking strategies Exercises: Audio Comprehension Exercises, Listening to Speeches, and Group Listening Activities	1	1-3
Instructional Hours			12
Suggested Learning Methods : Cooperative Learning			
II	Speaking Skills: Pronunciation, intonation, and stress patterns, Fluency-building techniques, engaging in conversations and small talk. Public speaking fundamentals: tone, clarity, and expression Exercises: Role-plays, Extemporaneous Speaking, and Short Speeches	1	4-6
Instructional Hours			12
Suggested Learning Methods : Inquiry Based Learning			

III	Reading Skills: Skimming and Scanning Techniques, Reading Comprehension Strategies for Technical and General Texts, Vocabulary Development through Context, Critical Reading, and Analysis Exercises: Reading Passages with Comprehension Questions, Vocabulary Exercises, and Summarization tasks					1	7-9
	Instructional Hours						12
Suggested Learning Methods : Classroom Activity							
IV	Writing Skills: Structuring Paragraphs and Essays, Essentials of Formal and Informal writing, Writing effective E-mails, Reports, and Memos. Punctuation, grammar, and editing basics Exercises: Essay writing, drafting business emails, and peer feedback on written work					1	10-13
	Instructional Hours						12
Suggested Learning Methods : Direct Method							
V	Integrated Language Skills: Practicing Workplace Scenarios: Group Discussions, Presentations, and Interviews, Idioms, Proverbs and Real Life Simulations Exercises: Case Studies, Simulations, Group Discussions, and Presentations					1	14-17
	Instructional Hours						12
Suggested Learning Methods : Activity Based Learning							
Total Hours						60 Hrs	
Text Books		<ol style="list-style-type: none"> 1. Richards, Jack. C with Jonathan Hull and Susan Proctor New Interchange: English for International Communication. 2. "English for the Real World" by Susan B. Anker 3. "Academic Encounters: Life in Society (Reading, Study Skills, and Writing)" by Jessica Williams 4. "English for Academic Purposes: A Comprehensive Overview of EAP and How it is Best Taught and Learnt" by R.R. Jordan 5. "Communication Skills in English" by Shalini Aggarwal 					
Reference Books		<ol style="list-style-type: none"> 1. M Ashraf Rizvi, "Effective Technical Communication", McGraw-Hill, 2nd Edition, New Delhi, 2018 2. "Practical English Usage" by Michael Swan 3. "Oxford Guide to Effective Writing and Speaking" by John Seely 4. "New International Business English" by Leo Jones and Richard Alexander 					
Web. URLs		https://learnenglish.britishcouncil.org https://www.usingenglish.com					
Tools for Assessment (30 Marks) Internal							
Cue Card	Reading Aloud	Pronunciation Drills	Reflective Journal	Dialogue Creation	Group Discussion	Total	
4	4	4	7	7	4	30	
Tools for Assessment (45 Marks) External							
Story Sequencing	Presentation		Record	Viva Voce		Total	
15	15		10	5		45	

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	L	H	H	H	H					
CO2	H	M	H	L	H	H	H	H					
CO3	H	M	H	L	H	H	H	H					
CO4	H	M	H	L	H	H	H	H					
CO5	H	M	H	L	H	H	H	H					

H-High; M-Medium; L-Low

Course designed by	Verified by
Dr. Ritu Shepherd	Dr. R. Malathi

Course Code		Title		
23U3MBC307		Core Paper VII – Microbial Physiology and Metabolism		
Semester: III		Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective		To provide the student with an overall vision of the operation of the different processes that allow growth of prokaryotic cells as well as their adaptation to a changing environment.		
Course Category		Skill Development		
Development Needs		Global		
Course Description		Know the growth characteristics of the microorganisms, distinguish chemoheterotrophic metabolism, anaerobic respiration and fermentation. Understand the key concept of Microbial Physiology.		
Course Outcomes		Teaching Methods	Assessment Methods	
CO 1	Know the growth characteristics of the microorganisms and understand the growth characteristics of the microorganisms which require different nutrient for growth.	Lecture	Assignment	
CO 2	Recognize the associated mechanisms of energy generation for their survival.	Lecture	Assignment	
CO 3	Distinguish the chemoheterotrophic metabolism-anaerobic respiration and fermentation.	Video Lessons	Quiz	
CO 4	Improve knowledge on different metabolic pathways in microorganisms.	Tutorial	Seminar	
CO 5	Understand the key concept of microbial physiology.	Lecture	Seminar	
Offered by	Microbiology			
Course Content			Instructional Hours / Week: 4	
Unit	Description	Text Book	Chapters	
I	Microbial Growth and nutrient uptake: Definitions of growth, Batch culture, Continuous culture, generation time and specific growth rate. Effect of oxygen concentration on growth. Nutritional categories of microorganisms. Passive and facilitated diffusion. Primary and secondary active transport, concept of uniport, symport and antiport Group translocation. Iron uptake.	1,2	1,3	
			Instructional Hours	12
Suggested Learning Methods: Video lectures				
II	Chemoheterotrophic Metabolism - Aerobic Respiration: Concept of aerobic respiration, sugar degradation pathways i.e. EMP, ED, Pentose phosphate pathway TCA cycle. Electron transport chain: components of respiratory chain, comparison of mitochondrial and bacterial ETC, electron transport phosphorylation, uncouplers and inhibitors.	2	8 & 9	
			Instructional Hours	12
Suggested Learning Methods: Model and presentation				

III	Chemoheterotrophic Metabolism - Anaerobic respiration and fermentation: Anaerobic respiration with special reference to dissimilatory nitrate reduction (Denitrification; nitrate /nitrite and nitrate/ammonia respiration; fermentative nitrate reduction). Fermentation - Alcohol fermentation and Pasteur effect; Lactate fermentation (homofermentative and heterofermentative pathways), concept of linear and branched fermentation pathways.	1	8&9										
Instructional Hours			12										
Suggested Learning Methods : Video lectures and demonstration													
IV	Chemolithotrophic and Phototrophic Metabolism: Introduction to aerobic and anaerobic chemolithotrophy with an example each. Hydrogen oxidation (definition and reaction) and methanogenesis (definition and reaction). Introduction to phototrophic metabolism - groups of phototrophic microorganisms, anoxygenic vs. oxygenic photosynthesis with reference to photosynthesis in green bacteria and cyanobacteria.	1&2	10,12&14										
Instructional Hours			12										
Suggested Learning Methods : Model presentation and group chart													
V	Advances in microbial physiology: Determination of bacterial growth curve, effect of temperature & pH on microbial growth, biochemical test - acid and gas production, starch hydrolysis, lipid hydrolysis.	3	7										
Instructional Hours			12										
Suggested Learning Methods : Video lectures													
Total Hours			60										
Text Books	<ol style="list-style-type: none"> 1. Kim B. H., Gadd G.M., Bacterial Physiology and Metabolism. Cambridge University Press, Cambridge, 2008. 2. Albert G. Moat, John W. Foster, Michael P. Spector., Microbial Physiology, Wiley – Liss, Inc., New York, 4th Edition, 2003. 3. Alfred E. Brown, Heidi R. Smith, Benson’s Microbiological Applications: Laboratory Manual in General Microbiology, McGraw-Hill Education, 14th Edition, 2017. 												
Reference Books	<ol style="list-style-type: none"> 1. Robert K. Poole., Advances in Microbial Physiology, Elsevier Academic Press, New York, Volume 49, 2004. 2. Cohen, G. N., Microbial Biochemistry, Springer, New York, 3rd Edition, 2014. 3. Rose A.H., Chemical Microbiology: An Introduction to Microbial Physiology, Butterworth & Co., USA, 3rd Edition, 2014. 4. Daniel R. Caldwell, Microbial Physiology & Metabolism, Wm. C. Brown, Germany, 1995. 												
Web. URLs	https://sites.google.com/site/microbialphysiologyoddsem/Teaching-Contents												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	L	H	H	H	H	H	M	M	H

CO2	H	M	M	H	M	M	M	M	H	L	L	L	H
CO3	H	M	H	H	M	M	M	H	H	H	M	M	H
CO4	H	H	H	H	M	M	H	H	H	H	L	M	H
CO5	H	H	H	H	L	M	H	H	H	L	M	L	H

H-High; M-Medium; L-Low

Course designed by	Verified by Chairman
Dr. B. David Jayaseelan	Dr. M. Thangavel

Course Code	Title		
24U3MBC308	Core Paper VIII - Molecular Biology		
Semester: III	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	Familiarize students with basic fundamental knowledge and explore skills in molecular biology and become aware of the complexity and harmony of the cells.		
Course Category	Skill Development		
Development Needs	Global		
Course Description	The course covers DNA, RNA and proteins and the molecular events that govern cell functions		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Describe the basic structure and biochemistry of nucleic acids discriminate between them.	Lecture	Assignment
CO 2	Overview the central dogma and identify the principles of DNA replication	Flipped Classroom	Seminar
CO 3	Discuss clearly about the organization and mechanisms of RNA	Video Lessons	Quiz
CO 4	Articulate applications of genetic code and mechanism of translation.	Tutorial	Seminar
CO 5	Outline in detail the explanation of Transcriptional Regulation with examples of lac operon and tryptophan operon in prokaryotic as well as eukaryotic organisms	Lecture / Case Studies	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 4	
Unit	Description	Text Book	Chapters
I	Primary structure of DNA: Chemical and structural qualities of 3',5'-Phosphodiester bond. Secondary Structure of DNA: Watson & Crick model, Chargaff's rule, X-ray diffraction analysis of DNA, Forces stabilizes DNA structure, Conformational variants of double helical DNA, Hogsteen base pairing, Triple helix, Quadruple helix, Reversible denaturation and hyperchromic effect. Tertiary structure of DNA: DNA supercoiling	1	3
Instructional Hours			12
Suggested Learning Methods: Comics Preparation / You tube Videos			
II	Overview of Central dogma. Organization of prokaryotic and eukaryotic chromosomes. DNA replication: Meselson & Stahl experiment, bi-directional DNA replication, Okazaki fragments. Overview of differences in prokaryotic and eukaryotic DNA replication.	1	6
Instructional Hours			12
Suggested Learning Methods: Chart Preparation			
III	Structure and function of mRNA, rRNA and tRNA. Characteristics of promoter and enhancer sequences. RNA synthesis: Initiation, elongation and termination of RNA synthesis. Differences in prokaryotic and eukaryotic transcription. Basic concepts in RNA world: Ribozymes, RNA processing: 5'-	2	11

	Capping, Splicing-Alternative splicing, Poly 'A' tail addition and base modification												
Instructional Hours			12										
Suggested Learning Methods: Videos													
IV	Introduction to Genetic code: Elucidation of genetic code, Codon degeneracy, Wobble hypothesis and its importance, Prokaryotic and eukaryotic ribosomes. Steps in translation: Initiation, Elongation and termination of protein synthesis. Inhibitors of protein synthesis. Posttranslational modifications and its importance	1	9										
Instructional Hours			12										
Suggested Learning Methods: You tube videos													
V	Organization of genes in prokaryotic and eukaryotic chromosomes, Hierarchical levels of gene regulation, Prokaryotic gene regulation –lac and trp operon, Regulation of gene expression with reference to λ phage life cycle.	1 2	11 12										
Instructional Hours			12										
Suggested Learning Methods: Videos / Chart Preparation													
Total Hours			60										
Text Books	<ol style="list-style-type: none"> 1. Friefelder, David. "Molecular Biology." Narosa Publications, 1999 2. Weaver, Robert F. "Molecular Biology" 2nd Edition, Tata McGraw-Hill, 2003. 3. Karp, Gerald "Cell and Molecular Biology: Concepts and Experiments" 4th Edition, John Wiley, 2005. 4. Friefelder, David and George M. Malacinski "Essentials of Molecular Biology" 2nd Edition, Panima Publishing, 1993. 												
Reference Books	<ol style="list-style-type: none"> 1. Tropp, Burton E. "Molecular Biology: Genes to Proteins". 3rd Edition. Jones and Bartlett, 2008. 2. Glick, B.R. and J.J. Pasternak. "Molecular Biotechnology: Principles and Applications of Recombinant DNA" 4th Edition. ASM, 2010. 												
Web. URLs	https://microbenotes.com/category/molecular-biology/												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO 5
CO1	H	M	M	M	L	H	M	H	M	L	M	M	M
CO2	H	H	M	M	M	M	M	H	H	M	L	M	M
CO3	H	M	M	H	H	H	H	H	H	M	L	L	M
CO4	H	H	H	H	H	H	H	H	H	L	L	L	M
CO5	H	H	H	H	H	M	H	H	H	L	H	M	M
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. R. Kasimani							Dr. M. Thangavel						

Course Code		Title	
24U3MBP309		Core Paper IX – Microbial Physiology and Molecular Biology Practical	
Semester: III		Credits: 3	CIA: 30 Marks
ESE: 45 Marks			
Course Objective		To teach a variety of techniques used in physiology and molecular Biology while conducting discovery-based research.	
Course Category		Skill Development / Employability	
Development Needs		Global	
Course Description		Students will develop skills on biochemical test, isolation and separation of DNA and RNA. Analyse basic concept of mutation	
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Outline the key concept of microbial physiology.	Lecture / Hands on	Performance
CO 2	Relate the knowledge on environment and its sampling techniques.	Lecture / Hands on	Observation
CO 3	Examine and quantification of microorganisms in soil.	Lecture / Hands on	Performance
CO 4	Apply knowledge on techniques in isolation of DNA.	Lecture / Hands on	Performance
CO 5	Analyse basic concept of mutation	Lecture / Hands on	Observation
Offered by		Microbiology	
Course Content		Instructional Hours / Week: 4	
Exp No	Experiments		
	MICROBIAL PHYSIOLOGY		
1.	Growth curve and determination of generation time in <i>E. coli</i> and yeast.		
2.	Factors affecting growth - Temperature and pH		
3.	Demonstration of the thermal death time and decimal reduction time of <i>E. coli</i>		
4.	Microbial physiology of various bacteria - Biochemical test - Acid and gas production, Starch hydrolysis, Lipid hydrolysis, IMVIC test, Catalase test, H ₂ S production, Oxidase test and Urease test		
	MOLECULAR BIOLOGY		
5.	Isolation of antibiotic resistance mutant by replica plating.		
6.	Isolation of DNA from bacteria and yeast		
7.	Electrophoretic separation of DNA		
8.	Isolation of RNA		
9.	Electrophoretic separation of RNA		
		Total Hours	60 Hrs
Text Books		1. James G. Cappuccino, Chad T. Welsh, Microbiology: A Laboratory Manual , Pearson Higher Education & Professional Group, 2017. 2. Stefan Surzycki, Basic Techniques in Molecular Biology , Springer, 2012. 3. Janice Speshock, Microbiology Lab Manual , Kendall Hunt Publishing Company, 2020.	

Reference Books		1. Susan Carson, Sue Carson, Heather Miller. Molecular Biology Techniques: A Classroom Laboratory Manual , Elsevier, 2012. 2. Sue Carson, Heather B. Miller, Melissa C. Srougi, Molecular Biology Techniques: A Classroom Laboratory Manual , Academic Press, 4 th edition, 2019.													
Web. URLs		https://books.google.co.in/books/about/Molecular_Biology_Techniques.html?id=emvJWX-2t9kC&redir_esc=y													
Tools for Assessment (30 Marks)															
Laboratory Performance							Test - I	Test - II	Observation notebook	Total					
Level of engagement in lab	Preparation	Result													
4	4	4					7	7	4	30					
Mapping															
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	H	M	M	M	M	M	M	H	M	L	M	M	M		
CO2	H	H	H	H	M	M	H	H	H	L	L	M	H		
CO3	H	H	M	M	H	H	H	H	H	M	L	L	H		
CO4	H	H	H	M	M	H	M	H	H	L	L	L	H		
CO5	H	H	H	H	M	H	H	H	M	M	M	L	H		
H-High; M-Medium; L-Low															
Course designed by							Verified by Chairman								
Dr. S. Esath Natheer							Dr. M. Thangavel								

Course code	Title		
23U3CNA303	Allied Paper III – Fundamentals of Computer Applications		
Semester: III	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	To make the students understand the basic concepts of information technology and MS office application		
Course Category	Skill Development / Employability		
Development Needs	Global		
Course Description	The course aims to transform knowledge on making use of essential computer applications which includes word processor, spreadsheets, presentations and introductory database skills.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the essential concepts of Information Technology	Lecture	Assignment
CO 2	Define document, formatting in word	Tutorial	Seminar
CO 3	Understand worksheet and workbook	Demonstration	Quiz
CO 4	Demonstrate slide presentation	Tutorial	Quiz
CO 5	Examine the methods of creating a presentation	Demonstration	Assignment
Offered by	Computer Science		
Course Content		Instructional Hours / Week : 3	
Unit	Description	Text Book	Chapters
I	The Computer Era – An Introduction: Introduction to information concepts and processing – Data – information – Need for information – Human being as information processor – Need for computerization – information technology – Components of information technology – hardware – software – data – user – storage – communication.	1	1
	Fundamentals of Computer System: What is a computer? – Characteristics of a computer – Intangible benefits	1	2
Instructional Hours			09
Suggested Learning Methods: Group Learning			
II	Creating documents with word: Creating blank file – saving a file – file formats. Formatting: Character formatting – formatting techniques – the font group – the font dialog box – page setup basics – Table setup basics – Inserting picture from a file.	2	4, 5, 8, 9
Instructional Hours			09
Suggested Learning Methods: You tube Videos			
III	Using Excel Worksheets and Work Book: Understanding workbooks and worksheets – moving around a worksheet – Entering text – entering date – modifying cell content – applying number formatting. Essential worksheet and cell range: Learning the fundamentals of excel worksheet - working with rows and columns – understanding cells and range – copying or moving ranges	2	12, 13, 14
Instructional Hours			09

Suggested Learning Methods: Group Discussion / Demonstration														
IV	Introducing formulas and functions: Understanding formula basics – entering the formula – editing the formula – Basic counting formula – summing formula. Getting started making charts: What is a chart? – Creating a chart – Working with charts – Understanding chart types.								2	15, 17, 18				
Instructional Hours												09		
Suggested Learning Methods: Chart Preparation														
V	Creating a Presentation, slides and Text: Starting a new presentation – Closing and reopening presentation – creating new slides – managing slides. Working with table and charts: Creating tables, Understanding charts and chart types								2	21, 23				
Instructional Hours												09		
Suggested Learning Methods: Lecture / You tube Videos														
Total Hours												45		
Text Books		<ol style="list-style-type: none"> Chetan Srivastava, “Fundamentals of Information Technology”, Kalyani Publishers, New Delhi, Edition 2002. John Walkenbach, Herb Tyson, et al, Office 2007 Bible”. Wiley India Pvt. Ltd, 2008. 												
Reference Books		<ol style="list-style-type: none"> John Walkenbach, Excel 2007 Bible”. Wiley India Pvt. Ltd, 2007. Amy Romanoff, Sherry Bonelli, “Microsoft Office 2000 Complete Reference”, BPB Publication, New Delhi. Sanjay Saxena “MS Office 2007 in a Nutshell”, Vikas Publishing House, Noida, 2001. Dinesh Maidasani, “Learning Computer Fundamentals, MS Office and Internet and Web Tech”, Firewall Media, 2005. 												
Web. URLs		https://support.microsoft.com/en-us/training												
Tools for Assessment (20 Marks)														
CIA I		CIA II		CIA III		Assignment		Seminar		Quiz		Total		
4		4		5		2		2		3		20		
Mapping														
CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	
CO1	H	H	H	M	H	H	M	H	-	-	-	-	M	
CO2	M	M	M	M	H	M	M	H	-	-	-	-	L	
CO3	H	H	M	H	M	M	H	M	-	-	-	-	M	
CO4	M	H	L	M	H	H	M	H	-	-	-	-	L	
CO5	M	M	H	H	M	H	H	M	-	-	-	-	M	
H-High; M-Medium; L-Low														
Course designed by							Verified by Chairman							
Mr. M. Senthil Kumar							Dr. N. Kavitha							

Course Code	Title		
23U4MBS301	Skill Enhancement Course II: Fundamentals of Bioinformatics		
Semester: III	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	To understand the major databases that is required to store the nucleic acid and DNA sequences and the information retrieval systems. The course also enables the students to gain knowledge of the genomic organization and the protein structures prediction.		
Course Category	Employability and Skill Development		
Development Needs	Global		
Course Description	To provide a system level understanding of complex interactions within biological systems and to model the biological systems employing computational concepts.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Develop knowledge on basic concepts of bioinformatics and its significance in Biological data analysis.	Flipped classroom/Lectures	Assignment
CO 2	Gain knowledge about various biological databases that provide information about nucleic acids and protein information retrieval from NCBI, EMBL.	Lectures / Video Lessons	Seminar
CO 3	Gain knowledge of the analytical tools for sequences databanks: BLAST, FASTA, Pairwise alignment- Multiple alignment- ClustalW, PRAS.	Lectures / Group Discussion	Quiz
CO 4	Understand the structural organization, structural properties and various techniques employed in the structure determination of biological macromolecules – DNA and protein.	Lectures / Video Lessons	Seminar / Assignment
CO 5	Gain knowledge on protein folding, RNA prediction and its significance in Bioinformatics	Lectures and Flipped classroom	Seminar
Offered by	Microbiology		
Course Content	Instructional Hours / Week: 3		
Unit	Description	Textbook	Chapters
I	Definition of Bioinformatics: Scope applications and limitations. Biological databases – Types of Databases, Information Retrieval from biological databases. DNA and protein sequence data banks, NCBI, EMBL, DDBJ, SWISSPROT.	1	1
Instructional Hours			05
Suggested Learning Methods : Group learning			
II	Database of metabolic pathways: Mode of data storage - File formats - FASTA, GenBank and Uniport, Data submission & retrieval from NCBI, EMBL, DDBJ, Uniport, PDB.	3	4

Instructional Hours											10				
Suggested Learning Methods: Online demonstration															
III	Sequence Alignment: BLAST and its types, Global Alignment, Local Alignment, Parametric and Multiple Alignment algorithms, Needleman. Phylogeny: Introduction, Molecular clock, phylogenetic tree construction, nearest neighbourhood, Parsimony analysis. Phylogenetic tree construction (MEGA).										2	7, 8			
Instructional Hours											10				
Suggested Learning Methods: Video Lectures															
IV	Genome organization and analysis: Diversity of Genomes: Prokaryotic & eukaryotic genomes, 2-D gel electrophoresis, SDS Page electrophoresis.										2	19			
Instructional Hours											10				
Suggested Learning Methods: Group learning															
V	Homology Search, Protein structure prediction (Secondary & Tertiary), RNA Structure prediction, function prediction (proteins), Protein-protein interaction, e-PCR.										2	8			
Instructional Hours											10				
Suggested Learning Methods: Online demonstration															
Total Hours											45				
Text Books	1.Gautam B. Singh, Fundamentals of Bioinformatics and Computational Biology, Springer Cham Heidelberg, New York, 2015. 2.Vittal R. Srinivas, Bioinformatics: A Modern Approach, PHI Learning Private Limited, New Delhi, 2005 3.Subramanian Mathura and Pandjassarame Kanguane, Bioinformatics: A Concept Based Introduction, Springer, New York, 2009.														
Reference Books	1. Hepsyba, S.G.H. and C.R. Hemalatha, 2009. Basic Bioinformatics, MJP Publishers, Chennai.														
Web. URLs	1. https://thebiologynotes.com/biological-databases-types-and-importance/ 2. https://thebiologynotes.com/category/bioinformatics/ .														
Tools for Assessment (20 Marks)															
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total									
4	4	5	2	2	3	20									
Mapping															
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	H	M	M	M	M	M	H	H	L	M	L	L	M		
CO2	H	M	M	H	M	H	H	H	M	L	L	L	H		
CO3	H	H	H	H	H	M	H	H	H	H	L	L	M		
CO4	M	H	M	M	M	H	H	H	H	H	M	-	H		
CO5	H	H	H	H	H	H	H	H	M	H	H	H	H		
H-High; M-Medium; L-Low															
Course designed by								Verified by Chairman							
Dr. K. E. Vivekanandan								Dr. M. Thangavel							

Course Code	Title		
22U4NM3BT1	Part IV : Basic Tamil – I (அடிப்படைத்தமிழ் - I)		
Semester: III	Credits: 2	CIA: 50 Marks	
(Common to all UG Programmes)			
Course Objective	தமிழ் மொழியைக் கற்பித்தல்-மொழித்திறனை வளர்த்தல்.		
Course Category	Skill Development (மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்)		
Development Needs	Regional (தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்)		
Course Description	மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	தமிழ் எழுத்துக்கள் அறிமுகம் செய்தல் மற்றும் வாசித்தல் ஆகியவற்றின் பயன்பாடு.	குழு விவாதம்	ஒப்படைவு
CO 2	பிறமொழி கற்றல் ஆர்வம் தூண்டல்.	குழு விவாதம்	கருத்தரங்கு
CO 3	பிறமொழி அறிவுத் திறன் மேம்படச்செய்தல்	விரிவுரை/ காணொளிப்பட விளக்கம்	குழுத்திட்டம்
CO 4	வார்த்தை அமைக்கும் திறன் பெறச்செய்தல்.	விரிவுரை/ குழு விவாதம்	குழுத்திட்டம்
CO 5	கையெழுத்துத்திறன் பெறச்செய்தல்.	குழு விவாதம்	குழுத்திட்டம்
Offered by	தமிழ்த்துறை		
Course Content : Basic Tamil – I அடிப்படைத்தமிழ் - I		Instructional Hours / Week : 2 Hours	
Unit	Description	Text Book	Chapters
I	தமிழ் மொழியின் அடிப்படைக் கூறுகள்	இலக்கணம்	1.உயிர்எழுத்துக்கள் 2.மெய் எழுத்துக்கள் 3.உயிர்மெய் எழுத்துக்கள்
Instructional Hours		6 Hours	
Suggested Learning Methods : எழுத்துக்களை எழுதும் மற்றும் வாசிக்கும் திறன் பெற்றமை			
II	சொல் அமைத்தல்	இலக்கணம்	1.ஓர் எழுத்து ஒருமொழி 2.இரண்டுமாதல் ஐந்து எழுத்துச்சொற்கள் 3.தமிழ் மாதங்கள் பெயர்,கிழமைகளின் பெயர் 4.வண்ணங்கள் பெயர், 5.சொல் ஆக்கம்
Instructional Hours		6 Hours	
Suggested Learning Methods : எழுத்துக்களை கொண்டு சொற்களை உருவாக்கும் பயிற்சி பெற்றமை			
III	தொடரமைப்பு	தொடரமைப்பு	1.எழுவாய் 2.செயப்படுபொருள்
Instructional Hours		6 Hours	
Suggested Learning Methods : சொற்களைக் கொண்டு தொடர் உருவாக்கும் பயிற்சி பெற்றமை			
IV	குறிப்பு எழுதுதல்	இலக்கணம்	1.தொடரமைப்பு 2.பத்தி அமைப்பு
Instructional Hours		6 Hours	
Suggested Learning Methods : பத்தி அமைப்பு உருவாக்கும் திறன் பெற்றமை			

V	பிழைநீக்குதல்	இலக்கணம்	1.ஒற்றுப்பிழை 2.வாக்கியப் பிழை										
Instructional Hours			6 Hours										
Suggested Learning Methods : இலக்கணப் பிழை இன்றி எழுதும் திறன் பெற்றமை													
Total Hours			30 Hours										
Text Books	1. இளங்கலை தமிழ் மாணவர்களுக்குரிய பாடநூல்“அரிச்சுவடி” தொகுப்பு: தமிழ்த்துறை,நேரு கலை மற்றும் அறிவியல் கல்லூரி,கோயம்புத்தூர்.												
Reference Books	1. பவணந்தி முனிவர்,நன்னூல் பூலியூர்க்கேசிகன் உரை,சாரதா பதிப்பகம், சென்னை-40. 2. தொல்காப்பியம், கணேசையர் பதிப்பு,உலகத் தமிழாராய்ச்சி நிறுவனம், சென்னை -113.												
Web. URLs	https://youtu.be/P7vvUnjI6vY , https://youtu.be/Zx4R3yZseuQ .												
Tools for Assessment (50 Marks)													
CIA I	CIA II	CIA III	Seminar	Assignment	Group Project	Total							
8	8	10	8	8	8	50							
Mapping													
CO/PO	PO 1	PO2	PO3	PO4	PO 5	PO6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO4	PSO5
CO1	L	L	H	L	H	M	H	H					
CO2	M	L	H	L	M	M	L	H					
CO3	H	L	H	L	L	M	M	H					
CO4	H	L	M	L	L	M	H	M					
CO5	M	L	H	L	M	M	H	H					
H-High; M-Medium; L-Low													
Course designed by							Verified by						
Dr. S. Satheesh kumar							Dr. A. Sridevi						

Course Code		Title	
22U4NM3AT1		Part IV: Advanced Tamil – I (சிறப்புத்தமிழ் -I)	
Semester: III		Credits: 2	ESE: 50 Marks
Course Objective	புதுக்கவிதை உருவாக்கும் திறன் வளர்த்தல் - மொழித்திறனை மேம்படுத்துதல்		
Course Category	Skill Development (மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்)		
Development Needs	Regional (தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்)		
Course Description	மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	புதுக்கவிதை படைக்கும் திறன்வளர்த்தல்	விரிவுரை	குழுத்திட்டம்
CO 2	படைப்பாக்கத்திறன் அறிவு பெறச்செய்தல்.	விரிவுரை / குழு விவாதம்	கருத்தரங்கு
CO 3	தகவல் தொடர்பியலுக்கான கடிதம்,அமைவுத்திறன் பெறச்செய்தல்	விரிவுரை / காணொளிப்பட விளக்கம்	கருத்தரங்கு
CO 4	மொழியைப் பிழையின்றிப் பேசும் ,எழுதும் திறன் பெறச் செய்தல்	விரிவுரை	ஒப்படைவு
CO 5	கடிதம் எழுதுதல் மற்றும் மொழியறிவைப் பெறுதல்.	விரிவுரை / காணொளிப்பட விளக்கம்	குழுத்திட்டம்
Offered by	தமிழ்த்துறை		
Course Content: Advanced Tamil - I (சிறப்புத்தமிழ் -I)		Instructional Hours / Week : 2 Hours	
Unit	Description	Text Book	Chapters
I	புதுக்கவிதை	1. பாரதியார் 2. பாரதிதாசன்	1.1.தேசபக்திபாடல் தாயின் மணிக்கொடி பாரீர் 1.2.பாரதிதாசன்(தமிழ்மொழிபற்று- கனியிடை,தமிழுக்கும் அழுதென்று)
		Instructional Hours	6 Hours
Suggested Learning Methods : கவிதை எழுதும் திறன் பெற்றமை			
II	பிழை நீக்குதல்	இலக்கணம்	2.1.சொற்பிழை நீக்கம் 2.2.தொடர் பிழை நீக்கம் 2.3.பத்தி எழுதச் செய்தல்
		Instructional Hours	6 Hours
Suggested Learning Methods :வாக்கியங்களைப் பிழை இன்றி எழுதும் திறன் பெற்றமை			
III	இலக்கணப் பயிற்சி அளித்தல்	இலக்கணம்	3.1.தொகை நிலைத்தொடர், 3.2.தொகா நிலைத்தொடர் 3.3.ஆகுபெயர் வகைகள்

Instructional Hours			6 Hours
Suggested Learning Methods : இலக்கணப் பிழை இன்றி எழுதும் பயிற்சி பெற்றமை			
IV	கடிதம் எழுதுதல்	இலக்கணப் பயிற்சி ஏடு	4.1. பாராட்டுக்கடிதம் 4.2. நன்றிக்கடிதம் 4.3. அழைப்புக்கடிதம் 4.4. அலுவலகக் கடிதம் 4.5. நட்புக்கடிதம்
Instructional Hours			6 Hours
Suggested Learning Methods : கடிதம் எழுதும் திறன் பெற்றமை			
V	இலக்கிய வரலாறு	தமிழ் இலக்கிய வரலாறு	1.வேலு நாச்சியார் 2.கப்பலோட்டிய தமிழன்
Instructional Hours			6 Hours
Suggested Learning Methods : தமிழ் இலக்கிய வரலாற்றின் சிறப்பினை அறிய பெற்றமை			
Total Hours			30 Hours
Text Books	1. இளங்கலை தமிழ் மாணவர்களுக்குரிய பாட நூல்“திரட்டு”தமிழ்த்துறை. தொகுப்பு: தமிழ்த்துறை,நேரு கலை மற்றும் அறிவியல் கல்லூரி, கோயம்புத்தூர்.		
Reference Books	1. பாரதியார்- பாரதியார் கவிதைகள், அபிராமி பதிப்பகம், 7- பி, கொடிமரத் தெரு, சென்னை- 013. 2. பவணந்தி முனிவர் – நன்னூல் புலியூர்க்கேசிகள் உரை, சாரதா பதிப்பகம், சென்னை -040.		
Web. URLs	https://youtu.be/xnsvFOHxDeo , https://youtu.be/kQoIj-29VIk .		
Course designed by		Verified by	
Dr. S. Satheesh kumar		Dr. A. Sridevi	

Course Code		Title	
22U4NM3CAF/ 21U4NM3CAF		Non Major Elective : Consumer Affairs	
Semester : III		Credits : 2	ESE : 50 Marks
(Common to all UG Programmes)			
Course Objective	To enable the students to understand the concepts of Consumers and Markets		
Course Category	Employability		
Development Needs	National & Global		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Know their rights and responsibilities as a consumer	Lecture/ Video Lectures	Assignment
CO 2	Gain knowledge about Consumer protection law in India	Lecture/ Peer Teaching	Seminar
CO 3	Understand the procedure about redressed of consumer complaints	Lecture/ Group Discussion	Seminar
CO 4	Learn about Consumer related regulatory agencies and Norms	Lecture/ Role Play	Assignment
CO 5	Comprehend Business Firms, Interface with Consumers.	Lecture/ Group Discussion	Quiz
Offered by	Department of Business Administration		
Course Content	Instructional Hours / Week : 2		
Unit	Description	Text Book	Chapters
I	Conceptual Framework - Consumer and Markets: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, Concept of Price in Retail and Wholesale, Maximum Retail Price (MRP), Fair Price, GST, labelling and packaging along with relevant laws, Legal Metrology. Consumer Complaining Behaviour: Alternatives available to Dissatisfied Consumers; Complaint Handling Process.	1	1 & 2
Instructional Hours			6
Suggested Learning Methods : Video lectures			
II	The Consumer Protection Law in India Objectives and Basic Concepts: Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice.	1	5 & 6
Instructional Hours			6
Suggested Learning Methods : Peer Teaching			

III	Grievance Redressal Mechanism under the Indian Consumer Protection Law								2	1			
	Who can file a complaint? Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Offences and penalties.												
Instructional Hours									6				
Suggested Learning Methods : Group Discussion													
IV	Role of Industry Regulators in Consumer Protection - Industry self-regulation (ISR) Protection Policies, Consumer Protection Agencies								2	4			
	i. Telecommunication: TRAI ii. Food Products: FSSAI Insurance : IRDA and Insurance Ombudsman												
Instructional Hours									6				
Suggested Learning Methods : Role Play													
V	Contemporary Issues in Consumer Affairs								2	6 & 7			
	Consumer Movement in India: Formation of consumer organizations and their role in consumer protection, Misleading Advertisements and sustainable consumption, National Consumer Helpline, Comparative Product testing. Quality and Standardization: Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance.												
Instructional Hours									6				
Suggested Learning Methods : Group Discussion													
Total Hours									30				
Reference Books		<ol style="list-style-type: none"> 1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) Consumer Affairs, Universities Press. 2. Choudhary, Ram Naresh Prasad (2005). Consumer Protection Law Provisions and Procedure, Deep and Deep Publications Pvt Ltd. 											
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	-	-	-	M	H	H	M	M	-	-	-	-
CO2	L	-	-	-	M	H	H	M	M	-	-	-	-
CO3	L	-	-	-	M	H	M	M	M	-	-	-	-
CO4	L	-	-	-	M	H	H	M	M	-	-	-	-
CO5	L	-	-	-	M	H	H	M	M	-	-	-	-
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. T. Sudha							Dr. T. Sudha						

Course Code	Title		
22U4NM3GST	Non Major Elective : Gender Sensitization		
Semester : III	Credits : 2	ESE : 50 Marks	
(Common to all UG Programmes)			
Course Objective	To raise awareness of gender, promote gender equality, and equip learners with key concepts and principles of gender sensitization.		
Course Category	Skill Development, Employability and Entrepreneurship		
Development Needs	Local, National and Global		
Course Description	The course aims an exploration of overview of gender, its social construction, gender issues and challenges in India, and equips learners with key concepts and principles of gender sensitization to promote inclusivity and equity.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Learn gender roles, socialization, and stereotypes.	Direct Instruction	Assignment
CO 2	Recognize the gender discrimination causes, areas, and levels in institutions.	Direct Instruction	Seminar
CO 3	Identify the gender identity formation, types, families, and socialization in India.	Video Lessons	Assignment
CO 4	Understand the gender concerns in access, enrollment, retention, participation, and achievement.	Direct Instruction	Assignment
CO 5	Apply the Laws Related to Women	Direct Instruction	Exhibition
Offered by	Department of Costume Design and Fashion		
Course Content	Instructional Hours / Week : 2		
Unit	Description	Text Book	Chapters
I	Gender Socialisation and Gender Roles: Introduction- Meaning of Sex and Gender, Gender Socialisation– Definitions, Agents of Gender Socialisation, Gender Roles- Meaning, Definitions, Nature of Gender Roles, Factors Determining Gender Roles/Stereotypes	1	-
Instructional Hours			6
Suggested Learning Methods : Group discussions			
II	Gender Discrimination: Gender Discrimination - Meaning and Causes of Gender Discrimination, Areas of Gender Discrimination, Gender Discrimination at Different Levels of Institutions	1	-
Instructional Hours			6
Suggested Learning Methods : Video documentaries and films			
III	Gender Identity: Gender Identity - Meaning, Formation and Factors of Gender Identity, Types of Gender Identity, Types of Families in India, Gender Socialisation within Indian Families	1	-
Instructional Hours			6
Suggested Learning Methods : Case Method			

IV	Gender Concerns: Gender Concerns Related to Access, Enrolment, Retention, Participation, and Achievement								1	-			
Instructional Hours										6			
Suggested Learning Methods : Video documentaries and films													
V	Laws Related to Women: Laws Related to Rape, Laws Related to Dowry - Dowry Prohibition Act, 1961, Laws Related to Remarriage, Laws Related to Divorce, Laws Related to Property Inheritance, Laws Related to Trafficking, Constitutional and Legal Aspects related to Women - Women's Reservation Bill – History and Current Status								1	-			
Instructional Hours										6			
Suggested Learning Methods : Case Method													
Total Hours										30			
Text Books	1. Gender School and Society : Self-learning Material, MANGALORE UNIVERSITY, Printed at Datacon Technologies, Bangalore, 2018												
Reference Books	1. United Nations Development Programme. (2014). Gender Equality and Women's Empowerment: Training Manual. New York: UNDP.												
Web. URLs	1. Coursera - https://www.coursera.org/courses?query=gender%20sensitization 2. edX - https://www.edx.org/learn/gender-sensitization 3. Udemy - https://www.udemy.com/topic/gender-sensitization/												
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	M	M	H	H	M	-	-	-	-	-
CO2	H	M	M	M	H	H	M	M	-	-	-	-	-
CO3	H	M	M	M	M	H	H	M	-	-	-	-	-
CO4	H	M	M	M	L	H	H	M	-	-	-	-	-
CO5	H	M	M	M	M	H	M	M	-	-	-	-	-
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Ms. M. Nandhini							Dr. S. Jayapriya						

Course Code	Title		
22U4NM3WRT / 21U4NM3WRT	Non Major Elective : Women's Rights		
Semester : III	Credits : 2	ESE : 50 Marks	
(Common to all UG Programmes)			
Course Objective	To facilitate the awareness about the social, economical, political, intellectual or cultural contributions of Women in India.		
Course Category	Skill Development		
Development Needs	National		
Course Description	Apply the knowledge of Rights related to women for their betterment.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Aware of basic constitutional rights	Lecture/ Case Study/ Role Play	Seminar
CO 2	Gain awareness on Political rights	Lecture/ Case Study/ Role Play	Role Play
CO 3	Understand individual and familial rights	Lecture/ Case Study/ Role Play	Role Play
CO 4	Grasp the provisions for Women's Rights in India	Lecture/ Case Study/ Role Play	Role Play
CO 5	Develop an understanding of the Protection Mechanisms for women	Lecture/ Case Study/ Role Play	Assignment
Offered by	Department of Social Work		
Course Content	Instructional Hours / Week : 2		
Unit	Description	Text Book	Chapters
I	Constitutional Rights of Women in India: Indian constitution relating to women - Fundamental rights - Directive principles of state policy - right to equality – rights against exploitation cultural and educational rights - the right to constitutional remedy - University Declaration of Human Rights -Enforcement of Human Rights for Women and Children - Role of Cells and Counseling Centers - Legal AID cells, Help line, State and National level Commission	4	2
Instructional Hours			6
Suggested Learning Methods : Seminar			
II	Political Rights of Women in India: Political Rights of Women in India - Electoral process – women as voters - candidates and leader - pressure group, 73rd and 74 th amendment and representation of women in local self –government – women in Rural and urban local bodies - Reservation of women - party ideologies and women's issues.	5	1
Instructional Hours			6
Suggested Learning Methods : Role Play			

III	Women's Rights: Access to Justice: Introduction – Criminal Law – Crime Against Women Domestic Violence – Dowry Related Harassment and Dowry Deaths - Molestation – Sexual Abuse and Rape Loopholes in Practice–Law Enforcement Agency								3	7			
	Instructional Hours										6		
Suggested Learning Methods : Role Play													
IV	Women's Rights: Violence Against Women – Domestic Violence The Protection of Women from Domestic Violence Act 2005, The Marriage Validation Act 1982 - The Hindu Widow Remarriage Act 1856 - The Dowry Prohibition Act 1961.								3	5			
	Instructional Hours										6		
Suggested Learning Methods : Creative Art Assignments													
V	Special Women Welfare Laws: Sexual Harassment at Work Places, Rape and Indecent Representation, The Indecent Representation (Prohibition) Act, 1986, Immoral Trafficking, The Immoral Traffic (Prevention) Act, 1956 - Acts Enacted for Women Development and Empowerment, Role of Rape Crisis Centers. Protection of Children from sexual Offences Act 2012.								3	9			
	Instructional Hours										6		
Suggested Learning Methods : Community Participation Program													
Total Hours										30			
Reference Books		<ol style="list-style-type: none"> 1. P. D. Kaushik “Women Rights” Book well Publication 2007 UN Centre for Human Rights, Discrimination against Women (Geneva: World Campaign for Human Rights,1994). 2. Agnes, Flavia. (1992). “Give us “Give us This Day Our Daily Bread: Procedures and Case Law on Maintenance”. Majlis, Bombay. 3. Agnes, Flavia. (1999). “Law and Gender Inequality: The Politics of Women’s Rights in India”. OUP, New Delhi 											
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	M	H	M	M	M					
CO2	H	M	M	H	M	M	H	H					
CO3	H	M	M	H	M	H	M	M					
CO4	M	H	M	H	M	M	M	H					
CO5	H	M	M	H	M	H	M	M					
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. P. Nathiya							Dr. P. Nathiya						

**EXTRA
DEPARTMENTAL
COURSE**

Course Code		Title	
24U4MB3ED1		Extra Departmental Elective Course – Mushroom Cultivation Technology Practical	
Semester: III		Credits: 2	ESE: 50 Marks
Course Objective	Able to cultivate in a limited space and describe the cultivation process. To get the knowledge on the mushroom cultivation technology and their significance of mushroom cultivation technology. The interested students will get the knowledge on cultivation. They can generate employments. They will also turn towards the steps in mushroom cultivation. Will get the knowledge on nutritional value of mushroom		
Course Category	Entrepreneurship and skill development		
Development Needs	Global		
Course Description	The course aims at making the students to gain knowledge and skills in developing their own cultivation unit by using the skills and technology in developing their own startup		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand structure and importance of edible mushroom, differentiate edible and poisonous mushrooms.	Lecture / Hands on	Performance
CO 2	Acquire knowledge about reproduction and cultivation of mushrooms.	Lecture / Hands on	Performance
CO 3	Gain information on mushroom cultivation houses.	Lecture / Hands on	Performance
CO 4	Know how to harvest and utilize the mushrooms.	Lecture / Hands on	Observation
CO 5	Recognize various types of recipes preparation using mushroom.	Lecture / Hands on	Performance
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 2	
Exp No	Experiments		
1.	Selection of different substrates for the cultivation of Mushrooms.		
2.	Collection of samples of Edible and Non-Edible Mushroom from field and Study their Features.		
3.	Preparation of Spawn for Mushroom Cultivation.		
4.	Cultivation of Button Mushroom or Oyster Mushroom.		
5.	Analysis of Nutrient contents from Mushroom.		
6.	Construction of Mushroom Houses.		

7.	Preparation of Value Added Products from Mushroom.	
	Total Hours	30
Text Books	<ol style="list-style-type: none"> 1. ChenjerayiKashangura, Edna Kunjeku, Audrey Mabveni, Tsungai Chirara, Arnold Mswaka, VimbaiManjonjo-Dalu. Manual for Mushroom Cultivation. Biotechnology Trust of Zimbabwe, 2004. 2. Nailoke Pauline Kadhila-Muandingi, Fabian SinvulaMubiana, Keumbo Lorna Halueendo. Mushroom Cultivation: A Beginners Guide. 2nd edition, University of Namibia, 2008. 	
Reference Books	<ol style="list-style-type: none"> 1. Gregoire Pesti. Mushrooms Cultivation, Antioxidant Properties and Health Benefits. Nova Science Pub Inc., 2014. Philip G. Miles, Shu-Ting Chang. Mushrooms: Cultivation, Nutritional Value, Medicinal Effect, and Environmental Impact, 2nd edition, CRC Press, 2004. 	
Web. URLs	https://www.biologydiscussion.com/fungi/mushrooms-meaning-values-and-cultivation-procedure/46635 https://www.yourarticlelibrary.com/mushrooms/mushrooms-cultivation-procedure-for-mushrooms-cultivation-1703-words/7268	
Course designed by		Verified by Chairman
Dhanusha J Nair		Dr. M. Thangavel

Course Code		Title	
24U4MB3ED2		Extra Departmental Elective Course – Vermitechnology Practical	
Semester: III		Credits: 2	ESE: 50 Marks
Course Objective		Able to prepare compost in a limited space and describe the decomposing process. The interested students will get the knowledge of composting. They can generate employments. They will also turn towards organic farming. Will help to maintain the environment pollution free and will get the knowledge of biodiversity of local earthworms.	
Course Category		Entrepreneurship and skill development	
Development Needs		Global	
Course Description		The course aims at making the students to gain knowledge and skills in developing their own compost unit by using the skills and technology in developing their own startup	
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand importance of Vermitechnology.	Lecture / Hands on	Observation
CO 2	Acquire knowledge on role of earthworms.	Lecture / Hands on	Observation
CO 3	Gain information on vermicompost processing.	Lecture / Hands on	Performance
CO 4	Know how to feed and monitor to prepare vermicompost.	Lecture / Hands on	Performance
CO 5	Know harvest and packaging technology of vermicompost.	Lecture / Hands on	Performance
Offered by		Microbiology	
Course Content		Instructional Hours / Week: 2	
Exp No	Experiments		
1.	Construction and set up of Vermicompost Unit		
2.	Study and Maintenance of different species of Earthworms and their feedstock.		
3.	Standardisation of substrates and preparation of Worm bed.		
4.	Observation of Environmental parameters in the Vermicompost Unit.		
5.	Harvesting and Packing of Vermicompost		
6.	Start Up of Biofertilizer Production as Entrepreneurship Program.		
7.	Field Visit		
		Total Hours	30

Text Books	1. Avnish Chauhan, Vermitechnology, Vermiculture, Vermicompost and Earthworms. Lap Lambert Academic publishing, 2012. 2. Rhonda Sherman, The Worm Farmer's Handbook. Chelsea Green Publishing, 2018.		
Reference Books	1. Sreenivasan E., Handbook of Vermicomposting Technology. The Western India Plywoods Ltd., 2015. 2. Glenn Munroe, Manual of On-Farm Vermicomposting and Vermiculture, Organic Agriculture Centre of Canada, 2005.		
Web. URLs	1. https://www.onlinebiologynotes.com/vermicomposting/ 2. https://www.vedantu.com/biology/vermiculture		
Course designed by		Verified by Chairman	
Dr. Sheeba E		Dr. M. Thangavel	

Course Code	Title	
24U4SEC302	Skill Enhancement Course IV: Employability Enhancement Training	
Semester: III	Credits: 1	CIA: 25 Marks
Course Objective	<p>The aim of the course to train students on Employability skills.</p> <p>To enhance their confidence in English Communication for professional and business scenario</p> <p>To train them on advanced Quantitative aptitude.</p> <p>To train students on proper usage of English Language</p> <p>To develop awareness about professional career and develop a plan of action</p>	
Course Category	Skill Development, Employability, Entrepreneurship	
Development Needs	Global	
Course Description	This course is a part of series of 3 courses aimed at enhancing the industry readiness of the students. This series aims at honing their multiple intelligence like Numerical, Linguistic, and Logical, spatial and interpersonal intelligence there by enhance their employability in the campus placements.	
Course Outcomes		
CO 1	Students shall make a clear self-analysis and prepare to begin planning their career and personal profiling towards achieving their academic and professional goals.	
CO 2	In their endeavour towards improving their English communication, they will try our demonstrating presentation skills and public speaking. Level II	
CO 3	Students will improve their grammar, reading comprehension, and verbal reasoning skills in English. They shall be prepared to crack any Verbal Aptitude rounds in the interview – Level I	
CO 4	Students will develop their ability to effectively listen, comprehend, and respond to spoken language through focused practice and assessments.	
CO 5	Students will strengthen their problem-solving abilities in Aptitude and logical reasoning topics and prepare themselves for clearing any aptitude round during the campus placements – Level II	
Offered by	NCPIR	
Course Content		
Unit	Description	
I	Introduction & Orientation Course introduction - Training expectations - Pre-assessment - APR201 (Quantitative Aptitude) -APR 202 (Verbal), Career Planning & Student Profiling	
		Instructional Hours
		03
II	Speaking Skills Speech Craft Activities – Presentation Skills -Public Speaking- Assessments-APO201, APO202	
		Instructional Hours
		15
III	Verbal Aptitude Sentence correction based on SV Agreement - Reading Comprehension- Listen and comprehend- Unit Assessment – AUA201, AUA202, AUA203, Post Assessment - APO204	
		Instructional Hours
		06
IV	Numerical Aptitude Time speed distance, Problems on Trains, Boats & Streams, Time & Work, Pipes & Cistern – Unit Assessment – AUA204, AUA205, AUA206, AUA207, AUA208, Post Assessment - APO205	
		Instructional Hours
		08

V	Logical & Non-Verbal Reasoning												
	Puzzles, Figure matrix, Figure Series, Mirror Image, Water Image – Unit Assessment AUA209-AUA210												
											Instructional Hours	04	
											Total Hours	36 Hrs	
Session	Topics											Unit	
1	Introduction & Orientation - APR201-APR202											1	
2	Career Planning & Personal Profiling											1	
3	Presentation Skills - Input											2	
4	Speaking Skills- Presentation Skills-APO201											2	
5	Speaking Skills- Presentation Skills -APO201											2	
6	Speaking Skills- Presentation Skills-APO201											2	
7	Speaking Skills- Presentation Skills-APO201											2	
8	Public Speaking Input											2	
9	Speaking Skills- Public Speaking-APO203											2	
10	Speaking Skills- Public Speaking-APO203											2	
11	Speaking Skills- Public Speaking-APO203											2	
12	Speaking Skills- Public Speaking-APO203											2	
13	Subject Verb Agreement											3	
14	Sentence Correction based on SV Agreement											3	
15	Reading Comprehension											3	
16	Listen and Respond											3	
17	Quantitative Aptitude - Time speed distance											4	
18	Quantitative Aptitude - Problems on Trains											4	
19	Quantitative Aptitude -Boats & Streams											4	
20	Quantitative Aptitude -Time & Work											4	
21	Quantitative Aptitude -Pipes & Cistern											5	
22	Nonverbal Reasoning – Puzzles, Figure Matrix											5	
23	Nonverbal Reasoning –Figure Series, Mirror Image, Water Image											5	
24	Post Evaluation Assessment APO 204, APO 205											3,4,5	
Tools for Assessment (25 Marks)													
Communication Assessment - Intermediate		Proctored Online Assessments in Quantitative & Verbal Aptitude – Level II							Attendance		Total		
10		10							5		25		
Mapping													
PO/PSO CO	PO1	PO2	PO 3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PS O3	PSO4	PSO5
CO1													
CO2													
CO3													
CO4													
CO5													
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						

SEMESTER IV

23U1TAM404		Part - I : Muthamizh (முத்தமிழ்)		
Semester: IV		Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective		சங்ககால மக்களின் வாழ்வியல் வாயிலாக பண்பாட்டுக் கூறுகளை உணர்த்துதல்		
Course Category		Skill Development (மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்)		
Development Needs		Global/Regional (உலக அளவில் தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்)		
Course Description		மாணவர்களின் மொழித்திறனை ஊக்குவித்தல் மற்றும் உலக அளவில் தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்		
Course Outcomes			Teaching Methods	Assessment Methods
CO 1	தமிழர்களின் வாழ்வியல் பண்புகளைக் கற்று அறிதல்.		விரிவுரை/காணொளிப் பட விளக்கம்	ஒப்படைவு
CO 2	தமிழ் இலக்கிய வகைகளைக் கூறுவதன் மூலம் தமிழின் இலக்கிய வளத்தை உணரச்செய்தல்.		விரிவுரை	குழுத்திட்டம்
CO 3	மாணவர்களிடையே காலத்திற்கேற்ப மனவளர்ச்சியை உருவாக்குதல்.		விரிவுரை/காணொளிப் பட விளக்கம்	கருத்தரங்கு
CO 4	நாட்டின் சிறந்த குடிமக்களாக மாணவர்களை உருவாக்குதல்.		விரிவுரை	ஒப்படைவு
CO 5	மாணவர்களின் மனநலத்தை வளர்த்தல்.		விரிவுரை/குழு விவாதம்	கருத்தரங்கு
Offered by		தமிழ்த்துறை		
Course Content: Muthamizh (முத்தமிழ்)			Instructional Hours / Week : 4	
Unit	Description	Text Book	Chapters	
I	எட்டுத்தொகை	1. நற்றிணை 2. குறுந்தொகை 3. பதிற்றுப்பத்து 4. புறநானூறு	1.1 குறிஞ்சி: நின்ற சொல்லார் ..., 1.2 முல்லை : இளமை பாரார் ..., குறிஞ்சி : நிலத்தினும்..., பாலை : ஆடு அமை ...விளையாட்டு ஆயமொடு 1.3 ஐந்தாம் பத்து : ஊன் தூவை அடிசில் 1.4. யாதும் ஊரே .. பல் சான்றீரே .. அற்றைத்திங்கள்	
			Instructional Hours	12 Hours
Suggested Learning Methods: சங்க இலக்கிய வழி நற்பண்புகளை அறியச்செய்தல்				
II	பத்துப்பாட்டு	1. சிறுபாணாற்றுப்படை 2. குறிஞ்சிப்பாட்டு 3. பொருநர் ஆற்றுப்படை 4. மதுரைக்காஞ்சி	2.1 கடையெழு வள்ளல்கள் சிறப்பு 2.2 அறத்தொடு நிறறல் 2.3 மன்னனின் விருந்தோம்பல் 2.4 பாண்டிய நெடுஞ்செழியன் குடிச்சிறப்பு	
			Instructional Hours	12 Hours
Suggested Learning Methods : புலவர்களின் மாண்புகளை வெளிப்படுத்துதல்				
III	அற இலக்கியங்கள்	1. நான்மணிக்கடிகை 2. இனியவை நாற்பது 3. களவழி நாற்பது- 4. ஆசாரக்கோவை	விளம்பிநாகனார் - (1-5 பாடல்கள்) பூதஞ்சேந்தனார் - (1-5 பாடல்கள்) பொய்கையார் - (11-15 பாடல்கள்) பெருவாயின் முள்ளியார் (1-5 பாடல்கள்)	
			Instructional Hours	12 Hours
Suggested Learning Methods : அற இலக்கியங்களின் மாண்புகளை அறிய பெற்றமை				
IV	தமிழ்ச் செயலிகள்	தனித்தமிழ்	4.1 செயலிகள் அறிமுகம் 4.2 வகைகள்	

			4.3 மொழிபெயர்ப்புச் செயலிகள் 4.4 தமிழ்ச் செயலிகள்										
Instructional Hours			12 Hours										
Suggested Learning Methods : தமிழ்ச் செயலிகள் பற்றி அறியும் வாய்ப்பு பெற்றமை													
V	இலக்கணம்	1.நன்னூல் 2.தொல்காப்பியம்	5.1 முதற்பொருள், கருப்பொருள், உரிப்பொருள் 5.2 பத்து அழகு 5.3 பத்து குற்றம் 5.4 ஆங்கிலத்திலிருந்து தமிழில் மொழிபெயர்த்தல்										
Instructional Hours			12 Hours										
Suggested Learning Methods : இலக்கண மாண்புகளை அறியும் திறன் பெற்றமை													
Total Hours			60 Hours										
Text Books	1. இளங்கலை முதலாம் ஆண்டு தமிழ் மாணவர்களுக்குரிய பாடநூல் தொகுப்பு: “முத்தமிழ்” தமிழ்த்துறை, நேரு கலை மற்றும் அறிவியல் கல்லூரி, கோயம்புத்தூர்.												
Reference Books	1. சங்க இலக்கியங்கள் - எட்டுத்தொகை, பத்துப்பாட்டு கழக வெளியீடு, திருநெல்வேலி. 2. தனித்தமிழ்- இளசுந்தரம், விகடன் பிரசுரம். சென்னை.												
Web. URLs	https://youtu.be/GrNnb68Fd6w , https://youtu.be/14-sEAUzXP8 .												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Seminar	Assignment	Group Project	Total							
4	4	5	2	2	3	20							
Mapping													
PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	H	L	H	H	M	H					
CO2	M	L	H	L	M	L	M	H					
CO3	H	L	H	L	H	H	M	H					
CO4	M	L	M	L	H	H	H	M					
CO5	H	L	L	L	M	H	L	M					
H-High; M-Medium; L-Low													
Course designed by							Verified by						
Dr. S. Satheesh kuma							Dr. A. Sridevi						

Course Code	Title		
24U1HIN404	Part I -Prayogik Hindi(प्रायोगिक हिंदी)		
Semester: IV	Credits:3	CIA: 20Marks	ESE: 55 Marks
(Common to all UG Programmes)			
Course Objective	साक्षरता प्रशंसा और विश्लेषण के सौंदर्य, सांस्कृतिक और सामाजिक पहलुओं के प्रति छात्रों को संवेदनशील बनाना उन्हें विभिन्न कालों के प्रख्यात लेखकों के हिंदी कथा साहित्य के बेहतरीन नमूने उपलब्ध कराना		
Course Category	Skill Development		
Development Needs	National		
Course Description	Improves Creative Writing.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	छात्र हिंदी भाषा से अच्छी तरह वाकिफ हो सकेंगे।	Role play	Assignment
CO 2	पाठ्यक्रम संवादी हिंदी में पारंगत होने में मदद करता है।	Group learning Acting	Seminar
CO 3	छात्र आधुनिक हिंदी साहित्य का ज्ञान प्राप्त कर सकेंगे।	Story Narration	Assignment
CO 4	छात्रों को निबंध लेखन में अच्छा अभ्यास मिलेगा।	Group learning and Work sheets	Group Project
CO 5	छात्रों को फिल्म की समीक्षा करने का अभ्यास मिलेगा।	Worksheets and Exercises	Seminar
Offered by	Hindi		
Course Content	Instructional Hours / Week : 4		
Unit	Description	Text Book	Chapters
I	पचपन खम्भे लाल दीवारें - उषा प्रियंवदा	1	4
Instructional Hours			12
Suggested Learning Methods: Visual Learning			02 Hrs
II	कथामाला :लौटना और लौटना - मृदुला गर्ग ममता - जयशंकर प्रसाद आदमी का बच्चा- यशपाल	1	3
Instructional Hours			12
Suggested Learning Methods : Auditory			02 Hrs
III	1.दिए गए अनुच्छेद पर समीक्षा लिखना 2.आधुनिक काल: प्रवृत्तियां और कवि	1	3
Instructional Hours			12
Suggested Learning Methods : Comprehensive Writing			02 Hrs
IV	1.सामान्य निबंध: आधुनिक शिक्षा प्रणाली, मोबाइल का दुष्परिणाम,आधुनिक युवा पीढ़ी	1	2

	2. हिंदी में दी गई कहानी के लिए सारांश लिखना।												
Instructional Hours				12									
Suggested Learning Methods : Auditory, Visual, Comprehensive				02 Hrs									
V	सिनेमा समीक्षा : तारे ज़मीन पर		1	4									
Instructional Hours				12									
Suggested Learning Methods : Comprehensive writing				02 Hrs									
Total Hours				60 Hrs									
Text Books	<ol style="list-style-type: none"> पचपन खम्भे लाल दीवारें - उषा प्रियंवदा हर हाल बेगाने - मृदुला गर्ग, राजपाल एंड संस, दिल्ली मेरा परिवार, लोक भारत प्रकाशन, इलाहाबाद 												
Reference Books	<ol style="list-style-type: none"> संजय चौहान, समकालीन हिंदी साहित्य विचार और विवाद, आशा किताबें श्रीराम देव, व्याकरण प्रदीप, लोक भारती प्रकाशन, अलाहाबाद डॉ वासु देव नंदन प्रसाद, आधुनिक हिंदी व्याकरण और रचना, भारती भवन प्रकाशक ओंकार नाथ वर्मा, सामान्य हिंदी, अरिहंत प्रकाशन भारत लिमिटेड 												
Web. URLs	<ol style="list-style-type: none"> www.webdunia.com www.hindikunj.com hindi-natak-vikas.html www.bhashaindia. www.hindisamay.com https://ebook.pustak.org/ 												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Group Project	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	H	M	M	M	H	M					
CO2	M	M	H	H	M	H	M	M					
CO3	M	M	L	M	M	H	M	M					
CO4	M	M	M	M	H	L	M	H					
CO5	H	H	M	M	H	M	H	H					
H-High; M-Medium; L-Low													
Course designed by							Verified by						
Ms. Krishnedu P.M							Ms. Heera P.K						

Course Code	Title		
24U1MAL404	Part 1 : Drisyakalaa Saahithyam (ദൃശ്യകലാ സാഹിത്യം)		
Semester: IV	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	സിനിമ എന്ന മാധ്യമത്തിന്റെ വിവിധ തലങ്ങളെ ആഴത്തിൽ മനസ്സിലാക്കാൻ കഴിയുന്നു.ദൃശ്യവിഷ്കരണത്തെ കുറിച്ചുള്ള അറിവ് ലഭിക്കുന്നു.		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Proper guidance, opportunities and encouragement that help them achieve their ambitions		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	തിരക്കഥയിലെ സംഭാഷണത്തിന്റെ പ്രസക്തി	Smart boards/ chalk and Talk	Assignment
CO 2	വർത്തമാനകാലത്തെ മൂല്യചൂതിയെ കുറിച്ചുള്ള വിവരണം	Group learning	Seminar
CO 3	മനുഷ്യമനസ്സിലെ അനിവാര്യമായ നന്മ	Peer Teaching	Assignment
CO 4	നാടകം എന്ന ദൃശ്യകലയുടെ സവിശേഷതകൾ	Group learning	Group Project
CO 5	മനുഷ്യമനസ്സിന്റെ അന്തർസംഘർഷങ്ങൾ	Smart boards/ chalk and Talk	Assignment
Offered by	Malayalam		
Course Content	Instructional Hours / Week : 4		
Unit	Description	Text Book	Chapters
I	തിരക്കഥ - ഞാൻ പ്രകാശൻ	1	5
Instructional Hours			12
Suggested Learning Methods : Visual Learning			02 Hrs
II	തിരക്കഥ - ഞാൻ പ്രകാശൻ	1	5
Instructional Hours			12
Suggested Learning Methods : Auditory, Visual			02 Hrs
III	തിരക്കഥ - ഞാൻ പ്രകാശൻ	1	3
Instructional Hours			12
Suggested Learning Methods : Visual Learning			02 Hrs
IV	നാടകം - ലങ്കാലക്ഷ്മി	1	2
Instructional Hours			12
Suggested Learning Methods: Auditory, Visual			02 Hrs
V	നാടകം - ലങ്കാലക്ഷ്മി	1	3
Instructional Hours			12
Suggested Learning Methods : Visual Learning			02 Hrs
Total Hours			60 Hrs

Text Books	1. തിരക്കഥ - ഞാൻ പ്രകാശൻ - ശ്രീനിവാസൻ, ഡി.സി.ബുക്സ് 2. നാടകം - ലക്ഷാലക്ഷി - സി.എൻ.ശ്രീകണ്ഠൻ നായർ - ഡി.സി ബുക്സ്												
Reference Books	1. കഥയും തിരക്കഥയും ഡോ.ആർ.വി.എം.ദിവാകരൻ - എൻ. ബി. എസ് കോട്ടയം 2. മലയാള സിനിമയും സാഹിത്യവും - മധു ഇറവങ്കര - ഡി.സി.ബുക്സ് 3. ഒരു സിനിമ എങ്ങനെ ഉണ്ടാകുന്നു. - കെ.കെ. ചന്ദ്രൻ 4. നാടക സാഹിത്യ ചരിത്രം - ജി. ശങ്കരപ്പിള്ള - ഡി.സി.ബുക്സ് 5. നാടകം കലയും കാഴ്ചയും - പി.ജി.സദാനന്ദൻ - ഡി.സി.ബുക്സ്												
Web. URLs	literature">http://www.keralaculture.org>literature http://www.manoramaonline.com												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Group Project	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	H	H	H							
CO2	M	H	H	M	H	M							
CO3	M	H	M	M	M	H							
CO4	M	L	L	H	L	H							
CO5	H	L	L	H	L	H							
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Ms. RAJANI N.							Dr. SMITHA C. R.						

Course Code	Title		
24U1FRN404	Part– I: Français général - IV		
Semester: II	Credits : 3	CIA:20Marks	ESE :55 Marks
Common to all UG Programmes			
Course Objective	To communicate during easy or habitual tasks and direct information exchange on familiar subjects to use simple words		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Improved accuracy & quality, improved communication		
Course Outcomes		Teaching Methods	Assessment Methods
CO1	Comprehend day to day conversations	Lecture	Assignment
CO2	Understand the text styles and poetical elements	Word game /Lecture	Seminar
CO3	Converse slowly in known situations	Lecture/ Video Lessons	Quiz
CO4	Develop an interest in the appreciation of literature	Role play / Tutorial	Assignment
CO5	Discuss and respond to content of reading passage	Roleplay/Lecture	Groupproject
Offered by	Department of French		
Course Content	Instructional Hours/Week: 4		
Unit	Description	Text Book	Chapters
I	<ul style="list-style-type: none"> • Parlons des héros réels ou imaginaires • Racontons la vie de quelqu'un • Racontons des expériences passées • Entraînement 	1	1
Instructional Hours			12
Suggested Learning Methods : Worksheet			
II	<ul style="list-style-type: none"> • Parlons des problèmes de la planète • Exprimons l'obligation et l'interdiction • Présentons des actions écologiques • Entraînement 	1	2
Instructional Hours			12
Suggested Learning Methods: Kahoot App			
III	<ul style="list-style-type: none"> • Parlons d'argent de poche • Décrivons des objets 	1	3
Instructional Hours			12
Suggested Learning Methods: Audio & Visual			
IV	<ul style="list-style-type: none"> • Comparons des attitudes • Entraînement 	1	4

	<ul style="list-style-type: none"> • Parlons de notre orientation 		
Instructional Hours			12
Suggested Learning Methods : Comprehensive Writing			
V	<ul style="list-style-type: none"> • Parlons de nos passions et de nos qualités • Imaginons l'avenir • Entraînement 	1	5
Instructional Hours			12
Suggested Learning Methods: Translating simple sentences			
Total Hours			60

Text Books	Adomania 2 – Méthode de Français
Reference Books	Latitudes 1
Web.URLs	Lingua.com, Duolingo App, You Tube Videos

Tools for Assessment (20Marks)

CIAI	CIAII	CIAIII	Assignment	Spelling Test	Quiz	Total
4	4	5	2	2	3	20

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	-	-	H	H	H	H	-	-	-	-	-	-	-
CO2	-	-	H	M	H	M	-	-	-	-	-	-	-
CO3	-	-	M	M	M	H	-	-	-	-	-	-	-
CO4	-	-	L	H	L	H	-	-	-	-	-	-	-
CO5	-	-	L	M	H	H	-	-	-	-	-	-	-

H-High; M-Medium; L-Low

Course designed by	Verified by Chairman
Mr. D. Balaji	Mr. D. Balaji

Course Code	Title		
24U2ENG404	Part II Communicative English Practical – II		
Semester: IV	Credits: 3	CIA: 30 Marks	ESE: 45 Marks
(Common to all UG Programmes)			
Course Objective	To enhance students' proficiency in Advanced Communication Skills, focusing on effective Verbal and Non-Verbal communication, to meet the demands of a Global Workplace.		
Course Category	Skill Development		
Development Needs	Global		
Course Description	SD: Helps to develop LSRW skill		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Demonstrate improved listening skills, able to understand and analyze spoken English in various contexts	CALL	Video Diary
CO 2	Exhibit effective spoken English skills, with clarity in pronunciation and fluency	CILL	Video Diary
CO 3	Display reading comprehension skills by interpreting different types of English texts	CILL	Book Review
CO 4	Develop structured, coherent written communication for personal and professional use	CALL	Vocabulary Journal
CO 5	Integrate all four language skills to communicate effectively in real-life scenarios	CALL	Vocabulary Journal
Offered by	Department of English		
Course Content	Instructional Hours / Week : 4		
Unit	Description	Text Book	Chapters
I	Fundamentals of Communication Understanding Communication: Process, types, and channels Barriers to Communication and how to overcome it. Verbal and Non-verbal Communication: Body language, gestures, and proxemics Listening Skills: Types, Importance, and Techniques for Active Listening Exercises: Group activities, Role Plays, Listening tests	1	1-3
Instructional Hours			12
Suggested Learning Methods : Cooperative Learning			
II	Presentation Skills: Planning and structuring a presentation, Effective use of visual aids Managing stage fright and engaging the audience, Developing persuasive and expository presentation styles Exercises: Individual and group presentations, Peer and instructor feedback	1	4-6
Instructional Hours			12
Suggested Learning Methods : Inquiry Based Learning			

III	Group Discussions Fundamentals of Group Discussions (GDs): Objectives and types Key skills for GDs: Initiation, idea generation, summarization, and time management, Handling disagreements and consensus-building Leadership in GDs: Roles and responsibilities Exercises: Mock GD sessions with constructive peer reviews					1	7-9
	Instructional Hours						12
Suggested Learning Methods : Classroom Activity							
IV	Interview Skills Types of interviews: HR, technical, stress, and behavioral interviews, Preparing resumes and cover letters Effective response techniques (STAR, PAR) Dressing, etiquette, and body language during interviews Exercises: Mock interviews with personalized feedback sessions					1	10-13
	Instructional Hours						12
Suggested Learning Methods : Direct Method							
V	Advanced Interpersonal Communication Interpersonal Communication: Essentials and impact Building trust and rapport, Conflict resolution and negotiation Communicating across cultures and understanding diversity Exercises: Case studies, Resume preparation, and feedback sessions					1	14-17
	Instructional Hours						12
Suggested Learning Methods : Activity Based Learning							
Total Hours						60 Hrs	
Text Books		<ol style="list-style-type: none"> Richards, Jack. C with Jonathan Hull and Susan Proctor New Interchange: English for International Communication. "English for the Real World" by Susan B. Anker "Academic Encounters: Life in Society (Reading, Study Skills, and Writing)" by Jessica Williams "English for Academic Purposes: A Comprehensive Overview of EAP and How it is Best Taught and Learnt" by R.R. Jordan "Communication Skills in English" by Shalini Aggarwal 					
Reference Books		<ol style="list-style-type: none"> M Ashraf Rizvi, "Effective Technical Communication", McGraw-Hill, 2nd Edition, New Delhi, 2018 "Practical English Usage" by Michael Swan "Oxford Guide to Effective Writing and Speaking" by John Seely "New International Business English" by Leo Jones and Richard Alexander 					
Web. URLs		https://learnenglish.britishcouncil.org https://www.usingenglish.com					
Tools for Assessment (30 Marks) Internal							
Role Play	Report Writing	Think – Pair -Share	Video Diary	Book Review	Vocabulary Journal	Total	
4	4	4	7	7	4	30	
Presentation	Mock Interview		Record	Viva Voce		Total	
15	15		10	5		45	

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	L	H	H	H	H					
CO2	H	M	H	L	H	H	H	H					
CO3	H	M	H	L	H	H	H	H					
CO4	H	M	H	L	H	H	H	H					
CO5	H	M	H	L	H	H	H	H					

H-High; M-Medium; L-Low

Course designed by	Verified by
Dr. Ritu Shepherd	Dr. R. Malathi

Course Code	Title		
24U3MBC410	Core Paper X – Environmental and Agricultural Microbiology		
Semester: IV	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	To provide the fundamental knowledge about the various scopes on Environmental and Agricultural Microbiology and their concepts.		
Course Category	Employability		
Development Needs	Global		
Course Description	Learn about concepts of ecosystem, waste management and bioremediation of environment pollution.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand about the concepts of soil and aquatic ecosystem.	Lecture / Video lessons	Assignment
CO 2	Learn about the interaction of microorganisms and their role in environment.	Lecture / Flipped Classroom	Assignment
CO 3	Discuss about the microorganisms and pollution.	Lecture / Video Lessons	Quiz
CO 4	Acquire knowledge on sewage treatment and their disposal.	Lecture / Tutorial	Seminar
CO 5	Gain knowledge on bioremediation of toxic components in the environment.	Lecture / Case Studies	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 4	
Unit	Description	Text Book	Chapters
I	Microbial ecosystem: General ecological concepts - Ecosystem and habitats, species diversity in microbial habitats (population, community, species richness, species abundance). Terrestrial environment: Soil profile and soil microflora. Aquatic Environment: Microflora of fresh water and marine habitats.	1	20
Instructional Hours			12
Suggested Learning Methods: Video lectures			
II	Microbial interactions and applications: Mutualism, commensalism, antagonism, competition, parasitism, predation, decomposition, bio-mining, nitrogen fixation (symbiotic). Disease in plants.	2, 3	2 & 7
	Role of microorganisms in nutrient cycling (Carbon, nitrogen, phosphorus and Sulphur).	3	4
Instructional Hours			12
Suggested Learning Methods: Video lectures and Model presentation			
III	Microorganisms and pollution: General aspects of pollution, pollution by pathogenic microorganisms, pollution by oxygen demanding carbonaceous material, mineral pollutants, heat pollution, pollution by recalcitrant chemicals.	2	16 – 20

Instructional Hours			12										
Suggested Learning Methods: Model presentation and Video lectures													
IV	Waste Management: Outlines of solid waste management: sources and types of solid waste, methods of solid waste disposal (composting and sanitary landfill). Liquid waste management: composition and strength of sewage (BOD and COD), Primary, secondary (oxidation ponds, trickling filter, activated sludge process and septic tank) and tertiary sewage treatment.	2	26										
Instructional Hours			12										
Suggested Learning Methods: Model presentation and Group discussion													
V	Bioremediation: Bioremediation of contaminated soil and marine oil pollutants. Degradation of pesticides - DDT and Propanil. Role of microbes in e-waste management and plastic degradation.	3	3										
Instructional Hours			12										
Suggested Learning Methods: Video lectures													
Total Hours			60										
Text Books	<ol style="list-style-type: none"> Madigan, B. and B.S. Stahl. Brock Biology of Microorganisms, 15th Edition, Perason, 2021. Vijaya Ramesh K. Environmental Microbiology, MJP Publishers, 2017. Grant WD., Long PF. Environmental Microbiology, Springer, 2013. 												
Reference Books	<ol style="list-style-type: none"> Watson, J.D., T.A. Baker, S.P. Bell, A. Gann, M. Levine and R. Losick. Molecular Biology of the Gene, Cold Spring Harbour Lab. Press, Pearson Pub., 7th edition, 2017. De Robertis, E.D.P. and E.M.F. De Robertis. Cell and Molecular Biology, Lippincott Williams and Wilkins, Philadelphia, 8th edition, 2006. 												
Web. URLs	<ol style="list-style-type: none"> https://www.easybiologyclass.com/molecular-biology-online-tutorials-lecture-notes-study-materials/ https://cdn.intechopen.com/pdfs/21996/InTech-Biodegradation_of_pesticides.pdf 												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	M	H	M	L	L	M	H	L	H
CO2	M	M	M	H	M	H	H	M	M	M	H	M	H
CO3	M	H	H	M	H	M	H	M	M	H	M	L	M
CO4	H	H	M	H	H	M	H	H	H	M	H	M	M
CO5	M	H	H	H	M	H	H	H	H	L	H	M	M
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. S. Esath Natheer							Dr. M. Thangavel						

Course Code		Title	
24U3MBP411		Core Paper XI – Environmental and Agricultural Microbiology Practical	
Semester: IV		Credits: 3	CIA: 30 Marks
		ESE: 45 Marks	
Course Objective		To teach a variety of techniques used in Environment and agriculture while conducting discovery-based research.	
Course Category		Skill Development / Employability	
Development Needs		Global	
Course Description		Students will develop skills on biochemical test, isolation and separation of DNA and RNA. Analyse basic concept of mutation	
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Outline the key concept of microbes in air.	Lecture / Hands on	Performance
CO 2	Relate the knowledge on environment and its sampling techniques.	Lecture / Hands on	Observation
CO 3	Examine and quantification of microorganisms in soil.	Lecture / Hands on	Performance
CO 4	Apply knowledge on techniques in isolation of microbes from soil environment	Lecture / Hands on	Performance
CO 5	Analyse algae and fungi from soil.	Lecture / Hands on	Observation
Offered by		Microbiology	
Course Content		Instructional Hours / Week: 4	
Exp No	Experiments		
	ENVIRONMENT		
1.	Microbial sampling of air from various sources – indoor, outdoor and hospital environment.		
2.	Analysis of water samples – Biological parameters: i). Determination of dissolved oxygen, ii) Determination of BOD, iii) Determination of COD.		
3.	Water analysis by MPN technique – presumptive, confirmed and completed coliform test.		
	AGRICULTURE		
4.	Isolation of microorganisms from soil (bacteria and fungi).		
5.	Isolation and identification of <i>Rhizobium</i> from root nodule of legumes.		
6.	Isolation and identification of <i>Azospirillum</i> from soil sample.		
7.	Isolation of blue green algae and their microscopic observation.		
8.	Microscopic examination of VAM infection.		
		Total Hours	60 Hrs
Text Books		1. James G. Cappuccino, Chad T. Welsh, Microbiology: A Laboratory Manual , Pearson Higher Education & Professional Group, 2017. 2. Stefan Surzycki, Basic Techniques in Molecular Biology , Springer, 2012. 3. Janice Speshock, Microbiology Lab Manual , Kendall Hunt Publishing Company, 2020.	

Reference Books		1. Susan Carson, Sue Carson, Heather Miller. Molecular Biology Techniques: A Classroom Laboratory Manual , Elsevier, 2012. 2. Sue Carson, Heather B. Miller, Melissa C. Srougi, Molecular Biology Techniques: A Classroom Laboratory Manual , Academic Press, 4 th edition, 2019.													
Web. URLs		https://books.google.co.in/books/about/Molecular_Biology_Techniques.html?id=emvJWX-2t9kC&redir_esc=y													
Tools for Assessment (30 Marks)															
Laboratory Performance							Test - I	Test - II	Observation notebook	Total					
Level of engagement in lab	Preparation		Result												
4	4		4		7			7			4		30		
Mapping															
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	H	M	M	M	M	M	M	H	M	L	M	M	M		
CO2	H	H	H	H	M	M	H	H	H	L	L	M	H		
CO3	H	H	M	M	H	H	H	H	H	M	L	L	H		
CO4	H	H	H	M	M	H	M	H	H	L	L	L	H		
CO5	H	H	H	H	M	H	H	H	M	M	M	L	H		
H-High; M-Medium; L-Low															
Course designed by							Verified by Chairman								
Dr. S. Esath Natheer							Dr. M. Thangavel								

Course Code	Title		
23U3MTA404	Allied Paper – IV: Biostatistics		
Semester : IV	Credits: 3	CIA : 20 Marks	ESE: 55 Marks
Course Objective	This course introduces the basic Statistical concepts that are applied in Biosciences to enable the students to learn the Statistical measures and their applications.		
Course Category	Skill Development		
Development Needs	Global		
Course Description	It provides a overview of Statistical methods for analyzing corrected data produced by longitudinal measures take over time		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Describing the method of data collection and presentation	Group learning/ Lectures.	Assignment
CO 2	Memorizing different Measures of Central Tendency and Measures of Dispersion	Peer Teaching/ Lectures	Unit Test
CO 3	Distinguishing different Statistical situations using Sampling Techniques	Lectures/ Tutorial	Seminar
CO 4	Executing one way and two way analysis using Analysis of Variance	Group learning/ Lectures	Assignment
CO 5	Constructing the equation of a Trend Line using Regression analysis	Video Lectures/ Lectures	Quiz
Offered by	Mathematics		
Course Content	Instructional Hours / Week : 3		
Unit	Description	Text Book	Chapter s
I	Introduction to Biostatistics: Definition – Application – Characteristics – Limitation – Data collection – Classification – Tabulation and frequency distribution.	1	1,2,4,6, 7,8
	Diagrammatic and Graphical Representation of data.		
Instructional Hours			9
Suggested Learning Methods : Problem Solving Practice			
II	Measures of Central tendency: Mean Median and Mode	1	9
	Measures of dispersion: Range, Quartile Deviation – Standard deviation – Co-efficient of variation.		10
Instructional Hours			9
Suggested Learning Methods : Seminar			
III	Correlation: Introduction – Types of correlation – Scatter diagram – Karl Pearson's co-efficient of Correlation – Coefficient of determination – Spearman's Rank Correlation.	1	12
	Regression Analysis - Regression Coefficients – Properties –Linear Regression.		13
Instructional Hours			9
Suggested Learning Methods : Problem Solving Practice			
IV	Sampling Techniques: Introduction – Methods of Sampling – Sampling and Non-Sampling errors.		

	Hypothesis Tests: Standard Error – Tests of Significance based on Large samples, ‘t’ and ‘F’					1	20						
Instructional Hours							9						
Suggested Learning Methods : Seminar													
V	Test of Significance – Chi Square Test					1	21						
	Analysis of Variance: One way and Two way Classifications.					2	9						
Instructional Hours							9						
Suggested Learning Methods : https://www.youtube.com/watch?v=ITf4vHhyGpc													
Total Hours							45						
Text Books	<ol style="list-style-type: none"> R.S.N. Pillai, V.Bagavathi, Statistics Theory and Practice, S.Chand & Sons 8th edition 2016 Unit-1 - Chapter 1,2,4,6,7,8; Pg.No:15-18, 27-37,50-99, 100-122 Unit-2 - Chapter 9,10;Pg.No: 124-170,180-193,244-250,259-273,279-282 Unit-3 - Chapter 12,13; Pg.No: 396-411, 413-420, 425-430,465-525 Unit-4 - Chapter 20 ; Pg.No: 810-846 Unit-5 - Chapter 21; Pg.No: 847-870 Irfan Ali Khan and Atiya Khanum, Fundamentals of Biostatistics, Ukaaz publications, Second Revised Edition, 2004. Unit-5 - Chapter 9 ; Pg.No: 344-353 												
Reference Books	<ol style="list-style-type: none"> Wayne W. Daniel, Chad L. cross, Biostatistics: A Foundation for Analysis in health sciences, John Wiley, 10th Edition, 2012. Dr. P.N. Arora and Dr. P.K. Malhan, Bio Statistics, Himalaya Publishing House, Revised Edition, 2006 												
Web. URLs	<ol style="list-style-type: none"> https://youtu.be/AbHn39y8eUo https://youtu.be/fNLeogEjMmM https://youtu.be/OXIpbKpOHxk 												
Tools for Assessment (20 Marks)													
CIA I	CIA II	Model	Assignment	Seminar	Quiz	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	L	M	H	M	M	L	M	H	M	M	L
CO2	M	H	M	M	M	H	M	H	M	M	H	M	H
CO3	L	H	M	M	M	M	L	H	M	M	M	L	H
CO4	H	H	H	M	H	H	M	M	M	H	H	M	M
CO5	H	H	H	M	H	M	M	L	M	H	M	M	L
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Ms. S. Ruth Kethsial							Dr. T. Chandrapuspham						

Course Code		Title	
23U3CNR405		Allied Paper V – MS Office Practical	
Semester: IV		Credits: 2	CIA: 20 Marks
		ESE: 30 Marks	
Course Objective		To enable the students to learn and gain knowledge about MS Office	
Course Category		Skill Development / Employability	
Development Needs		Global	
Course Description		The course encompasses the essential skills for using word processing tool, working with spreadsheets, and able to know building databases along with preparing presentations.	
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the functions of Word, Excel and PowerPoint	Demonstration	Performance
CO 2	Apply built in functions and formulas in excel	Demonstration	Observation
CO 3	Use chart representation for data	Demonstration	Performance
CO 4	Employ various test using Microsoft Excel	Demonstration	Performance
CO 5	Summarize the model of PowerPoint Presentation	Demonstration	Observation
Offered by	Computer Science		
Course Content		Instructional Hours / Week: 2 & 2	
Exp No	Experiments		
1.	Create a MS-Word document to prepare your resume.		
2.	Create a MS – Word Table to prepare student Mark list		
3.	Calculate the Mean, Median and Mode for the given data using Microsoft Excel Worksheet.		
4.	Find the range, Quartile deviation, Standard Deviation and Co-efficient of variance for the given data using Microsoft Excel Worksheet.		
5.	Find Pearson product moment Correlation coefficient for the given data using Microsoft Excel Worksheet.		
6.	Find T-test, F-test and Chi-square test for the given data using Microsoft Excel Worksheet.		
7.	Create a MS-PowerPoint presentation to demonstrate Chart.		
8.	Prepare a PowerPoint presentation. Presentation should contain 5 Slides with proper heading and content (use picture, Table and Charts)		
		Total Hours	60
Text Books	Chetan Srivastava, “Fundamentals of Information Technology”, Kalyani Publishers, New Delhi, Edition 2002.		
Reference Books	Dinesh Maidasani, “Learning Computer Fundamentals, MS Office and Internet and Web Tech”, Firewall Media, 2005.		
Web. URLs	https://support.microsoft.com/en-us/training		
Tools for Assessment (20 Marks)			

Application of Logic		E-Program Creativity			E-Program debugging		Test - I		Test - II		Observation notebook		Total
3		3			3		4		4		3		20
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	H	M	H	H	M	H	-	-	-	-	M
CO2	M	M	M	M	H	M	H	M	-	-	-	-	L
CO3	H	H	M	H	M	M	M	H	-	-	-	-	M
CO4	M	H	L	M	H	H	H	M	-	-	-	-	L
CO5	M	M	H	H	M	H	M	H	-	-	-	-	M
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Mr. M. Senthil Kumar							Dr. N. Kavitha						

Course Code	Title		
23U4MBS402	Skill Enhancement Course VI – Biofertilizers and Biopesticides		
Semester: IV	Credits : 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	Students will impart knowledge on microorganisms as an alternative to synthetic fertilizers and pesticides to increase the soil fertility, disease and pest control in agriculture is gaining prominence.		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Learn about the benefits of microorganisms used as biofertilizers and biopesticides in the agricultural field to save the cost of production, increase the yield and methods involved in their production for environment sustainability.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Acquire knowledge on bacterial biofertilizers for sustainable agriculture.	Lecture	Assignment
CO 2	Demonstrate the use of cyanobacteria and Azolla in wetland crop improvement.	Flipped Classroom	Assignment
CO 3	Recognize the protagonist of mycorrhizae in crop improvement.	Video Lessons	Quiz
CO 4	Understand about the concepts in usage of bacteria as biopesticides and their mode of action.	Tutorial	Seminar
CO 5	Learn about the usage of viruses as biopesticides and their advantages.	Lecture / Case Studies	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 3	
Unit	Description	Text Book	Chapters
I	Bacterial biofertilizers: General account of the microbes used as biofertilizers for various crop plants and their advantages over chemical fertilizers. Isolation, characteristics, types, inoculum production and field application - <i>Rhizobium</i> , <i>Azotobacter</i> , <i>Azospirillum</i> and <i>Frankia</i> .	1	3
	Phosphate Solubilizers: Phosphate solubilizing microbes – Isolation, characterization, mechanism of phosphate solubilization, mass inoculum production, field application.	3	1, 2, 9 & 10
Instructional Hours			9
Suggested Learning Methods: Video lectures			
II	Algal biofertilizers: Isolation, characteristics, types, inoculum production and field application of Cyanobacteria (Blue Green Algae) and Azolla: Azolla and <i>Anabaena azollae</i> association, nitrogen fixation, factors affecting growth, blue green algae and Azolla in rice cultivation.	2	11
Instructional Hours			9
Suggested Learning Methods: Model and presentation			
III	Fungal biofertilizers: Mycorrhizae - Ecto and Endomycorrhiza. Concept of Mycorrhiza, VAM - Isolation, characteristics, preparation, mass production and field application.	2	3
Instructional Hours			9

Suggested Learning Methods : Video lectures and demonstration														
IV	Bacterial Biopesticides: History and concept, definition, classification, concept, scope, production and field application - <i>Bacillus thuringiensis</i> , <i>Trichoderma viride</i> . Mechanism of action of BT toxin.								4	4 & 5				
Instructional Hours											9			
Suggested Learning Methods : Model presentation and field visit														
V	Viral Biopesticides: Classification, characterization, production and field application - Baculovirus and Polyhedrosis Granulosis virus. Biosafety in usage of viral pesticides. Advantages of biopesticides over synthetic pesticides.								4	6 & 7				
Instructional Hours											9			
Suggested Learning Methods : Field visit and Video lectures														
Total Hours											45			
Text Books		<ol style="list-style-type: none"> 1. Panda H. Manufacture of Biofertilizer and Organic Farming. Asia Pacific Business Press Inc., Delhi, 2011. 2. Kaushik B.D., Deepak Kumar and Md. Shamim. Biofertilizers and Biopesticides in Sustainable Agriculture. Apple Academic Press. 2020. 3. Khan, M. S., A. Zaidi and J. Musarrat. Phosphate Solubilizing Microorganisms. Springer, Cham. 2014 4. Saleem, F. and A. R. Shakoori. Development of Bioinsecticide, Lap Lambert Academic Publishing GmbH KG, 2012. 												
Reference Books		<ol style="list-style-type: none"> 1. Deshmukh, A. M., P. P. Dixit and R. M. Khobragade. Handbook of Biofertilizers and Biopesticides. Oxford Book Co., Jaipur, India, 2007. 2. Giri, B., Ram Prasad, Qiang-Sheng Wu and A. Varma. Biofertilizers and Sustainable Agriculture, Springer Nature Switzerland, 2019. 3. Aggarwal, S.K. Advanced Environmental Biotechnology, APH publication, 2005. 												
Web. URLs		https://vikaspedia.in/agriculture/agri-inputs/bio-inputs/bioinputs-for-nutrient-management/biofertilizers												
Tools for Assessment (20 Marks)														
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total								
4	4	5	2	2	3	20								
Mapping														
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	H	M	M	H	L	H	H	H	H	H	M	M	H	
CO2	H	M	M	H	M	M	M	M	H	L	L	L	H	
CO3	H	M	H	H	M	M	M	H	H	H	M	M	H	
CO4	H	H	H	H	M	M	H	H	H	H	L	M	H	
CO5	H	H	H	H	L	M	H	H	H	L	M	L	H	
H-High; M-Medium; L-Low														
Course designed by							Verified by Chairman							
Dr. S Esath Natheer							Dr. M. Thangavel							

Course Code	Title		
22U4NM4BT2	Part IV : Basic Tamil – II (அடிப்படைத்தமிழ் - II)		
Semester: IV	Credits: 2	CIA: 50 Marks	
(Common to all UG Programmes)			
Course Objective	அற இலக்கியங்களை அறிமுகப்படுத்துதல்.		
Course Category	Skill Development (மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்)		
Development Needs	Regional (தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்)		
Course Description	மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	அற இலக்கிய அறிவு பெறுதல் - சிறுகதைகள் வழி சமூக அறிவு பெறுதல்.	விரிவுரை / காணொளி வகுப்பு	ஒப்படைவு
CO 2	தமிழ் எழுத்துக்கள் அறிமுகம் செய்தல் மற்றும் வாசித்தல் ஆகியவற்றின் பயன்பாடு.	குழு விவாதம்/ விரிவுரை	கருத்தரங்கு
CO 3	பிறமொழி அறிவுத் திறன் மேம்படச்செய்தல்.	விரிவுரை/காணொளி ப்பட விளக்கம்	ஒப்படைவு
CO 4	மொழிப்பெயர்ப்புத் திறன் மேம்படச்செய்தல்.	விரிவுரை/ குழு விவாதம்	குழுத்திட்டம்
CO 5	வார்த்தை அமைக்கும் திறன் பெறச்செய்தல்.	விரிவுரை / குழுத்திட்டம்	குழுத்திட்டம்
Offered by	தமிழ்த்துறை		
Course Content : Basic Tamil – II (அடிப்படைத்தமிழ் II)		Instructional Hours / Week : 2 Hours	
Unit	Description	Text Book	Chapters
I	நீதி நூல்கள்	1.பாரதியார் ஆத்திச்சூடி 2.கொன்றைவேந்தன்	1.1 1 முதல் 12 வரிகள் 2.1 1 முதல் 7 வரிகள்
Instructional Hours		6 Hours	
Suggested Learning Methods : நீதிநூல்களின் சிறப்பினை அறியும் பயன் பெற்றமை			
II	பதினெண் கீழ்க்கணக்கு நூல் (திருக்குறள்)	திருக்குறள்	2.1.கடவுள் வாழ்த்து -அகர முதல எனத் தொடங்கும்... அதி 1 குறள் -1 2.2. வான் சிறப்பு- நீரின்றி அமையாது உலகு. அதி-2.குறள் - 10 2.3. அன்புடைமை - அன்பின் வழியது உயிர்நிலை. அதி - 8.குறள் - 10 2.4. கல்வி - கண்ணுடையார் என்பர் . அதி-40 குறள்-393 2.5. இனியவை கூறல் - இனிய உளவாக இன்னாத அதி10. குறள் -10
Instructional Hours		6 Hours	
Suggested Learning Methods : திருக்குறளின் சிறப்பினை அறிந்தமை			
III	கிராமியக் கதைகள்	கிராமியக் கதைகள்	3.1.பரமார்த்தக்குரு கதைகள் 3.2.நாட்டுப்புறக் கதைகள் அறிமுகம்
Instructional Hours		6 Hours	
Suggested Learning Methods : கிராமியக் கதைகளின் கதை அமைப்பினை அறியும் வாய்ப்பு பெற்றமை			

IV	மொழிப்பயிற்சி	மொழிப்பயிற்சி	4.1. பிறமொழிச் சொற்களுக்கு தமிழ்ச்சொல் எழுதுதல்										
Instructional Hours			6 Hours										
Suggested Learning Methods :			தமிழ்ச்சொல் எழுதும் திறன் பெற்றமை										
V	எழுத்துப்பயிற்சி	எழுத்துப்பயிற்சி	5.1 தன்விவரம் எழுதுதல் 5.2 பெயர், கல்லூரி விவரம் எழுதச்செய்தல்										
Instructional Hours			6 Hours										
Suggested Learning Methods :			பிறமொழி கலப்பு இன்றி தமிழ்ச்சொல் எழுதும் திறன் பெற்றமை										
Total Hours			30 Hours										
Text Books		1. இளங்கலை தமிழ் மாணவர்களுக்குரிய பாடநூல் “அரிச்சுவடி” 2. தொகுப்பு: தமிழ்த்துறை, நேரு கலை மற்றும் அறிவியல் கல்லூரி, கோயம்புத்தூர்.											
Reference Books		1. ஓளவையார் ஆத்திச்சூடி மணிவாசகர் பதிப்பகம், கோயம்புத்தூர் இராஜவீதி, 01. 2. திருக்குறள் - பரிமேலழகர் உரை, மணிவாசகர் பதிப்பகம், சென்னை - 600018.											
Web. URLs		https://youtu.be/d5be921uxhE , https://youtu.be/Wtg-GJpfXTM .											
Tools for Assessment (50 Marks)													
CIA I	CIA II	CIA III	Seminar	Assignment	Group Project	Total							
8	8	10	8	8	8	50							
Mapping													
CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	H	L	H	M	H	H					
CO2	L	L	H	L	M	M	L	H					
CO3	H	L	H	L	L	M	M	H					
CO4	H	L	M	L	L	M	H	M					
CO5	H	L	H	L	M	M	H	H					
H-High; M-Medium; L-Low													
Course designed by							Verified by						
Dr. S. Satheesh Kumar							Dr. A. Sridevi						

Course Code	Title		
22U4NM4AT2	Part IV : Advanced Tamil – II (சிறப்புத்தமிழ் -II)		
Semester: IV	Credits: 2	ESE: 50 Marks	
Course Objective	நூல்களின் வழி அறச் சிந்தனைகளை உருவாக்குதல் செம்மொழியினைச் செம்மைப்படுத்துதல்.		
Course Category	Skill Development (மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்)		
Development Needs	Regional (தமிழ் மொழியின் அவசியத்தை உணர்த்துதல்)		
Course Description	மாணவர்களின் மொழித்திறனை ஊக்குவித்தல்		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	அறச்சிந்தனைகள் பெறுதல் மற்றும் இலக்கண வழக்கு முறைகளைப் பெறுதல்.	விரிவுரை/காணொளிப்பட விளக்கம்	கருத்தரங்கு
CO 2	கடிதம் எழுதுதல் மற்றும் மொழியறிவைப் பெறுதல்	விரிவுரை/ குழு விவாதம்	ஒப்படைவு
CO 3	படைப்பாக்கத்திறன் அறிவுபெறச்செய்தல்	விரிவுரை	கருத்தரங்கு
CO 4	தகவல் தொடர்பியலுக்கான கடிதம், அமைவுத்திறன் பெறச்செய்தல்	விரிவுரை/ குழு விவாதம்	குழுத்திட்டம்
CO 5	மொழியைப் பிழையின்றிப் பேச, எழுதும் திறன் பெறச்செய்தல்	விரிவுரை/காணொளிப்பட விளக்கம்	ஒப்படைவு
Offered by	தமிழ்த்துறை		
Course Content : Advanced Tamil – II (சிறப்புத்தமிழ் -II)		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	பதினெண் கீழ்க்கணக்கு நூல்கள்	1.திருக்குறள் 2.நாலடியார்	1.1. கூடாநட்பு 1.2. செய்நன்றியறிதல் - நாலடியார் 1.3. கல்வி (131,132 செய்யுள்கள்)
Instructional Hours			6
Suggested Learning Methods : திருக்குறளின் சுவை அறியும் வாய்ப்பு பெற்றமை			
II	சிறுகதை	1.வெ.இறையன்பு - பூனாத்தி சிறுகதைகள்	2.1 சேவியர் வாத்தியார் 2.2 தூரிகை
Instructional Hours			6
Suggested Learning Methods : சிறுகதைகளின் சுவை அறியும் வாய்ப்பு பெற்றமை			
III	இலக்கணம்	இலக்கணப் பயிற்சி ஏடு	3.1 எழுத்தும் சொல்லும் 3.2 சுட்டெழுத்துகள் 3.3 சொற்களைச் சரியாகப் பயன்படுத்தும் முறை 3.4 வினைச்சொற்கள், பெயர்ச்சொற்கள் 3.5 வினா எழுத்துகள்
Instructional Hours			6
Suggested Learning Methods : இலக்கணப் பிழை இன்றி எழுதும் பயிற்சி பெற்றமை			
IV	வழக்கறிதல்	இலக்கணம்	மரபு வழக்கு - இயல்பு வழக்கு, தகுதி வழக்கு - அறிதல்
Instructional Hours			6
Suggested Learning Methods : வழக்குகள் பற்றி முழுமையாக அறியும் பயிற்சி பெற்றமை			

V	படைப்பாற்றல் பயிற்சி	இலக்கிய வரலாறு	கவிதை-சிறுகதை-நூல் மதிப்பீடு எழுதுதல்
Instructional Hours			6
Suggested Learning Methods : மதிப்பீடு செய்யும் பயிற்சி பெற்றமை			
Total Hours			30 Hrs
Text Books	1. இளங்கலைத்தமிழ் மாணவர்களுக்குரிய பாடநூல்“திரட்டு” தொகுப்பு: தமிழ்த்துறை, நேரு கலை மற்றும் அறிவியல் கல்லூரி, கோயம்புத்தூர்.		
Reference Books	1. திருக்குறள் –பரிமேலழகர் உரை, மணிவாசகர் பதிப்பகம், சென்னை - 018 2. வெ.இறையன்பு - புனாத்தி சிறுகதைகள், விஜயா பதிப்பகம், கோவை.		
Web. URLs	https://youtu.be/_vB59q6At8s , https://youtu.be/aSvxO_rV9eQ .		
Course designed by		Verified by	
Dr. S. Satheesh Kumar		Dr. A. Sridevi	

Course Code	Title	
22U4NM4GEN	Non Major Elective : General Awareness	
Semester : IV	Credits : 2	ESE : 50 Marks

(Common to all UG Programmes)

Course Objective:

Enable the students to learn General knowledge and prepare for different competitive exams.

Course Outcomes:

CO1	Determine Verbal Aptitude, Numerical Aptitude and Logical Reasoning
CO2	Recall basic Science, history, Tamil, Computer, Commerce concepts which would help to crack competitive Examinations
CO3	Acquire time Management skills to attempt competitive Examinations
CO4	Develop Aptitude and problem-solving skills
CO5	Gain Knowledge about Current Affairs

Course Content

Instructional Hours / Week : 2

S. No.	Topics
1.	Verbal Aptitude
2.	Numerical Aptitude and Logical Reasoning
3.	Abstract Reasoning
4.	Tamil and Other Literature
5.	General Science and Technology
6.	Computer
7.	Economics and Commerce
8.	History and Freedom Struggle
9.	Sports
10.	Current Affairs
Total Hours: 30	

Text Book: “General Awareness”, compiled by Nehru Arts and Science College, Coimbatore

Mapping

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	-	-	H	-	-	L	-	-	-	-	-
CO2	H	L	-	-	H	-	-	L	-	-	-	-	-
CO3	H	L	-	-	H	-	-	L	-	-	-	-	-
CO4	H	L	-	-	H	-	-	L	-	-	-	-	-
CO5	H	L	-	-	H	-	-	L	-	-	-	-	-

H-High; M-Medium; L-Low

Course Designed by	Verified by HOD	Checked by	Approved by Chairman
Ms. P. Sheeba Maybell	Dr. T. Chandrapushpam		

VBOE

Value Based Open
Elective

Course Code		Title	
22U4VBOE01		Value Based Open Elective Course : Design Ecosystem	
Semester: IV		Credits: 2	ESE: 50 Marks
Course Objective		To gain the knowledge on ecosystem and environmental sustainability	
Course Category		Crosscutting Issue : Environment And Sustainability	
Development Needs		Global	
Course Description		Design ecosystem describes about the components, types, structural and functional unit of ecology where the living organisms interact with each other and the surrounding environment.	
Course Outcomes		Teaching Methods	
CO 1	Understand about the basic concepts of ecosystem and environmental planning	Lecture / Video Lessons	
CO 2	Gain knowledge of challenges and design process of ecosystem	Lectures / Video Lessons	
CO 3	Understand about functions and flow of energy in ecosystem	Case study / Model	
CO 4	Analyse about process and mechanism of ecosystem control	Tutorial / Group Discussion	
CO 5	Demonstrate about green infrastructure and regulatory framework	Lecture / Tutorial	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Sustainable Human Dominated-Ecosystem and Environmental planning: Introduction to Ecology & environmental sciences; Principles and Scope of Ecology. Axioms of Ecological Engineering, Sustainable design principles, Global population dynamics, Human dominated earth.	1	1
Instructional Hours			6
Suggested Learning Methods: Video Lectures			
II	Designing Ecosystem services & Biomes: Design challenges and needs, the design process, biomes, ecoregions, other land classification systems.	1	3 & 4
Instructional Hours			6
Suggested Learning Methods: Video Tutorials			
III	Energy and mass flow through ecosystem: Structure and Functions of Ecosystems - Abiotic and Biotic components, Flow of energy and cycling of materials; water, carbon, nitrogen and phosphorus	3	2
Instructional Hours			6
Suggested Learning Methods : Group Discussion			
IV	Ecosystem control: Population control process, community control process. Stream restoration design -hydrology, sedimentology, geomorphology, habitat, riparian corridor and	2	6

	construction.		
Instructional Hours			6
Suggested Learning Methods : Group Discussion			
V	Green infrastructure design: Green infrastructure network, sustainable cities initiatives, agricultural sustainability indicators, surrounding environmental, ecological and social justice; environmental ethics, issues and possible solutions	3	4
Instructional Hours			6
Suggested Learning Methods : Online Tutorial			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. Matlock, M. D. and M. Robert. Ecological Engineering Design: Restoring and Conserving Ecosystem Services. JohnWiley& Sons, Inc. 2011. 2. Meffe, G.K., L. Nielson, R. L. Knight and D. Schenborn. Ecosystem Management: Adaptive, Community-Based Conservation. Island Press. 2012. 3. Elliot, D. 2003. Energy, Society and Environment, Technology for a Sustainable Future. Routledge Press. 		
Reference Books	<ol style="list-style-type: none"> 1. Sim Van Der Ryn and S. Cowan. Ecological Design. Island Press, 1996. 2. Neeraja, N. Environment and Ecology: A Dymanic Approach, 3rd Edition. GKP Books Catalogue. 2018. 		
Web. URLs	<ol style="list-style-type: none"> 1. https://www.nationalgeographic.org/encyclopedia/ecosystem/ 2. https://www.environmentandecology.com/ 		
Course designed by		Verified by Chairman	
Dr. S. ESATH NATHEER		Dr. M. THANGAVEL	

Course Code	Title		
22U4VBOE02	Value Based Open Elective Course: Design Thinking		
Semester: IV	Credits: 2	ESE:50Marks	
Course Objective	Inculcate the fundamental concepts of design thinking and develop the students as a good designer by imparting creativity and problem solving ability		
Course Category	Crosscutting Issue : Professional Ethics		
Development Needs	Local, National and Global		
Course Description	The course aims to provide introduction to the basic concepts and techniques of design thinking and methods of implementing design thinking in the real world.		
Course Outcomes		Teaching Methods	
CO 1	Learn the basic concepts of design thinking	Direct Instruction	
CO 2	Develop the skill of applying the design thinking	Direct Instruction	
CO 3	Learn the business uses of design thinking	Video Lessons	
CO 4	Understand the variety of approaches within the design thinking discipline	Direct Instruction	
CO 5	Impart knowledge in design thinking mindset	Direct Instruction	
Course Content		Instructional Hours / Week: 2	
Unit	Description	Text Book	Chapters
I	Design Thinking Background Definition of Design Thinking, Variety within the Design Thinking Discipline, Design Thinking Mindset	1	1
Instructional Hours			06
Suggested Learning Methods: Brain Storming			
II	Design Thinking Approach Fundamental Concepts – Empathy, Ethnography, Divergent Thinking, Convergent Thinking, Visual Thinking, Assumption Testing, Prototyping, Time for Learning and Validation	1	5,1,3
Instructional Hours			06
Suggested Learning Methods :Learning by Teaching			
III	Design Thinking Resources – People, place, material, organizational fit Design Thinking Processes - Numerous Approaches, Double Diamond Process, 5-Stage, School Process, Designing for Growth Process, Role of Project Management	1	5,6
Instructional Hours			06
Suggested Learning Methods :DIY Activities			

IV	Design Thinking in Practice I: Process Stages of Designing for Growth - Design Thinking Tools and Methods – I- Purposeful Use of Tools and Alignment with Process, Visualization, Journey Mapping	1	6
Instructional Hours			06
Suggested Learning Methods: Case Method			
V	Design Thinking in Practice II: Design Thinking Tools and Methods – II- Value Chain Analysis, Mind Mapping, Brainstorming, Concept Development, Assumption Testing, Rapid Prototyping, Customer Co-Creation, Learning Launch	2	8
Instructional Hours			06
Suggested Learning Methods :Project Based Learning			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. “Designing for growth: A design thinking tool kit for managers”, by Jeanne Liedtka and Tim Ogilvie., 2011, ISBN 978-0-231-15838-1 2. “The design thinking playbook: Mindful digital transformation of teams, products, services, businesses and ecosystems”, by Michael Lewrick, Patrick Link, Larry Leifer., 2018, ISBN 978-1-119-46747-2 		
Reference Books	<ol style="list-style-type: none"> 1. “Presumptive design: Design provocations for innovation”, by Leo Frishberg and Charles Lambdin., 2016, ISBN: 978-0-12-803086-8 2. “Systems thinking: Managing chaos and complexity: A platform for designing business architecture.”, “Chapter Seven: Design Thinking”, by JamshidGharajedaghi, 2011, ISBN 978-0-12-385915-0 		
Web. URLs	<ol style="list-style-type: none"> 1. https://www.designcouncil.org.uk/news-opinion/design-process-what-double-diamond 		
Course designed by		Verified by Chairman	
M. NANDHINI		Dr. S. JAYAPRIYA	

Course Code	Title		
22U4VBOE03	Value Based Open Elective Course : Disaster Management		
Semester: IV	Credits: 2	ESE: 50 Marks	
Course Objective	To learn knowledge about disaster and risk and apply the same in the time of any disaster.		
Course Category	Crosscutting Issue : Environment And Sustainability		
Development Needs	National		
Course Description	This course is designed to provide students with a comprehensive understanding of the concepts, theories, and practices of disaster and risk management. Students will learn how to identify and assess risks, develop emergency plans, and mitigate the impact of disasters on communities and organizations.		
Course Outcomes		Teaching Methods	
CO 1	Understand different types of disasters and their impact on individuals and communities.	Lecture/ Demonstration	
CO 2	Analyze the disaster management scenario in India, the policy framework, and the role of different stakeholders in reducing disaster risk and building resilience	Lecture/ Case Studies	
CO 3	Understand the concepts of risk and vulnerability in disaster management and analyze the different approaches to disaster risk reduction.	Lectures / Video Lessons	
CO 4	Analyze the concept and nature of disaster preparedness, different components of a disaster preparedness plan	Tutorial / Case Studies	
CO 5	Narrate the emergency responses to be taken by the national disaster management force and the practical training process on disaster management	Lecture / Class Projects	
Course Content		Instructional Hours / Week:2	
Unit	Description	Text Book	Chapters
I	Introduction on Disaster Definitions and Terminologies used in Disaster Management, Natural Disaster: Flood, Cyclone, Earthquakes, Landslides, epidemic or Pandemic etc. Man-made Disaster: Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea, Rail & Road), Structural failures, War and terrorism. Case studies will be examined for each natural & Man-made disaster.	1	1
Instructional Hours			6
Suggested Learning Methods: Power Point Presentation			
II	Disaster management in India Hazard and Vulnerability Profile India, Disaster Management Indian scenario, India's vulnerability profile, Disaster Management Act 2005 and Policy guidelines, National Institute of Disaster Management, National Disaster Response Force (NDRF),	1	2
Instructional Hours			6
Suggested Learning Methods: PPT and Video Lecture			

III	Risk and Vulnerability Analysis Risk: Assessing Disaster Risk, Disaster Risk Reduction, Vulnerability: Its concept and analysis, Strategic Development for Vulnerability Reduction, Climate Variability & Disaster Risk, Industrial hazard and Risk Management	1	3
Instructional Hours			6
Suggested Learning Methods: Video Lecture			
IV	Disaster Preparedness Concept and Nature, Disaster Preparedness Plan, Prediction, Early Warnings and Safety Measures of Disaster, Role of Information, Education, Communication, and Training, Role of Government, International and NGO Bodies.	1	4
Instructional Hours			6
Suggested Learning Methods: PPT and Group Activity			
V	Emergency Response and 3Rs Emergency response, 3Rs (Rehabilitation, Reconstruction and Recovery), Government and NGO involvement, Public health management, and the role of Educational Institutions in Disaster management.	1	5
Instructional Hours			6
Suggested Learning Methods: Laboratory Practice			
Total Hours			30
Text Books	1. Disaster and Risk Management (2023), Notes Compiled by the Department of Criminology, Nehru Arts and Science College, Coimbatore		
Reference Books	<ol style="list-style-type: none"> 1. J. P. Singhal, "Disaster Management", Laxmi Publications, 2003. 2. M C Gupta, "Manual on Natural Disaster Management in India", NIDM, New Delhi, 2013 3. R K Bhandani, "An Overview on Natural & Man-made Disasters and their Reduction", CSIR, New Delhi, 2000 4. Dr. Mrinalini Pandey, "Disaster Management", Wiley India Pvt. Ltd, 2014. 5. National Disaster Management Authority Publications-Guidelines & Templates for Disaster Management 		
Course designed by		Verified by Chairman	
Dr. Aslam Moideen. C. A		Dr. Aslam Moideen. C. A	

Course Code	Title		
22U4VBOE04	Value Based Open Elective Course: Environmental Pollution and Waste Management		
Semester: IV	Credits:2	ESE:50 Marks	
Course Objective	To acquire deeper knowledge about Environmental Management Systems		
Course Category	Crosscutting Issue : Environment And Sustainability		
Development Needs	Global		
Course Description	Environmental Pollution and waste Management involves studying the management of any unnecessary resource use or release of substances into the water, land or air that could harm human health or the environment		
Course Outcomes		Teaching Methods	
CO 1	Understand the types of environmental pollutants	Lecture / Group Learning	
CO 2	Describe, develop and interpret methods of the Environmental Management Systems.	Lecture/ Online Tutorial	
CO 3	Critically evaluate methods and possibilities within Environmental Management Systems from asystems perspective.	Lecture/ Online Tutorial	
CO 4	Understand the effective management of environmental pollutants	Lecture/ Online Tutorial	
CO 5	Learn Environmental Auditing for various Industries/Projects.	Lecture/ Online Tutorial	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Introduction to Environmental pollutants, Types of pollutants, Biodegradable pollutants, Non-biodegradable pollutants; Air pollution, Water Pollution, Soil Pollution	1	1,2
Instructional Hours			6
Suggested Learning Methods: Industrial Visit			
II	Introduction to Environmental Management System basic definitions and terms, Framework for Environmental Management Systems, Approach for developing an Environmental Management System.	2	2, 4
Instructional Hours			6
Suggested Learning Methods :Web search			
III	The introduction and implementation of ISO 14001: environmental policy, planning, implementation and operation, checking, management review. Applications EMS in terms of Process flow chart, effluent Generation, composition and treatment of effluents from following industries – sugar, pulp and paper, electroplating, dairy, oil refineries, etc.	2	5
Instructional Hours			6
Suggested Learning Methods : Online tutorial			

IV	Introduction to Environmental Auditing, Category “A” & “B” types of projects. Procedures and Guidelines to conduct Environmental Audit. Plastic Pollution: Causes, impacts, and reduction strategies -Global issue of plastic pollution and innovative solutions	3	7
Instructional Hours			6
Suggested Learning Methods : Online tutorial			
V	Municipal Solid Waste Management: Collection, transportation, and disposal of solid waste - Examination of waste treatment technologies and waste-to-energy processes. E-waste Management: Challenges and recycling techniques for electronic waste - Discussion on the environmental and health hazards associated with improper e-waste disposal.	1	8
Instructional Hours			6
Suggested Learning Methods : Online tutorial			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. ISO 14001 Certification - Environmental Management Systems: A Practical Guide for Preparing Effective Environmental Management Systems Textbook Binding – Import, 10 Aug 1995 by W. Lee Kuhre (Author) 2. M. N Rao, “Waste Water Treatment” Oxford and IBH publishing Co. Pvt Ltd, 2007 3. Peavy, H.S, D.R. Rowe & T. George, “Environmental Engineering”, New York: McGraw Hill, 1987 		
Reference Books	<ol style="list-style-type: none"> 1. Christopher Sheldon and Mark Yoxon, “Installing Environmental management Systems – a step by step guide” Earthscan Publications Ltd, London, 1999. 		
Web. URLs	<ol style="list-style-type: none"> 1. https://www.anits.edu.in/online_tutorials/es/Unit%203.pdf 		
Course designed by		Verified by Chairman	
Dr. O. S. NIMMI		Dr. N. SARANYA	

Course Code	Title		
22U4VB0E05	Value Based Open Elective Course : History of Ancient India		
Semester: IV	Credits: 02		ESE : 50 Marks
Course Objective	To explore the rich and diverse history of ancient India, examining its civilizations, political systems and cultural achievements.		
Course Category	Employability		
Development Needs	Global		
Course Description	This course gives an in depth analysis of the Ancient Indian History marking the beginning of urban civilization in the Indian subcontinent.		
Course Outcomes		Teaching Methods	
CO 1	Understand the salient features of Indus valley civilization	Lecture	
CO 2	Evaluate the features Civilizations	Tutorial	
CO 3	Evaluate the rise of new movements	Lecture	
CO 4	Visualize the administration of Mauryas and the art and architecture of Mauryas	Tutorial	
CO 5	Identify the administration of Guptas and their contribution to University	Lecture	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Definitions - Nature and Scope of History - History and Its Relationship with other Social Sciences - Geographical Features of India Sources of Indian History: Pre- History Paleolithic, Mesolithic, Neolithic, Chalcolithic and Megalithic Cultures.	1 &4	1-5
Instructional Hours			6
Suggested Learning Methods : Lecture/Tutorial			
II	Indus Valley Civilization - Its Features & Decline; Early Vedic and Later Vedic Civilizations Vedic Literature Society Economy - Polity Religion.	2	2-4
Instructional Hours			6
Suggested Learning Methods : Lecture/Tutorial			
III	Rise of New Religious Movements Charvakas, Lokayathas, Jainism and Buddhism; Mahajanapadas - Rise of Magadha; Impact.	3	3
Instructional Hours			6
Suggested Learning Methods : Lecture/Tutorial			

IV	Foundation of the Mauryan Dynasty; Ashoka and His Dharma Polity Administration - Society Economy Religion Literature - Art and Architecture; Disintegration of the Mauryan Empire; Post-Mauryan Kingdoms - Indo-Greeks - Kushanas and Kanishka - Society Economy Literature Art and Architecture; The Satavahanas; Sangam Age Literary Development.	4	4 & 5
Instructional Hours			6
Suggested Learning Methods : Lecture/Tutorial			
V	Gupta Empire: A Brief Political Survey - Polity and Administration, Social and Economic Conditions, Agriculture and Land Grants - Feudalism, Caste System, Position of Women, Education, Literature Science and Technology, Art and Architecture - Harshavardana and His Achievements.	4	5
Instructional Hours			6
Suggested Learning Methods : Lecture/Tutorial			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. E.H. Carr, What is History? Penguin Books, England, 1990. 2. Majumdar, R.C., History and Culture of the Indian People, Vols. I, II & III. 3. Romila Thapar, Asoka and the Decline of the Mauryas, OUP, New Delhi, 1995. 4. Romila Thapar, Early India (From the earliest to AD 1300). 		
Reference Books	<ol style="list-style-type: none"> 1. Poonam Dalal : Ancient and Medieval India for UPSC & State Level Exam 		
Course designed by		Verified by Chairman	
S. KAVITHA		Dr. R. MALATHI	

Course Code		Title		
22U4VBOE06		Value Based Open Elective Course : Indian Knowledge System		
Semester: IV		Credits: 2	ESE: 50 Marks	
Course Objective		To make the students understand the knowledge system in India and apply it to their day to day life		
Course Category		Value Education		
Development Needs		National		
Course Description		This course will actively engage for spreading the rich heritage of our country and traditional knowledge in the field of Arts and literature, Agriculture, Basic Sciences, Engineering & Technology, Architecture, Management, Economics, etc		
Course Outcomes		Teaching Methods		
CO 1	Understand the History and an overview of Indian knowledge System.	Flipped Classroom		
CO 2	Interpret the Importance of Vedic Corpus and Philosophical System	Student Centric		
CO 3	Analyse the Foundational Concepts like Linguistics and and Number Systems.	Blended Mode		
CO 4	Interpret the concepts of Astronomy and Town Planning Architecture.	Flipped Classroom		
CO 5	Describe the Importance of Health, Wellness, Psychology and Administrative Governance	Case-Base		
Course Content		Instructional Hours / Week : 2		
Unit	Description	Text Book	Chapters	
I	Indian Knowledge System: An Introduction: Importance of Ancient Knowledge-Defining Indian Knowledge System –The Indian Knowledge System Corpus-A Classification Framework-History of Indian Knowledge System.	1	1	
			Instructional Hours	6
Suggested Learning Methods : Cooperative Learning				
II	The Vedic Corpus: Introduction to Vedas-The four Vedas. Philosophical System: Indian Philosophical System – Development and Unique Features-Vedic schools of Philosophy.	1	2 & 3	
			Instructional Hours	6
Suggested Learning Methods : Peer Learning				

III	<p>Linguistics: Component of a Language-Role of Sanskrit in Natural Language Processing.</p> <p>Mathematics: Unique Aspects of Indian Mathematics-Great Mathematicians and their Contributions-Arithmetic Calculations.</p>	1	5 & 8
Instructional Hours			6
Suggested Learning Methods : Group Learning			
IV	<p>Astronomy: Unique aspects of Indian Astronomy-Historical Development of Astronomy in India-Elements of the Indian Calendar</p> <p>Town Planning Architecture: Indian Architecture- A Historical Perspective –Town Planning-Unitary Building –Temple Architecture</p>	1	9 & 12
Instructional Hours			6
Suggested Learning Methods : Mind Mapping			
V	<p>Health, Wellness and Psychology: Ayurveda -Definition of Health-Tridosas-Relationships to Health-Disease-Disease Management-Yoga way of Life-Indian Approach to Psychology.</p> <p>Governance and Public Administration: Arthashastra Governance and Administration.</p>	1	13 & 14
Instructional Hours			6
Suggested Learning Methods : Case Studies			
Total Hours			30
Text Books	1. B.Mahadevan,Vinayak Rajat Bhat,Nagendra Pavana R.N , Introduction to Indian Knowledge System: Concepts and Applications, PHI Learning Private Limited,Delhi, 2022.		
Reference Books	1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002. 2. Traditional Knowledge System in India, by Amit Jha, 2009.		
Web. URLs	1. https://www.youtube.com/watch?v=LZP1StpYEPM 2. http://nptel.ac.in/courses/121106003/		
Course designed by		Verified by Chairman	
Dr. N. SARANYA		Dr. K. RAJARAJESWARI	

Course Code	Title		
22U4VBOE07	Value Based Open Elective Course : Principles of Intellectual Property Rights		
Semester: IV	Credits: 2	ESE: 50 Marks	
Course Objective	To make the students to recognize the importance of IP and to educate the pupils on basic concepts of Intellectual Property Rights. To learn the procedure of obtaining Patents, Copyrights, Trade Marks & Industrial Design		
Course Category	Entrepreneurship		
Development Needs	Global		
Course Description	The course is designed to provide comprehensive knowledge to students regarding the general principles of IPR, Concepts and Theories, Criticisms of Intellectual Property Rights, the registration process, and the International Regime Relating to IPR.		
Course Outcomes		Teaching Methods	
CO 1	Understand Intellectual Property Rights (IPR), its significance in promoting innovation and creativity, and the different types of IPRs.	Lecture	
CO 2	Equip with the knowledge to navigate the patent filing process effectively.	Tutorial	
CO 3	Comprehend the fundamentals of copyrights, their types, registration procedures, terms and remedies	Lecture	
CO 4	Narrate the trademarks, their rights, types, purpose, registration process, and the trademark landscape in India	Tutorial	
CO 5	Analyze the significance of geographical indications (GI) and the need for their protection, the relevant laws and regulations in India	Lecture	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Introduction to Intellectual Property Rights (IPR): Definition of IPR, Importance of IPR, Kinds of Intellectual property rights: Copy Rights, Patent, Trade Mark, Trade Secret and trade dress, Design, Layout Design, Geographical Indication, Plant Varieties and Traditional Knowledge, IPR in India and the world, IPR and WTO.	1	1,2
Instruction Hours			6
Suggested Learning Methods : Lecture/Tutorial			
II	Patent: Introduction to Patent, Patent Act 1970 and its amendments, Patentable and non-Patentable inventions, legal requirements for obtaining Patent, Registration Procedure of Patent, The role of Patentees and Different layers of the international patent system: National and International Patent filing procedures.	1	4
Instruction Hours			6
Suggested Learning Methods : Lecture/Tutorial			

III	Copyright: Introduction to Copyrights, Origin, and Definition & Types of Copyrights, Registration procedure, Assignment & license, Terms of Copyright, Piracy, Infringement, Remedies, Copyrights with special reference to software, Copyrights in India.	1	
Instructional Hours			6
Suggested Learning Methods : Lecture/Tutorial			
IV	Trademarks: Introduction to trademarks, Rights of trademark, Types of trademark, purpose, and function of a trademark, trademark protection, and trademark registration process, trademarks in India.	1	9
Instructional Hours			6
Suggested Learning Methods : Lecture/Tutorial			
V	Design: Introduction to Design, Registration of Design, Cancellation of Registration, International Convention on Design, functions of Design, Geo Graphical Indication: Introduction to Geo Graphical Indication, Why and how GI needs protection and GI laws, Indian GI act.	1	7,10
Instructional Hours			6
Suggested Learning Methods : Lecture/Tutorial			
Total Hours			30
Text Book	1. Intellectual Property Rights, Asha Vijay DurafeDhanashree K. Toradmalle, Wiley Publisher, 2022		
Reference Book	1. B.L. Wadera, Patents, trademarks, copyright, Designs and Geographical Judications.		
Web. URLs	1. https://dst.gov.in/sites/default/files/E-BOOK%20IPR.pdf		
Course designed by		Verified by Chairman	
Dr. K. PRATHAPCHANDRAN		Dr. S. SARASWATHI	

Course Code	Title		
22U4VBOE08	Value Based Open Elective Course : Science, Society and Culture		
Semester: IV	Credits: 2	ESE: 50 Marks	
Course Objective	To create awareness on Science, Indian Society and cultural heritage of our Country		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Facilitate the awareness on Science in everyday life, Indian Society and Social empowerment, Democracy and Freedom of our Country. Ancient Civilization, cultural heritage and perceptions of Indian Culture		
Course Outcomes		Teaching Methods	
CO 1	Know the concepts of Science in our daily life and awareness about Scientific community	Lecture / Video Lessons/ Model	
CO 2	Gain knowledge on Indian society and development of modern society	Lecture / Video Lessons	
CO 3	Learn about Indian social issues and awareness on our social laws	Lectures / Case study	
CO 4	Understand the Indian culture, diversity of culture and Traditional customs	Tutorial / Group Discussion	
CO 5	Comparison of ancient heritage and civilization of our country and follow them in our life	Lecture / Tutorial	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Common Science -Developments and their applications- effects in day to day Life - Achievements of Indians in Science and Technology. Awareness in the fields of IT, Space, Computers, Robotics, Nanotechnology and Biotechnology. Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India. India's Policy in the Field of the Science, Policies and Reports related to Science-Innovative Technology Vision.	1	1
Instructional Hours			6
Suggested Learning Methods: Video Lectures			
II	Social Behaviour -Salient features of our Society-Social diversity of India-Impact of globalization on Indian society. Social empowerment, Democracy and Freedom-Role of women and women's organization in the development of healthy society.	2	1
Instructional Hours			6
Suggested Learning Methods : Video Tutorials			
III	National Integration – Communalism-Regionalism and Secularism – Problems relating to development and management of Social	2	1 & 2

	Sector-Services relating to Health, Education and Human Resources. Welfare schemes for vulnerable sections of the people-Performance of Centre and States schemes-Mechanisms-Laws, Institutions and Bodies constituted for the protection and development of vulnerable sections.		
Instructional Hours			6
Suggested Learning Methods : Group Discussion			
IV	South Asian Cultures -Indian culture-combination of several cultures-Indian philosophy-Religious culture-Family structure and marriage-Wedding rituals-Indian greetings-Indian foods- Festivals-Traditional clothing. Epics of India-Indian Arts and Music-Indian architecture and Sculptures-Indian Languages and Literature-Perceptions of Indian culture.	3	1
Instructional Hours			6
Suggested Learning Methods : Video Tutorials			
V	Ancient Civilization -Indus Valley Civilization-Harappa and Mohenjo-Daro civilization-Evolutions of early Buddhist Architecture-Advent in China-Ellora caves civilization-King Gupta's period of civilization-Vijayanagara inscriptions-Mohall's period of civilization-British culture.	4	2
Instructional Hours			6
Suggested Learning Methods : Online Tutorial			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. Science, Culture and Society: Understanding Science in the 21st Century by Mark Erickson, Paperback – Illustrated, 2015. 2. Khanna, Indian Social order and Laws, Universities Press. 3. Choudhary, Social Protection Law Provisions and Procedure. 4. Indian Heritage systems-Universal Law Publishing Company. 5. Ancient Civilization of Indian sub-continent- Ancient Books. 		
Reference Books	<ol style="list-style-type: none"> 1. National integration and Secularism: Issues and Challenges, Regal Publications. 2. Ancient Culture of India: Issues and Concerns. 		
Web. URLs	<ol style="list-style-type: none"> 1. https://www.amazon.in/Science-Culture-Society-Understanding-Century-dp-0745662250/dp/0745662250/ref=dp_ob_title_bk. 2. https://iasscore.in/upsc-syllabus/indian-society/indian-society-mains. 3. https://www.worldhistory.org/india/ 		
Course designed by		Verified by Chairman	
Dr. K. NARAYANASAMY		Dr. M. THANGAVEL	

Course Code		Title	
22U4VBOE09		Value Based Open Elective Course: Community Engagement	
Semester: IV		Credits: 2	ESE: 50 Marks
Course Objective	This course serves as an introduction to community engagement, helping learners to explore methods of community involvement, change making process, and professionalism within the community.		
Course Category	Skill Development		
Development Needs	National		
Course Description	Apply the principles of communication for outreach to the diverse public, decision makers, and stakeholder groups.		
Course Outcomes		Teaching Methods	
CO 1	Apply professional behavior when working with community organizations	Lecture/ Case Study	
CO 2	Investigate the complexity of problems related to community needs	Lecture/ Role Play	
CO 3	Design and conduct the phases of a community engagement process, using consensus building and relating to formal planning procedures.	Lecture/ Case Study	
CO 4	Recognize community interests, power dynamics, and conflict, and facilitate empowerment of excluded groups and negotiation	Lecture// Role Play	
CO 5	Direct cross-jurisdictional, inter-agency, inter-disciplinary, and multi-stakeholder collaboration.	Lecture/ Case Study	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Concept, Ethics and Spectrum of Community engagement, Local community, Rural culture and Practice of community engagement	3	2
Instructional Hours			6
Suggested Learning Methods: Seminar			
II	Rural Development Programs and Rural institutions, Local Administration and Community Involvement	2	3
Instructional Hours			6
Suggested Learning Methods : Role Play			
III	Stages, Components and Principles of community development,	1	3

	Utility of public resources. Social contribution of community networking, Various government schemes.		
Instructional Hours			6
Suggested Learning Methods : Role Play			
IV	Community Engaged Research and Ethics in Community Engaged Research. PRA, Programmes of community engagement and their evaluation.	1	2
Instructional Hours			6
Suggested Learning Methods : Creative Art Assignments			
V	Rural Distress, Rural Poverty, Impact of Disasters on Migrant Laborers, Mitigation of Disaster.	2	1
Instructional Hours			6
Suggested Learning Methods : Community Participation Program			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. Participatory Rural Appraisal, PRA Application in Rural Development Planning, R Ramesh 2. Introduction to Community Development, Theory, Practice, and Service-Learning, Gary Paul Green, Jerry W. Robinson, Jr, 2011, SAGE Publications 		
Reference Books	<ol style="list-style-type: none"> 1. Community-based participatory research: a capacity-building approach for policy advocacy aimed at eliminating health disparities. Am J Public Health. 2010 2. Achieving successful community engagement: A rapid realist review. BMC Health Services Research. 		
Web. URLs	<ol style="list-style-type: none"> 1. https://unnatbharatabhiyan.gov.in › presentations 2. https://www.wellawareworld.org/ 		
Course designed by		Verified by Chairman	
Dr. P. NATHIYA		Dr. P. NATHIYA	

Course Code	Title		
22U4VBOE10	Value Based Open Elective Course : Emotional Intelligence		
Semester: IV	Credits: 2	ESE: 50 Marks	
Course Objective	To enable the Students to understand the concepts of Emotional Intelligence, its models and components		
Course Category	Employability & Skill Development		
Development Needs	National & Global		
Course Description	Understanding the importance of Emotional Intelligence and build effective relationships		
Course Outcomes		Teaching Methods	
CO 1	Understand the Self-Awareness, Self-Management, Social Awareness and Relationship Management	Lecture/ Video Lectures	
CO 2	Discover personal competence and techniques of building emotional intelligence.	Lecture/ Role Play	
CO 3	Narrate the insights into establishing positive relationships	Lecture/ Peer Teaching	
CO 4	Understand the emotional intelligence and its importance	Lecture/ Role Play	
CO 5	Summarize the Self-Management Techniques	Lecture/ Group Discussion	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Fundamentals of Emotional Intelligence: Meaning Definition Nature and Significance Models of Emotional Intelligence-: Ability, Trait and Mixed Building blocks of emotional intelligence: Self-awareness, Self-Management, Social Awareness, and Relationship Management	1	1 & 2
Instructional Hours			6
Suggested Learning Methods: Video lectures			
II	Personal Competence: Meaning Definition Self Awareness: Observing and recognizing one's own feelings, Knowing one's strengths and areas of development. Self-Management: Managing emotions, anxiety, fear, and anger.	1	5 & 6
Instructional Hours			6
Suggested Learning Methods: Role Play			
III	Social Competence: Social Awareness: Others' Perspectives, Empathy and Compassion Relationship Management: Effective communication, Collaboration, Teamwork and Conflict Management	2	1 & 2
Instructional Hours			6
Suggested Learning Methods: Peer Teaching			

IV	Emotional Intelligence: Measurement and Development - Meaning Definition, Importance Measures of emotional intelligence Strategies to develop and enhance Emotional Intelligence	2	4 & 5
Instructional Hours			6
Suggested Learning Methods: Role Play			
V	Self-Management Techniques: Meaning Definition Techniques to regulate emotions such as Mindfulness, Conditioned relaxation response and Boundary setting Techniques of Relationship Management: Display of empathy, Effective Communication , Teamwork , Conflict resolution	2	6 & 7
Instructional Hours			6
Suggested Learning Methods: Group Discussion			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. Bar-On, R., & Parker, J.D.A.(Eds.) (2000). The handbook of emotional intelligence. San Francisco, California: Jossey Bros. 2. Goleman, D. (2005). Emotional Intelligence. New York: Bantam Book. 3. Sternberg, R. J. (Ed.). (2000). Handbook of intelligence. Cambridge University Press. 		
Reference Books	<ol style="list-style-type: none"> 1. HBR's 10 Must Reads on Emotional Intelligence (2015) 2. HBR's 10 Must Reads on Managing Yourself (2011) 3. Self-Discipline: Life Management, Kindle Edition, Daniel Johnson. 		
Course designed by		Verified by Chairman	
Dr. T. SUDHA		Dr. T. SUDHA	

Course Code	Title		
22U4VBOE11	Value Based Open Elective Course : Fundamentals of Tourism		
Semester: IV	Credits: 2	ESE: 50 Marks	
Course Objective	To impart Knowledge on Tourism and its development in the economic growth and also to identify the tourist needs.		
Course Category	Employability		
Development Needs	Global		
Course Description	To enhance the students to get part in the tourism industry and to know about concepts of tourism.		
Course Outcomes		Teaching Methods	
CO 1	Understand tourism and its development	Direct Instruction	
CO 2	Analyse the Factors influencing the Travel Motivations.	Direct Instruction	
CO 3	Comprehend the Tourist Transport	Video Lessons	
CO 4	Understand the Tourist Accommodations	Direct Instruction	
CO 5	Apply the Travel Agency Operations	Video Lessons	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	The Tourism Phenomenon: Definition – Tourism; Tour; Tourist; Visitor; Excursionist; Domestic; International; Inbound; Outbound; Destination. Growth of Tourism / Evolution / History of Tourism & Present status of tourism in India. Thomas Cook – Grand Circular Tour.	1	9, Key Terms
		Instructional Hours	6
Suggested Learning Methods: Lecture Based Learning			
II	Travel Motivations: Categories of Motivations: Physical Motivators, Cultural Motivators, Interpersonal Motivators, Status and prestige Motivators. Types of Tourism: Pleasure, relaxation, Rest and recreation, Health, Participation in Sports, Curiosity and Culture, Ethnic and Family, Spiritual and Religious, Professional or Business.	1	3
		Instructional Hours	6
Suggested Learning Methods : Group Learning Method			
III	Tourist Transport: Role of Transport in Tourism, Modes of Transport, Road Transport, Air Transport, Rail Transport, Sea Transport.	2	15
		Instructional Hours	6
Suggested Learning Methods : Group Learning Method			

IV	Tourist Accommodation: Definition, Types of Hotels, International Hotels, Resort Hotels, Commercial Hotels, Residential Hotels, Floating Hotels. Supplementary Accommodation: Motel, Youth Hostel, Camping Sites, Pension, Bed and Breakfast Establishment, Tourist Holiday Villages, Time and Resort Condominiums.	1	8
Instructional Hours			6
Suggested Learning Methods: Group Learning Method			
V	Travel Agency: Products of Travel Agency, Classification of Travel Agency, Functions, Travel Related Business, International Travel Requirements, Travel Agency Operations.	3	2,3
Instructional Hours			6
Suggested Learning Methods: Lecture Based Learning			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. A.K. Bhatia, Tourism Development: Principles & Practices, Sterling Publishers Pvt 2007. 2. A.K. Bhatia, International Tourism Management, Sterling Publishers Pvt 2012. 3. Jagmohan Negi, Travel Agency Operations Concepts and Principles, Kanishka Publishers and Distributors, 2003. 		
Reference Books	<ol style="list-style-type: none"> 1. Biswanth Gosh, Tourism & travel management, Vikas Publishing House, Second Edition, 2008. 2. Christopher Holloway, Business of tourism, Elsevier Publisher, Second Edition, 2006. 		
Course designed by		Verified by Chairman	
B. TAMILSELVAN		R. PRAHADEESWARAN	

Course Code		Title	
22U4VBOE12		Value Based Open Elective : Health Education	
Semester: IV		Credits:2	ESE:50Marks
Course Objective		1. Acquire knowledge on different dimensions of health. 2. Inbuilt healthy life style practices	
Course Category		Value education	
Development Needs		Local	
Course Description		It provides knowledge on values and practices for healthy living	
Course Outcomes			Teaching Methods
CO1	Recall the importance of health education		Interactive session
CO2	Enlist the right choice of foods and dietary pattern		Interactive session
CO3	Identify methods to manage mental health issues		Activity based teaching
CO4	Practice effective personal health habits		Interactive session
CO5	Summarize the importance of environmental health for mankind		Interactive session
Course Content		Instructional Hours/Week:2	
Unit	Description	Text Book	Chapters
I	Health Education: Concept of health, Components of wellness, spectrum and determinants of health - Definition of health-health education- Aim, objective and principles of health education - Health services, Related Activity -Measuring the health attitudes of students	1	1
Instructional Hours			6
Suggested Learning Methods: Group Activity			
II	Food and Health Basic 4, 5and7 food groups; functional food groups-energy yielding, body building and protective foods (only sources and functions), food pyramid, meal planning pattern, healthy eating pattern. Related Activity -Assessing dietary adequacy of students	3,4	1 & 1, 2
Instructional Hours			6
Suggested Learning Methods: Peer Learning			

III	Mental Health Meaning of mental health –importance of mental health- characteristics of emotionally healthy-Self esteem-Values and patterns in decision making- Mental health problem of adolescences –depression & stress -causes and management Related activity-Stress level assessment in students	1	6
	Instructional Hours		6
Suggested Learning Methods: Role play			
IV	Personal Health Definition of personal health- under nutrition and over nutrition -prevalence of life style disease-healthy lifestyle practices- personal hygiene-Importance of physical activities& exercise Related Activity -Analyzing the physical activity pattern of students	1	8
	Instructional Hours		6
Suggested Learning Methods: Assignment			
V	Environment and Health Definition of environmental health, Biodiversity, climate change and biodiversity, environmental pollution-causes and consequences of air, water and soil pollution-Food contamination and consequences Related Activity-Group discussion on case studies	2	5,8
	Instructional Hours		6
Suggested Learning Methods: Group Discussion			
Total hours			30
Text Books	<ol style="list-style-type: none"> 1. Anspaugh (2001), Teaching Today’s Health, Library of Congress Cataloging, 6th Edition, US 2. Tyler Miller (2006), Environmental Science, Cengage learning India private ltd 3. Srilakshmi (2010), Dietetics, New age International private limited, New Delhi 4. Srilakshmi (2010), Food Science, New age International private limited, New Delhi 		
ReferenceBooks	<ol style="list-style-type: none"> 1. Howley& Don Franus(B) (2003) Health Fitness Instructor’s Handbook. Human Kinetics publication. 2. Ramachandran. L. Dharmalingam. T (1993) Health Education India. Vikas publishing House Private Limited 		
Journals	<ol style="list-style-type: none"> 1. Health education 		
Course designed by		Verified by Chairman	
Dr. A. SWARNALATHA		Dr. A. SWARNALATHA	

Course Code	Title		
22U4VBOE13	Value Based Open Elective Course : Media and Politics		
Semester: IV	Credits: 2	ESE: 50 Marks	
Course Objective	To Impart knowledge of understanding the media and politics		
Course Category	Skill Development		
Development Needs	Global		
Course Description	This course examines how media and political institutions interact to shape public thinking and debates around social problems.		
Course Outcomes		Teaching Methods	
CO 1	Understand the basic idea of media and Politics	Lecture and Demonstration	
CO 2	Summarize the political stance of media.	Lecture	
CO 3	Apply the Skills on writing political news.	Lecture and Demonstration	
CO 4	Evaluate the various characteristics of media Organization.	Video Lectures	
CO 5	Apply the mass media influences as individuals, groups, and society in political contexts	Discussion	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Media – Meaning and importance. Role of media in Society Political Communication – Mass Media politics and Society- Cinema and political manifestation. Social media and Political narration	1	1
Instructional Hours			06
Suggested Learning Methods: Learning by Teaching			
II	Characteristics of Modern Mass Media: Print and Electronic Media – Political economy and Ownership	2	2
Instructional Hours			6
Suggested Learning Methods : Active Learning			
III	Political Economy - State ownership versus private ownership of mass media – Consequences of private and public- Media ownership pattern Government Regulation – Monopoly- Media content and its Censorship.	1	2
Instructional Hours			6
Suggested Learning Methods : Group Learning			

IV	Public Opinion- The relationship between the mass media and public sphere- Political manipulation of media content- the impact of mass media on global political processes.	3	3
Instructional Hours			6
Suggested Learning Methods: Visual Learning			
V	Political effects of Mass Media: Individual- group- and Society Public- making public opinion- Setting of Political agenda- Political Socialization- Political Imobilization	2	4
Instructional Hours			6
Suggested Learning Methods : Case study based Learning			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. Lowe, L. (2016). The Definitive Guide to Creative Writing and Media Productions. United States: Xlibris UK. 2. Marshall, C. (2018). Writing for Social Media. United Kingdom: BCS Learning & Development Limited. 3. Cain, S., Batty, C. (2016). Media Writing: A Practical Introduction. United Kingdom: Palgrave Macmillan. 		
Reference Books	<ol style="list-style-type: none"> 1. Mencher, Melvin."Basic News Writing" Universal Bookstall, New Delhi.1993. 2. Sreenivas Rao. Academic Book Centre, Ahmedabad. 1981. 3. Barnard, J. (2019). The Multimodal Writer: Creative Writing Across Genres and Media. United Kingdom: Bloomsbury Academic. 4. Kuehn, S. A., Lingwall, J. A. (2016). The Basics of Media Writing: A Strategic Approach. United States: SAGE Publications. 		
Web. URLs	1. https://www.bing.com/videos/		
Course designed by		Verified by Chairman	
P. BAIJU PAUL		Dr. PAUL T BENZIKER	

Course Code		Title	
22U4VBOE14		Value Based Open Elective :Positive Psychology and Work Life	
Semester: IV		Credits: 2	ESE: 50 Marks
Course Objective	To bring an experience marked by predominance of positive emotions and informing them about emerging paradigm of Positive Psychology		
Course Category	Skill Development		
Development Needs	National		
Course Description	Build relevant competencies for experiencing and sharing happiness as lived experience and its implications		
Course Outcomes			Teaching Methods
CO 1	Understand the realities of Psychology and Work life		Lecture/ Case Study
CO 2	Insight on origin and development of Positive Psychology		Lecture/ Role Play
CO 3	Reveal the knowledge about phases of Positive Psychology		Lecture/ Case Study
CO 4	Perceptiveness about Happiness in Psychology and its Traits		Lecture/ Role Play
CO 5	Furnish the specific skills and techniques for working with Trust and Companionship		Lecture// Role Play
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Introduction to Positive Psychology : Positive Psychology: Concept, History, Nature, Dimension and scope of Positive Psychology Seligman's PERMA	3	1
Instructional Hours			6
Suggested Learning Methods: Seminar			
II	Positive Emotional States and Processes, Positive Emotions and well being: Hope & Optimism, Love, The Positive Psychology of Emotional Intelligence, Influence of Positive Emotions	2	3
Instructional Hours			6
Suggested Learning Methods : Role Play			
III	Strengths and Virtues : Character Strengths and Virtues Resilience in the phase of challenge & Loss, Empathy and Altruism	1	3
Instructional Hours			6
Suggested Learning Methods : Role Play			
IV	Happiness : Introduction to Psychology of happiness, well being and scope, Types of happiness- Eudaimonic and Hedonic	3	2

	History of Happiness, Theories, Measures and Positive correlates of happiness, Traits associated with Happiness, Setting Goals for Life and Happiness		
Instructional Hours			6
Suggested Learning Methods : Creative Art Assignments			
V	Forgiveness and Gratitude : Forgiveness and Gratitude , Personal transformation and Role of suffering , Trust and Compassion	1	3
Instructional Hours			6
Suggested Learning Methods : Community Participation Program			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. Argyle, M. 1987. <i>The psychology of happiness</i>. London: Methuen. 2. Carr, Alan (2007). <i>Positive Psychology: The science of human happiness and human strengths</i>. Routledge, Taylor and Francis Group-London. Csikzentmihalyi, Mihaly (1990) <i>Flow: The Psychology of Optimal Experience</i>, Harper Perennial. 3. Garcia,Hector., &Mirrales. Francesc.(2017) <i>IKIGAI-The Japanese Secret to a Long and Happy Life</i>, Hutchinson London. 		
Reference Books	<ol style="list-style-type: none"> 1. Frankl, Viktor E. (1988). <i>The Will to Meaning: Foundations and Applications of Logotherapy</i>.Meridian/Plume 2. Frankl, Viktor E. (2000) <i>Man’s Search for Ultimate Meaning</i>, Basic Books. 3. Snyder, C. R., & Lopez, S. J., &Pedrotti, J. T (2011) <i>Positive Psychology: The Scientific and Practical Explorations of Human Strengths</i>, Sage Publications India Pvt Ltd. 		
Course designed by		Verified by Chairman	
Dr. P. NATHIYA		Dr. P. NATHIYA	

Course Code	Title		
22U4VBOE15	Value Based Open Elective Course : Professional Ethics		
Semester: IV	Credits: 2	ESE: 50 Marks	
Course Objective	Students will understand the importance of Values and Ethics in their personal lives and Professional careers		
Course Category	Employability & Skill Development		
Development Needs	National & Global		
Course Description	Understanding the importance of maintaining Professional Ethics and build effective career.		
Course Outcomes		Teaching Methods	
CO 1	Understand the basic purpose of Profession	Lecture	
CO 2	Summarize the Professional Rights And Responsibilities	Lecture/Peer Teaching	
CO 3	Apply the various Roles in Applying Ethical Principles at Various Professional Levels	Lecture/Case Study	
CO 4	Professional Ethical Values and Contemporary Issues	Lecture/Role Play	
CO 5	Excelling in Competitive and Challenging Environment to Contribute to Industrial Growth.	Lecture/Group Discussion	
Course Content	Instructional Hours / Week : 2		
Unit	Description	Text Book	Chapters
I	Introduction to Professional Ethics: Meaning Definition Basic Concepts Governing Ethics, Personal & Professional Ethics, Life Skills, Emotional Intelligence Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.	1	1 & 2
Instructional Hours			6
Suggested Learning Methods: Video lectures			
II	Basic Theories: Basic Ethical Principles, Moral Developments, Deontology Virtue Theory, Rights Theory, Casuist Theory, Moral Absolution, Moral Rationalism, Moral Pluralism Ethical Egoism, Feminist Consequentialism, Moral Issues, Moral Dilemmas, Moral Autonomy	1	5 & 6
Instructional Hours			6
Suggested Learning Methods: Mini Case Analysis			
III	Professional Practices: Professions and Norms of Professional	2	1 & 2

	Conduct, Norms of Professional Conduct vs. Profession Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.		
Instructional Hours			6
Suggested Learning Methods: Group Discussion			
IV	Ethics in changing domains of Research: The US government wide definition of research misconduct, research misconduct distinguished from mistakes and errors, recent history of attention to research misconduct The emerging emphasis on understanding and fostering responsible conduct, responsible authorship, reviewing & editing.	2	4 & 5
Instructional Hours			6
Suggested Learning Methods: Role Play			
V	Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Deflection, Pollution, Ethics in Manufacturing and Marketing Media Ethics; War Ethics; Bio Ethics, Intellectual Property Rights	2	6 & 7
Instructional Hours			6
Suggested Learning Methods: Group Discussion			
Total Hours			30
Text Books	<ol style="list-style-type: none"> 1. Professional Ethics: R. Subramanian, Oxford University Press, 2015. 2. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press, 2015 		
Reference Books	<ol style="list-style-type: none"> 1. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008 		
Course designed by		Verified by Chairman	
Dr. T. SUDHA		Dr. T. SUDHA	

Course Code	Title		
22U4VBOE16	Value Based Open Elective Course : The Science of Happiness		
Semester: IV	Credits: 2	ESE: 50 Marks	
Course Objective	To explore the key elements of happiness at work and strategies to cultivate joy, well-being, and productivity in the workplace, relationship between happiness and various work-related factors, such as efficiency, creativity, innovation, work-life balance, and making a difference for others.		
Course Category	Skill Development		
Development Needs	Global		
Course Description	To create a positive work environment and promote happiness for themselves and others.		
Course Outcomes		Teaching Methods	
CO 1	Understand the Happiness as a Scientific Construct	Lecture Method	
CO 2	Apply the Theories and Models of Well-being	Flipped Teaching	
CO 3	Demonstrate the Individual Factors and Happiness	Lecture Method	
CO 4	Analyze the Social and Environmental Factors in Happiness	Lecture Method	
CO 5	Apply Happiness and Work Efficiency	Flipped Teaching	
Course Content		Instructional Hours / Week : 2	
Unit	Description	Text Book	Chapters
I	Introduction to Happiness as a Scientific Construct Defining happiness and its importance in individual and societal well-being, Overview of subjective well-being and its components - life satisfaction, positive emotions, and negative emotions, Exploration of cultural variations in happiness and its measurement	1	1
Instructional Hours			6
Suggested Learning Methods: Group Discussion			
II	Theories and Models of Well-being Prominent theories of well-being - hedonic well-being, eudemonic well-being, PERMA model. Role of factors - autonomy, meaning, and engagement in happiness. Strengths and	1	2
Instructional Hours			6
Suggested Learning Methods: Group Discussion			

III	Individual Factors and Happiness Personality traits - optimism, resilience and their influence on happiness. Role of genetics and biological factors in determining happiness levels. Examination of personal values, goals, and self-esteem and their impact on subjective well-being	1	3
Instructional Hours			6
Suggested Learning Methods: Group Discussion			
IV	Social and Environmental Factors in Happiness Importance of social relationships and social support in promoting happiness. Influence of social comparison, social norms, and cultural factors on well-being. Impact of environmental factors - access to nature, quality of living conditions on happiness.	1	4
Instructional Hours			6
Suggested Learning Methods: Group Discussion			
V	Happiness and Work Efficiency Impact of happiness on work efficiency and productivity, strategies for managing daily hassles and reducing stress in the workplace, link between happiness and creativity in the workplace, Strategies for fostering a creative and innovative work environment	1	5
Instructional Hours			6
Suggested Learning Methods: Group Discussion			
Total Hours			30
Text Books	1. Susan A. David, Ilona Boni well, and Amanda Conley Ayers; The Oxford Hand book of Happiness.		
Reference Books	1. Achor, S. (2010). The happiness advantage: The seven principles of positive psychology that fuel success and performance at work. Random House. 2. Lyubomirsky, S. (2008). The how of happiness: A scientific approach to getting the life you want. Penguin. 3. Diener, E., & Seligman, M. E. P. (2002). Very happy people. Psychological Science, 13(1), 81-84.		
Web. URLs	1. https://onlinecourses.nptel.ac.in/noc23_hs06/preview		
Course designed by		Verified by Chairman	
Dr. K. RAJARAJESWARI		Dr. K. RAJARAJESWARI	

SEMESTER V

Course Code		Title		
23U3MBC512		Core Paper XII – Immunology		
Semester: V		Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective		To assimilate knowledge on host-microbial interactions		
Course Category		Skill Development		
Development Needs		Global		
Course Description		The course describes on Microbiology on immune system, immunology and immunology related techniques		
Course Outcomes			Teaching Methods	Assessment Methods
CO 1	Develop knowledge and awareness on Host defense mechanism and host-microbial interactions.		Lecture	Assignment
CO 2	Develop knowledge on Essential concepts of immune factors and the immune system		Flipped Classroom	Seminar
CO 3	Distinguish the different types of mechanisms and differences between primary and secondary responses and their relevance to immunizations		Video Lessons	Quiz
CO 4	Understand the production of Identify the role of antigen presenting cells, lymphocytes, and phagocytic cells in immune response		Tutorial	Seminar
CO 5	Use of Immunotechniques and its applications.		Lecture / Case Studies	Seminar
Offered by		Microbiology		
Course Content			Instructional Hours / Week: 4	
Unit	Description		Text Book	Chapters
I	History and Scope of Immunology: Hematopoiesis - Formation of blood cells, Cells of immune system, Organs involved in immune system, Phagocytosis.		1	1,2
			Instructional Hours	12
Suggested Learning Methods: Comics Preparation / You tube Videos				
II	Immunity and Types of immunity, Antigen – Antibody – types Theories of antibody formation – instructive, selection theory and clonal selection theory Monoclonal antibodies and its applications (Hybridoma technology)		1,2	2,4
			Instructional Hours	12
Suggested Learning Methods: Chart Preparation				
III	Allergy and Hypersensitivity, Classification types and Mechanisms, Immunodeficiency diseases. Complement cascade system. Blood transfusion - ABO grouping - Rh factor		3	10,11
			Instructional Hours	12

Suggested Learning Methods: Videos														
IV	Autoimmunity Mechanisms and autoimmunity response diseases: RA, SLE and Myasthenia Gravis. Transplantation, Tumour immunology Tissue transplantation, HLA typing - Mechanism of acceptance and rejection								4	15, 16				
Instructional Hours												12		
Suggested Learning Methods: You tube videos														
V	Antigen-Antibody Interactions- Agglutination, Immuno-electrophoresis, Immunofluorescence techniques, Blotting technique.								1	3				
Instructional Hours												12		
Suggested Learning Methods: Videos / Chart Preparation														
Total Hours												60		
Text Books	1. Annadurai B. A. Textbook of Immunology and Immunotechnology. S Chand & Co. Ltd., New Delhi. 1st Edition. 2008 2. Vaman Rao C. Immunology. Narosa Publishing House., New Delhi. 2nd Edition. 2008. 3. Arti Kapil. Ananthanarayan and Paniker's Text Book of Microbiology., Orient Blackswan Private Limited. 9th Edition. 2013. 4. Roitt I.M. Essentials of Immunology, Black Well Scientific Publishers, London. 1988.													
Reference Books	1. Kindt TJ, Goldsby RA, Osborne BA and Janis Kuby. Immunology. WH Freeman and Company, New York. 2007. 2. Tizard I.R. Immunology: An Introduction. Saunders College Publishers, USA. 4th Edition 1995.													
Web. URLs	1. https://www.frontiersin.org/journals/immunology 2. https://www.youtube.com/watch?v=rgphaHmAC_A													
Tools for Assessment (20 Marks)														
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total								
4	4	5	2	2	3	20								
Mapping														
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	H	L	L	M	L	L	M	L	L	M	L	L	M	
CO2	L	M	L	L	L	M	L	M	L	M	L	L	M	
CO3	L	L	M	M	L	M	L	M	H	H	M	L	L	
CO4	M	L	L	M	L	L	M	L	H	M	H	M	L	
CO5	L	M	L	L	L	M	L	L	M	L	H	M	H	
H-High; M-Medium; L-Low														
Course designed by							Verified by Chairman							
Dr. B. David Jayaseelan							Dr. M. Thangavel							

Course Code		Title		
23U3MBC513		Core Paper XIII – Medical Microbiology		
Semester: V		Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective		Students gain knowledge about foundation in medical microbiology. Concepts in bacteriology, mycology and parasitology		
Course Category		Employability/Skill		
Development Needs		Global		
Course Description		This course describes about the classification Infection, types of infection, Host-parasite relationship		
Course Outcomes		Teaching Methods	Assessment Methods	
CO 1	Understand the Infection, types of infection, Host-parasite relationship and Micro flora of human body.	Lecture	Assignment	
CO 2	Gain knowledge on nature of Antimicrobial agents	Lectures / Video lessons	Seminar	
CO 3	Understand the different concepts of control agents for microorganisms.	Lectures / Video Lessons	Assignment/ Seminar	
CO 4	Acquire knowledge on parasitology morphology and life cycle	Lectures / Video lessons	Quiz/Assignment	
CO 5	Learn the techniques to control the pathogenicity and laboratory diagnosis of fungi.	Lectures and Videos	Seminar	
Offered by		Microbiology		
Course Content			Instructional Hours / Week: 4	
Unit	Description	Text Book	Chapters	
I	Infection: types of infection, sources of infection, reservoirs and vehicles of infection, predisposing factors. Normal Micro flora of human body: normal flora of skin, respiratory, gastrointestinal, genital tract, blood born infection and nosocomial infection..	1	9, 10	
Instructional Hours			12	
Suggested Learning Methods: Comics Preparation / You tube Videos				
II	Antimicrobial agents: Histroy, Antibiotics, Antifungal and Antivirals (common drugs, their spectrum and mode of action). Methodologies for testing of antibacterial, antifungal (in vivo and in vitro infectivity models), mechanism drug resistance.	1	28	
Instructional Hours			12	
Suggested Learning Methods: Chart Preparation				
III	Bacteriology: Gram positive organisms - Morphology, cultural characteristics, pathogenicity and laboratory diagnosis of <i>Staphylococcus aureus</i> , <i>Streptococcus pyogenes</i> , <i>Bacillus anthracis</i> , <i>Mycobacterium tuberculosis</i> . Gram negative organisms -. <i>E. coli</i> , <i>Salmonella typhi</i> , <i>Vibrio cholerae</i> , <i>Pseudomonas aeruginosa</i> , <i>Neisseria gonorrhoeae</i>	2	22-41	
Instructional Hours			12	
Suggested Learning Methods: Videos				

IV	Parasitology: Morphology, Life cycle, Pathogenicity and laboratory diagnosis of <i>Entamoeba histolytica</i> , <i>Trichomonas vaginalis</i> , <i>Plasmodium malariae</i> , <i>Taenia solium</i> , <i>Enterobius vermiculari</i> , <i>Ascaris lumbricoides</i> .						3	3-18					
Instructional Hours							12						
Suggested Learning Methods: You tube videos													
V	Mycology: Morphology, Pathogenicity and laboratory diagnosis of <i>Candida albicans</i> , <i>Cryptococcus neoformans</i> , <i>Aspergillosis</i> , <i>Histoplasma capsulatum</i> .						4	8-15					
Instructional Hours							12						
Suggested Learning Methods: Videos / Chart Preparation													
Total Hours							60						
Text Books	1. Brooks, G. F., Jawetz, Melnick and Adelbergs Medical Microbiology. New York.: Graw-Hill Medical. 2. Paniker, C. K., and Ananthanarayan, Textbook of Microbiology. Himayatnagar, Hyderabad: Orient Longman. 2005. 3. Paniker, C. K., Textbook of Medical Parasitology. New Delhi: Jaypee Brothers												
Reference Books	1. Patricia, M.T. Bailey and Scott's Diagnostic Microbiology, 13th Edition, Mosby, Inc. Publishers, China. 2014. 2. Patrick R. Murray, Ken. S. Rosenthal, George. S. Kobayashi, Michael A. Ptaller Medical Microbiology, 3 rd Edition, C.V. Mosby Co. 1998.												
Web. URLs	1. https://microbiologyinfo.com/												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO₂	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO₅
CO1	H	H	M	H	H	H	H	H	H	H	L	L	M
CO2	H	H	M	H	H	M	M	M	H	M	L	L	H
CO3	H	H	L	M	H	H	M	H	H	H	H	M	L
CO4	H	H	L	H	H	H	M	H	H	M	H	M	M
CO5	H	H	M	M	H	H	H	M	M	M	H	H	H
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. M. Thangavel							Dr. M. Thangavel						

Course Code	Title		
24U3MBC514	Core Paper XIV - Industrial Microbiology		
Semester: V	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	To assimilate knowledge across industry and microbiology discipline		
Course Category	Skill Development		
Development Needs	Global		
Course Description	The course describes the roles of microorganisms in producing different fermented products and preparation of specific media required for different fermentation processes		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Develop knowledge and awareness of the basic principles and concepts of fermentation.	Lecture	Assignment
CO 2	Interpret the screening of microorganisms and media used in industry.	Flipped Classroom	Seminar
CO 3	Distinguish the different types of fermentation processes used	Video Lessons	Quiz
CO 4	Understand the production of industrially important products.	Tutorial	Seminar
CO 5	Use research-based knowledge on downstream processing.	Lecture / Case Studies	Seminar
Offered by	Microbiology		
Course Content	Instructional Hours / Week: 4		
Unit	Description	Text Book	Chapters
I	History and Fermentor: Introduction, Historical background, Fermentor - principle, types - design - mode of operation - instrumentation and control - sterilization of fermentor - aseptic inoculation method. Process flow sheeting.	1	1,2
Instructional Hours			12
Suggested Learning Methods: Comics Preparation / You tube Videos			
II	Industrially important microorganisms: Screening methods for Industrial microbes, Media formulation, Strain Improvement, Preservation Techniques. Inoculum media and inoculum preparation.	1,2	2,4
Instructional Hours			12
Suggested Learning Methods: Chart Preparation			
III	Fermentation Process: Submerged and Solid-state Fermentation. Batch, Continuous & Fed-Batch Fermentation. Immobilization of cell and enzymes.	2	10,11
Instructional Hours			12
Suggested Learning Methods: Videos			
IV	Microbial production of Industrial products: Beverages, Vitamins - Riboflavin, cyanocobalamin. Enzymes (protease,	1	15, 16

	amylase). antibiotics (penicillin, streptomycin), Single cell protein (Baker's yeast, spirulina) Mushroom production – (Oyster and Button mushroom) Immobilization of cell and enzymes.												
Instructional Hours			12										
Suggested Learning Methods: You tube videos													
V	Downstream processing: Recovery and purification of fermentations products (intracellular and extracellular), cell disruption, precipitation, filtration, centrifugation, solvent recovery, chromatography, Ultra filtration and drying. Quality Assurance of Finished products.		1	3									
Instructional Hours			12										
Suggested Learning Methods: Videos / Chart Preparation													
Total Hours			60										
Text Books	<ol style="list-style-type: none"> 1. Casida LE Jr. Industrial Microbiology, 5th edition, Wiley Eastern Ltd., New Delhi. 1993. 2. Stanbury, P.F., Whitaker, A. and Hall, S.J. Principles of Fermentation Technology, 2nd Edn. Pergamon Press, Oxford, 1999. 												
Reference Books	<ol style="list-style-type: none"> 1. Crueger W and Crueger A. Biotechnology: A Text Book of Industrial Microbiology, 2nd edition. Panima Publishing Corporation, New Delhi. 2000. 2. Glazer NA and Nikaido H. Microbial Biotechnology: Fundamentals of Applied Microbiology. 2nd edition, Cambridge University Press. 2007. 3. Waites MJ, Morgan, NL, Rockey JS, and Higton G. Industrial Microbiology: An Introduction, Blackwell Science, London. 2001 												
Web. URLs	<ol style="list-style-type: none"> 1. https://bio.libretexts.org/Bookshelves/Microbiology/Book%3A_Microbiology_(Boun dless)/17%3A_Industrial_Microbiology 2. http://www.lcwu.edu.pk/ocd/cfiles/Biotechnology/Maj/Biotech-402/IndustrialMicrobiology-An-Introduction-0632053070-Wiley_compressed.pdf 3. https://microbiologynotes.org/category/industrial-microbiology/ 												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO₂	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO₅
CO1	H	L	L	M	L	L	M	L	L	M	L	L	M
CO2	L	M	L	L	L	M	L	M	L	M	L	L	M
CO3	L	L	M	M	L	M	L	M	H	H	M	L	L
CO4	M	L	L	M	L	L	M	L	H	M	H	M	L
CO5	L	M	L	L	L	M	L	L	M	L	H	M	H
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. R. Kasimani							Dr. M. Thangavel						

Course Code		Title		
24U3MBP515		Core Paper XV – Immunology and Medical Microbiology Practical		
Semester: V		Credits: 4	CIA: 40 Marks	ESE: 60 Marks
Course Objective		To assimilate knowledge across Industrial, immunological and medical discipline.		
Course Category		Skill Development / Employability		
Development Needs		Global		
Course Description		Students will develop skills on isolation, and enumeration of microbes from air, water and effluent samples. Collection and processing of clinical samples and the testing methods.		
Course Outcomes		Teaching Methods	Assessment Methods	
CO 1	Get hands on exposure, knowledge and awareness of the basic tests in Industrial Microbiology	Lecture / Hands on	Behaviour & Performance	
CO 2	Acquire knowledge about updated recent analysis methods.	Lecture / Hands on	Observation	
CO 3	Acquire knowledge about the clinical samples and their testing methods.	Lecture / Hands on	Performance	
CO 4	Understanding of the knowledge of medically important immunological procedures.	Lecture / Hands on	Performance	
CO 5	Understand the testing knowledge in the field of medical microbiology	Lecture / Hands on	Observation	
Offered by		Microbiology		
Course Content			Instructional Hours / Week: 4	
Exp No	Experiments			
1.	Immunology: ABO Blood grouping and Rh typing			
2.	WIDAL Test			
3.	RPR and CRP			
4.	ASO and pregnancy test			
5.	Total and differential blood cell count by haemocytometer			
6.	Radial and Double immuno diffusion			
7.	Demonstration of ELISA, SDS PAGE, Western Blotting			
8.	Medical Microbiology Isolation, identification of following pathogens from clinical samples: <i>E. coli</i> , <i>Salmonella spp.</i> , <i>Pseudomonas spp.</i> , <i>Proteus spp.</i> , <i>Klebsiella spp.</i> , <i>Staphylococcus spp.</i> , <i>Streptococcus spp.</i>			
9.	<i>Isolation of Clinically important Fungi – Candida albicans (Germ Tube Technique)</i>			
10.	Antibiotic sensitivity testing of the isolates (for Gram negative and Gram Positive)			
11.	Examination of stool for ova/cyst by direct/ concentration method			

Total Hours													60	
Text Books			1. Rajan S and Selvi Christy R. Experimental Procedures in Life sciences . Anajanaa Book House, Chennai, 2015. 2. James G Cappuccino and Natalie Sherman. Microbiology - A Laboratory Manual (4 th edition).The Benjamin publishing company, New York. 2016.											
Reference Books			1. James G. Cappuccino and Chad Welsh. Microbiology A Laboratory Manual . Pearson Education Limited, 2017. 2. Dubey RC and Maheshwari DK. (2002). Practical Microbiology . S Chand and Co. Ltd., New Delhi, 2002. 3. Gunasekaran P. Laboratory Manual in Microbiology . New Age International, 2007											
Web. URLs			1. https://microbenotes.com/fields-of-microbiology/ 2. https://bio.libretexts.org/Bookshelves/Microbiology/Book%3A_Microbiology_(Boundless)/1%3A_Introduction_to_Microbiology/1.3%3A_The_Science_of_Microbiology/1.3B_Applied_Microbiology											
Tools for Assessment (40 Marks)														
Laboratory Performance							Test - I	Test - II	Observation notebook	Total				
Level of engagement in lab	Preparation		Result											
5	5		5		10	10	5	40						
Mapping														
CO \ PO	P O1	P O2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	M	L	L	M	L	M	L	M	M	L	H	L	M	
CO2	H	H	L	M	L	H	L	L	L	M	L	M	L	
CO3	H	M	L	M	L	H	L	M	M	H	M	H	M	
CO4	M	H	L	M	L	M	L	L	M	H	M	L	L	
CO5	M	M	L	H	L	M	L	L	H	M	M	L	M	
H-High; M-Medium; L-Low														
Course designed by								Verified by Chairman						
Dr. B. David Jayaseelan								Dr. M. Thangavel						

Course Code	Title		
23U3MBE501	Discipline Specific Elective Paper – I Group A - Microbial Biotechnology		
Semester: V	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	To empower the students with knowledge on microbial products and give insight on fermentation process and their application in industrial microbial products production and applications.		
Course Category	Employability and Skill Development		
Development Needs	Global		
Course Description	The students gain knowledge in the working of the fermenter and design of the fermenter and their applications in the production of enzymes and antibiotics.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the concepts of microbial fermentation technology.	Flipped classroom/Lectures	Assignment
CO 2	Describe about different types of fermentation and its uses.	Lectures / Video Lessons	Seminar
CO 3	Design and development the production of SCP production.	Lectures / Group Discussion	Quiz
CO 4	Interpret the process optimization, immobilization and scale up of fermentation process.	Lectures / Video Lessons	Seminar / Assignment
CO 5	Apply the knowledge of microbial biotechnology on product development	Lectures and Flipped classroom	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 4	
Unit	Description	Text Book	Chapter
I	Fermentation: An overview: Brief history of fermentation – Fermentation: general concepts, Applications of fermentation; Range of fermentation process - Microbial biomass, enzymes, metabolites, Component parts of a fermentation process.	1	1-2
Instructional Hours			12
Suggested Learning Methods : Group learning			
II	Types of fermentations: Aerobic and anaerobic fermentation, Submerged and solid state fermentation; Factors affecting submerged and solid state fermentation; Substrates used in SSF and its advantages; Culture media - types, components and formulations. Sterilization: Batch and continuous sterilization.	2	2-5
Instructional Hours			12
Suggested Learning Methods : Quizzes			
III	Production of single cell protein from bacteria, fungi and algae: Characteristics, nutritional value and safety, substrates used, process examples, applications. Production and applications of microbial exopolysaccharides: Factors affecting fermentative production of exopolysaccharides	1	4
Instructional Hours			12
Suggested Learning Methods: Group learning			

IV	Process development: Optimization of a process, Classical and statistical methods of optimization, Immobilization: different matrices, whole cell and enzyme immobilization; Scale up of bioprocess General concept of a fermenter: Batch, fed batch and continuous fermentation.						2, 3	2,1					
Instructional Hours							12						
Suggested Learning Methods: Lectures													
V	Applications of Microbial Biotechnology: Microorganisms as source of novel compound production. Biopolymer and bioplastics, algal biotechnology, bioweapons, and bioshields. Microbes as biocontrol agents (<i>Baculoviruses</i> , <i>Beauveria bassiana</i> , <i>Bacillus thuringiensis</i> , <i>Bacillus sphaericus</i> , <i>Bacillus popilliae</i>).						1	13					
Instructional Hours							12						
Suggested Learning Methods: Lectures													
Total Hours							60						
Text Books	1. Microbial Technology vol I and II by H.J. Peppler and D.Pearlman 2. .Uma Shankar Singh and Kiran Kapoor, Microbial Biotechnology, Oxford Book Company, 2010. 3.Stanbury, P.F., Whitaker and Hall, A.S.J., Principles of Fermentation Technology. Butterworth- Heinemann, 2016. 4.Vogel, H.C. Todaro, C.L. and Todaro C.C., Fermentation and Biochemical Engineering. Handbook: Principles, Process Design and Equipment. Noyes Publications, 3rd Edition, 2014.												
Reference Books	1.Harzevilli, F.D. and H. Chen. Microbial Biotechnology: Progress and Trends. CRC Press, 2017. 2.Arnold L. Demain, Julian E. Davies, Richard H. Baltz. Manual of Industrial Microbiology and Biotechnology. American Society of Microbiology, 2010. 3.Yuan Kun Lee, Microbial Biotechnology: Principles and Applications, World Scientific, 2006.												
Web. URLs	1. https://nptel.ac.in/courses/102/106/102106086/ 2. https://nptel.ac.in/content/storage2/courses/102103013/pdf/mod7.pdf												
Tools for Assessment (25 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
5	5	6	3	3	3	25							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO2	PSO 3	PS O4	PSO5
CO1	L	M	L	M	L	M	M	L	M	M	L	L	M
CO2	L	M	M	L	L	L	M	M	M	L	M	M	L
CO3	M	M	L	H	L	M	H	M	M	H	M	H	M
CO4	L	M	H	H	M	L	M	L	M	H	M	L	L
CO5	M	H	H	H	L	L	M	M	M	M	H	L	M
H-High; M-Medium; L-Low													
Course designed by								Verified by Chairman					
Dr. K. E. Vivekanandan								Dr. M. Thangavel					

Course Code		Title		
23U3MBE502		Discipline Specific Elective – I – Group B - Soil Microbiology		
Semester: V		Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	To understand the vital role, microbial process, applications and interaction of microorganisms in agriculture field and also in various hosts.			
Course Category	Employability			
Development Needs	Global			
Course Description	Students will be able to explain the processes used by microorganisms for their replication, survival, interaction with their environment, hosts and host populations.			
Course Outcomes		Teaching Methods	Assessment Methods	
CO 1	Gain knowledge on soil type and the factors that limit microbial growth in soil.	Lecture	Assignment	
CO 2	Gain knowledge on microbial decomposition and bio-remediation processes.	Lecture / Demonstration	Seminar	
CO 3	Gain knowledge on biogeochemical cycles, bio-fertilizers, and bio-Insecticides.	Lectures / Video Lessons	Quiz	
CO 4	Compare the characters of pathogens affecting plants with example.	Tutorial / Videos	Seminar	
CO 5	Gain practical knowledge about the important processes pertaining to soil and agricultural microbiology.	Lecture / Group Discussion	Quiz	
Offered by	Microbiology			
Course Content		Instructional Hours / Week : 4		
Unit	Description	Text Book	Chapters	
I	Introduction to soil microbiology – properties of soil (structure, texture & formation). Types and significance of soil microbes– bacteria, fungi, algae, protozoa, nematodes, actinomycetes, viruses. Factors affecting microbial population. Rhizosphere and non-rhizosphere regions.	1	27	
			Instructional Hours	12
Suggested Learning Methods: Comics Preparation / You tube Videos				
II	Microbial decomposition: Bioconversion of organic wastes – sugarcane waste - coir pith composting - Principles and Applications- conversion process. Anaerobic composting of sewage sludge.	3	11-12	
			Instructional Hours	12
Suggested Learning Methods: Demonstration				
III	Biogeochemical cycle: Carbon, Phosphorus and Nitrogen. Biological nitrogen fixation – Symbiotic and non-symbiotic nitrogen fixer, Root nodule formation - Nitrogenase and Hydrogenase. Biofertilizer - <i>Rhizobium</i> , <i>Azotobacter</i> , Cyanobacteria, <i>Azolla</i> , VAM - Mass multiplication and crop response. Phosphate solubilizing bacteria. Biopesticide - Classification, mode of action - Bacterial insecticides	2	5	

	(Bacillus thuringiensis) and Viral insecticides (NPV) and Fungal: <i>T. viride</i> , PGPR.												
Instructional Hours			12										
Suggested Learning Methods: Demonstration													
IV	Plant pathology: symptoms, characters of pathogens and control measures: Bacterial diseases - Citrus canker, Blight of rice. Fungal diseases – Red rot of sugarcane, Tikka leaf spot of ground nut. Viral diseases - TMV, Vein clearing disease of Bhendi (<i>Abelmoschus esculentus</i>).		2	8									
Instructional Hours			12										
Suggested Learning Methods: Videos and Hands on training													
V	Enumeration of bacteria from rhizosphere and non-rhizosphere region. Cultivation of free-living and symbiotic N ₂ fixing bacteria. Isolation of cellulose degrading organisms. Isolation of phosphate solubilizing bacteria.		1	19									
Instructional Hours			12										
Suggested Learning Methods: Laboratory practice / You tube Videos													
Total Hours			60										
Text Books	<ol style="list-style-type: none"> 1. Jeff Hardin, Gregory Paul Bertoni, Lewis J. Kleinsmith - Becker's world of the cell, Pearson Benjamin Cummings, 8th edition, 2012. 2. Verma P.S., Agarwal V.K., Cell Biology, Genetics, Molecular Biology, Evolution and Ecology, S. Chand & Company Ltd., 2005. 3. James D. Watson, Molecular Biology of the Gene, Cold Spring Harbor Laboratory Press, 7th edition, 2013. 												
Reference Books	<ol style="list-style-type: none"> 1. Janet Iwasa, Wallace Marshall, Karp's Cell and Molecular Biology: Concepts and Experiments, John Wiley & Sons, Inc., 8th edition, 2016. 2. Watson, J. D., Baker T.A., Bell, S. P., Gann, A., Levine, M., and Losick, R., Molecular Biology of the Gene, Cold Spring Harbour Lab. Press, Pearson Pub., 6th edition, 2008. 3. De Robertis, E.D.P. and De Robertis, E.M.F., Cell and Molecular Biology, Lippincott Williams and Wilkins, Philadelphia, 8th edition, 2006. 												
Web. URLs	http://www.nptel.ac.in/courses/102103015/pdf/mod3.pdf												
Tools for Assessment (25 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
5	5	6	3	3	3	25							
Mapping													
CO \ PO	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PS O5
CO1	L	M	L	M	L	L	L	L	M	L	M	L	M
CO2	H	M	L	M	L	L	L	M	L	M	M	L	M
CO3	H	M	L	H	L	M	L	L	M	L	L	M	L
CO4	M	H	L	H	L	M	M	L	L	M	M	L	M
CO5	H	M	L	H	L	L	L	M	H	M	L	L	M
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. P. Vinoth Kumar							Dr. M. Thangavel						

Course Code		Title	
23U3MBE503		Discipline Specific Elective – I – Group C Management of Human Microbial Diseases	
Semester: V		Credits: 3	CIA :20 Marks ESE:55 Marks
Course Objective		This course helps to Diagnosis of Human Microbial diseases	
Course Category		Employability	
Development Needs		Global	
Course Description		Students will be able to explain the processes used by microorganisms for their role in infections, pathogenesis, including collection, quality control, quality assurance, safety, setup, identification, susceptibility testing, and reporting results.	
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Identify causes of human disease and mode of transmission	Lecture	Assignment
CO 2	Describe the concept of health, disease, Infection and pathogen.	Lecture / Demonstration	Seminar
CO 3	Disseminate knowledge on laboratory diagnosis of infections.	Lectures / Video Lessons	Seminar
CO 4	Understand Treatment using antibiotics.	Tutorial / Videos	Seminar
CO 5	Explicate General preventive measures.	Lecture / Group Discussion	Quiz
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 3	
Unit	Description	Text Book	Chapters
I	Human Diseases Caused by Bacteria and Virus - Airborne Diseases - Arthropod-Borne Diseases -Direct Contact Diseases - Food-Borne and Waterborne Diseases - Zoonotic Diseases - Opportunistic Diseases.	2	39
Instructional Hours			9
Suggested Learning Methods: Comics Preparation / You tube Videos			
II	Human Diseases Caused by Fungi and Protists - Airborne Diseases - Arthropod-Borne Diseases -Direct Contact Diseases - Food-Borne and Waterborne Diseases - Zoonotic Diseases - Opportunistic Diseases.	2	40
Instructional Hours			09
Suggested Learning Methods: Demonstration			
III	Diagnosis of Infectious Diseases – Laboratory Diagnosis of Bacterial, fungal, vial and Parasitic infections.	1	47
Instructional Hours			09

Suggested Learning Methods: Demonstration														
IV	Treatment using antibiotics: Mode of action of antimicrobial drugs - Emergence of antibiotic resistance. Mechanism of action of Antiviral and Antifungal drugs.								2	9				
Instructional Hours												09		
Suggested Learning Methods: Videos and Hands on training														
V	Epidemiology and control of infectious diseases - Types OF Epidemiological Studies - Transmission of Infectious Disease - Vaccine efficacy.								3	33				
Instructional Hours												09		
Suggested Learning Methods: Laboratory practice / You tube Videos														
Total Hours												45		
Text Books	<ol style="list-style-type: none"> Brooks, G. F. Jawetz, Melnick and Adelbergs. Medical Microbiology. New York. McGraw-Hill Medical, 2007. Joanne M. Willey, Linda M. Sherwood, Christopher J. Woolverton. Prescott's Microbiology. McGraw-Hill Publications, 2014. Goering R., Dockrell H., Zuckerman M. and Wakelin D. Mims' Medical Microbiology. 4th edition. Elsevier, 2007. 													
Reference Books	<ol style="list-style-type: none"> Tille, P. M. Bailey & Scotts Diagnostic Microbiology. St. Louis, MO: Elsevier, 2017. Murray, P. R. Basic Medical Microbiology. Philadelphia: Elsevier, 2018. 													
Web. URLs	<ol style="list-style-type: none"> https://courses.lumenlearning.com/microbiology/chapter/mechanisms-of-antibacterial-drugs/ https://www.msmanuals.com/en-in/home/infections/diagnosis-of-infectious-disease/diagnosis-of-infectious-disease 													
Tools for Assessment (20 Marks)														
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total								
4	4	5	2	2	3	20								
Mapping														
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	M	L	M	M	M	M	L	H	H	H	M	L	L	
CO2	H	H	M	L	H	H	L	H	H	H	M	L	L	
CO3	H	H	M	L	H	H	L	H	H	H	M	L	H	
CO4	H	H	L	H	L	H	L	H	H	H	H	L	L	
CO5	M	H	L	H	H	L	L	H	H	H	H	H	H	
H-High; M-Medium; L-Low														
Course designed by							Verified by Chairman							
Dr. Dinesh M. D							Dr. M. Thangavel							

Course Code	Title	
24U3MBT501	Internship	
Semester: V	Credits: 2	CIA: 50 Marks
Course Objective	<ul style="list-style-type: none"> •Provide practical experience in a relevant field. •Develop professional skills, including teamwork, communication, and problem-solving. •Encourage handling the real-world applications related to their field of study. 	
Course Category	Skill Development	
Development Needs	Local, Regional, National and Global	
Course Description	Provides focused practical exposure in specialized areas of Microbiology and its related industry, enabling students to gain in-depth knowledge and hands-on experience.	
Course Outcomes		
CO 1	Demonstrate the ability to translate classroom learning into professional practice within the field of study.	
CO 2	Gain hands-on experience with tools, techniques, and processes commonly used in the specific domain of their internship.	
CO 3	Exhibit improved verbal and written communication skills through interactions with industry professionals, peers, and mentors.	
CO 4	Work effectively in teams, demonstrating cooperation, adaptability, and the ability to contribute meaningfully to group projects and goals.	
CO 5	Identify personal strengths, areas for improvement, and insights about career aspirations, culminating in a detailed internship report or presentation.	
The internship program will be conducted during the Summer Vacation after IV Semester		
Course Content		No of Days : 15 Working Days
Week	Description	
I	Introduction to Workplace Task Familiarization Active Involvement in Projects/Tasks	
		No of hours
		30
II	Mid-Term Reflection Enhanced Project Involvement Preparation for Final Presentation/Report	
		No of hours
		30
Suggested Learning Methods : Learning by doing		
		Total hours
		60

Students will undergo detailed training, observation, and project participation in one of the six chosen areas.

1. **Production Techniques:**
 - Enzyme.
 - Antibiotics.
 - Food and Beverages.
2. **Design and Development:**
3. Use of AI for identifying the pathogens.
4. Developing innovative techniques for production of microbial products.
5. **Sustainability Practices:**
 - Sustainable material sourcing and eco-friendly processes.
 - Waste management and recycling of microbial products.
6. **Preservation techniques for food and other products:**
 - Identifying market trends and consumer preferences.
 - Role of branding and marketing in fashion.

Internship Guidelines

1. **Selection of Internship Field:**
 - The internship should align with the student's area of study/ research.
 - Pre-approved organizations or sectors should be listed as options to ensure relevance and quality of experience.
2. **Learning Goals:**
 - Identify specific learning goals in the beginning, such as understanding workflow, technical skill-building, or industry standards.
 - Goals should be measurable and achievable within the internship period.
3. **Internship Supervisor:**
 - Each student should have an internal faculty mentor and an external supervisor from the Internship providing organization.
 - Supervisors will guide tasks and monitor performance through weekly reports.
4. **Activity Logbook/Maintenance of Internship Diary:**
 - Students must maintain a daily activity logbook or diary documenting activities, observations, challenges, and skills learned.
 - The logbook should be submitted as part of the final evaluation with video of 2-5 minutes.
5. **Weekly Report Submissions:**
 - Weekly progress reports should be submitted to the internal mentor, outlining achievements and reflections and Mentor should visit the Industry at least once.
 - Feedback from both the internal mentor and external supervisor will be essential to help students meet their learning goals.
6. **Performance Feedback by Mentor (External supervisor):** Mentor should mention the acquisition of skill sets by the intern.
7. **Presentation and Viva voce** will be conducted with the Guide, Respective HoD and Another HoD.

Tools for Assessment (50 Marks)

Activity Logbook		Performance Feedback by Mentor				Evaluation Report				Presentation & Viva Voce				
10		10				15				15				
Mapping														
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	M	L	H	L	M	M	H	M						
CO2	M	L	H	L	H	M	H	M						

CO3	M	L	H	L	H	H	H	H					
CO4	M	L	H	L	H	L	H	H					
CO5	H	M	H	L	H	H	H	H					

H-High; M-Medium; L-Low

Course designed by	Verified by Chairman
Dr. Dinesh. M.D	Dr. M. Thangavel

Course Code	Title		
24U4MBS503	Skill Enhancement Course VII – Medical Heritage of Ancient India		
Semester: V	Credits: 3	CIA :20 Marks	ESE:55 Marks
Course Objective	This course helps to Understand the Ancient Microbial diseases and its diagnosis		
Course Category	Skill Development		
Development Needs	Global		
Course Description	Students will be able to explain the nature of ancient diseases and the methods of treatments Role of ancient infections, pathogenesis, including collection, quality control, quality assurance, safety, setup, identification, susceptibility testing, and reporting results.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	To provide a general introduction to Indian Knowledge system	Lecture	Assignment
CO 2	To sensitize the students to the contributions made by ancient Indians in the field of Science, Philosophy and related applications and concepts	Lecture / Demonstration	Seminar
CO 3	To appreciate that the course would help to enhance efficiency, effectiveness, quality and excellence in the System of Indian Knowledge in Medical Sciences	Lectures / Video Lessons	Seminar
CO 4	To gain insight to conduct research and verify Indian knowledge	Tutorial / Videos	Seminar
CO 5	To develop readiness to undertake reforms and innovations in the practice of Indian Knowledge System	Lecture / Group Discussion	Quiz
PEO1	Describe the Ancient Indian Concept and classification of Indian scheme Knowledge in Medical Sciences.	Lecture / Group Discussion	Discussion
PE02	Discuss the importance of Ancient Indian Medical Knowledge System in present times	Lecture / Group Discussion	Discussion
Offered by	Microbiology		
Course Content	Instructional Hours / Week: 02		
Unit	Description	Text Book	Chapters
I	.Introduction to Indian Knowledge System –Historical Perspectives of IKS -Concepts of IKS - Need & Significance of IKS - Organization of IKS - Some salient aspects of IKS	1	
Instructional Hours			06
Suggested Learning Methods: Comics Preparation / You tube Videos			

II	Introduction to Vedas, A synopsis of the four Vedas, Sub-classification of Vedas, Messages in Vedas, Introduction to Vedāṅgas, Prologue on Śikṣā and Vyākaraṇa, Basics of Nirukta and Chandas, Introduction to Kalpa and Jyotiṣa, Vedic Life: Distinctive Features		2										
Instructional Hours			06										
Suggested Learning Methods: Demonstration													
III	Introduction to health, Āyurveda: approach to health, Sapta-dhātavaḥ: seven-tissues, Role of agni in health, Tri-doṣas, Āyurveda: definition of health, Psychological aspects of health, Disease management elements.		1										
Instructional Hours			06										
Suggested Learning Methods: Demonstration													
IV	Health and Wellness - Dinacaryā: daily regimen for health & wellness, Importance of sleep, Food intake methods and drugs, Approach to lead a healthy life, Indian approach to psychology, The tri guṇa system & holistic picture of the individual, The Nature of Consciousness, Consciousness studies and issues.		2										
Instructional Hours			06										
Suggested Learning Methods: Videos and Hands on training													
V	Medical Ethics in Ancient India – Definition – History of Medical ethics – Basic concepts of ethics in ancient India – Importance of Medical Ethics- Current perspectives of Medical Ethics.		2										
Instructional Hours			06										
Suggested Learning Methods: Laboratory practice / You tube Videos													
Total Hours			30										
Text Books	Introduction to Indian Knowledge system by Mahadevan												
Reference Books	Indian Knowledge System by Bhag Chand Chauhan – Based on NEP2020												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO₃	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO₅
CO1	L	H	L	L	M	M	L	M	M	M	M	L	L
CO2	H	H	M	L	H	H	L	M	M	M	M	L	L
CO3	H	H	M	L	H	H	L	H	H	H	M	L	H
CO4	H	H	H	H	H	H	L	H	H	H	H	L	L
CO5	M	H	H	H	H	L	L	H	H	H	H	H	H
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. M. Thangavel							Dr. M. Thangavel						

Course Code	Title	
24U4SEC503	Skill Enhancement Course VIII: Campus to Corporate	
Semester: V	Credit: 1	CIA: 25 Marks
Course Objective	The aim of the course is to train students and prepare them for the transition from campus to corporate. To create an awareness about industry requirement and opportunities. To train them on logical and Non-verbal Aptitude. To hone their skills to perform well in group discussion, presentation and face to face interviews.	
Course Category	Skill Development, Employability, Entrepreneurship	
Development Needs	Global	
Course Description	This course is a part of series of 3 courses aimed at enhancing the industry readiness of the students. This series aims at honing their multiple intelligence like Numerical, Linguistic, and Logical, spatial and interpersonal intelligence there by enhance their employability in the campus placements.	
Course Outcomes		
CO 1	Students must be ready to prepare and present themselves for any campus placements. They must be confident enough to attend and crack any recruitment process. They must develop an effective business communication like drafting email and cover letters	
CO 2	Students must be capable of preparing a personal profile to present themselves for any interview. They must be able to customise and present the same according to the requirements sought by various organisation they apply for.	
CO 3	Students will strengthen their problem-solving abilities in Aptitude and logical reasoning topics and prepare themselves for clearing any aptitude round during the campus placements – Level III	
CO 4	They must be confident to participate and contribute effectively in any Group Discussion.	
CO 5	Expand their presentation skills, including personal Introduction, and Interview Etiquette, and present themselves confidently in front of any interview panel	
Offered by	NCPIR	
Course Content		
Unit	Description	
I	Introduction & Orientation Course introduction - Training expectations - Pre-assessment - APR301(Aptitude), Industry Awareness	
		Instructional Hours
		03
II	Interview Etiquette Resume Building- Cover Letter - Group Discussion Inputs -Mock GD- Personal Information Round – Mock Interview -Assessments- APO301, APO302,	
		Instructional Hours
		18
III	Numerical Aptitude Permutation & Combination, Probability, Arithmetic Reasoning, Placement Paper I & II, Unit Assessments-AUA301, AUA302, AUA303 – Post Assessment APO301	
		Instructional Hours
		08
IV	Logical & Non-Verbal Reasoning Blood Relations, - Direction Sense-Unit Assessment – AUA304	
		Instructional Hours
		04

V	Writing Skills												
	Email Etiquette – Passage Writing												
	Instructional Hours											03	
Total Hours											36 Hrs		
Session	Topics											Unit	
1	Introduction & Orientation - APR301											1	
2	Industry Awareness											1	
3	Interview Etiquette - Resume Building											2	
4	Interview Etiquette – Writing a Cover Letter											2	
5	Interview Etiquette - Resume Correction & Feedback											2	
6	Interview Etiquette - Group Discussion - Do & Don'ts											2	
7	Interview Etiquette - Mock GD											2	
8	Interview Etiquette - Mock GD											2	
9	Interview Etiquette - Mock GD											2	
10	Interview Etiquette - Personal Information Round (Inputs)											2	
11	Interview Etiquette -Mock PIR											3	
12	Interview Etiquette -Mock PIR											3	
13	Interview Etiquette -Mock PIR											3	
14	Quantitative Aptitude – Permutation & Combination											3	
15	Quantitative Aptitude – Probability											3	
16	Quantitative Aptitude – Arithmetic Reasoning											3	
17	Quantitative Aptitude – Arithmetic Reasoning											4	
18	Logical Reasoning – Blood Relations											4	
19	Logical Reasoning – Direction Sense											4	
20	Placement Paper I											4	
21	Placement Paper II											5	
22	Email Etiquette											5	
23	Passage Writing											5	
24	Post Assessment											6	
Tools for Assessment (25 Marks)													
Mock Interview Process		Proctored Online Assessments in Quantitative & Verbal Aptitude – Level III							Attendance			Total	
10		10							5			25	
Mapping													
PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PS O3	PSO4	PS O5
CO1													
CO2													
CO3													
CO4													
CO5													
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						

Course Code	Title	
24U4SEC504	Skill Enhancement Course IX – Industrial Exploration	
Semester: V	Credit: 1	Total Marks: 25 Marks
Course Objective	To provide students with practical exposure to industrial practices, enhance their understanding of organizational workflows, and develop a real-world perspective on the Microbiology related industries.	
Course Category	Skill Development	
Development Needs	Local, Regional, National, Global	
Course Description	This course includes visits to industries establishments in Microbiology domain. Students will observe and interact with professionals, gaining insights into production processes, business strategies, and market trends.	
Course Content		
Module	Description	
1	Pre-Visit Preparation (6 Hours) 1. Overview of the industry, safety, etiquette or any other field of Practice. 2. Objectives and expectations of the visit.	
2	Industrial Visit (18 Hours) <ul style="list-style-type: none"> • Observation of organizational structures and operations. • Exposure to key processes in areas such as: <ul style="list-style-type: none"> ○ Medical industry. ○ Production of Microbial products:. ○ Food and Beverage production. ○ Marketing of Microbial products. ○ Interaction with industry professionals and Q&A sessions 	
3	Post-Visit Analysis and Reporting (6 Hours) <ul style="list-style-type: none"> • Discussion and reflection on the visit experience. • Preparation of an industrial visit report. • Presentation of observations and learning Outcomes. 	
Total Hours		30

Students will undergo detailed Industry Establishments for Visit in one of the six chosen areas.

1. Hospitals and Laboratories
2. Food and Dairy Industries.
3. Pharmaceutical Industries
4. Leather Industries.
5. Research Units like Molecular Laboratories.

Tools for Assessment (25 Marks)

Involvement in Industrial Visit	Group Discussion	Quiz	Total
5	10	10	25

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	H	L	M	M	H	M					
CO2	M	L	H	L	H	M	H	M					
CO3	M	L	H	L	H	H	H	H					
CO4	M	L	H	L	H	L	H	H					
CO5	H	M	H	L	H	H	H	H					

H-High; M-Medium; L-Low

Course designed by	Verified by Chairman
Dr. Dinesh M.D	Dr.M.Thangavel

SEMESTER VI

Course Code	Title		
23U3MBC616	Core Paper XVI – Recombinant DNA Technology		
Semester: VI	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	Students can acquire knowledge on the gene manipulation and tools used for construction of gene cloning. The students can understand and learn about the transformation techniques and recombinant product development.		
Course Category	Employability		
Development Needs	Global		
Course Description	Understand about the components required for gene manipulation, transfer of specific DNA into target cell by using vectors and production of recombinant products.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Distinguish the milestones of genetic engineering and DNA modifying enzymes.	Lecture / Video lessons	Assignment
CO 2	Formulate the ideas on usage of cloning vectors.	Lecture / Flipped Classroom	Assignment
CO 3	Device methods for transformation of DNA.	Lecture / Video Lessons	Quiz
CO 4	Understand about the PCR, DNA sequencing and blotting techniques.	Lecture / Tutorial	Seminar
CO 5	Learn about various recombinant product development and their uses.	Lecture / Case Studies	Seminar / Model presentation
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 5	
Unit	Description	Text Book	Chapters
I	Gene Manipulation: Definition and Applications. Milestones in genetic engineering and biotechnology. Restriction endonucleases, nomenclature, types, mode of action and its application.	1	3
	DNA modifying enzymes and their applications: DNA polymerases. Terminal deoxy nucleotidyl transferase, kinases and phosphatases and DNA ligases.	3	4
Instructional Hours			12
Suggested Learning Methods: Video lectures			
II	Cloning Vectors: Definition and Properties. Plasmid vectors: pBR and pUC series. Expression vector: Bacteriophage lambda and M13 based vectors. Yeast Vector: Shuttle vector, cosmid vector & YAC.	4	6

	DNA library & screening: cDNA library, Cloning strategies, linkage adaption, homeopoitic system, screening of recombinants.	2	7			
Instructional Hours			12			
Suggested Learning Methods: Video lecture and model presentation						
III	Transformation of DNA: Physical: biolistic method (gene gun), electroporation, microinjection. Chemical: liposome, PEG. Biological: Viral and <i>Agrobacterium</i> mediated delivery.	3	5			
Instructional Hours			12			
Suggested Learning Methods: Online Tutorial						
IV	PCR & DNA Sequencing: Types, principles and application of PCR. Blotting techniques - Southern, Northern and Western. RAPD - Rapid Amplification of cDNA ends. DNA sequencing: Chain termination method, automated sequencing, pyro sequencing and shotgun sequencing.	2	8			
Instructional Hours			12			
Suggested Learning Methods: Project based learning						
V	Products of recombinant DNA technology: Products of human therapeutic - insulin, hGH, antisense molecules. Bt transgenic – cotton and brinjal. Gene therapy, recombinant vaccines and protein engineering.	3	15-17			
Instructional Hours			12			
Suggested Learning Methods: Video lectures and group discussion						
Total Hours			60			
Text Books	<ol style="list-style-type: none"> 1. Sandy B Primrose, Richard Twyman and Robert H Old. Principles of Gene Manipulation, Wiley-Blackwell Publications, 7th Edition, 2013. 2. David P. Clark and Nanette J. Pazdernik. Molecular Biology, Academic Press, 2013. 3. T. A. Brown, Gene cloning and DNA Analysis – An Introduction, Blackwell Publishing, 8th Edition. Blackwell Publishing Ltd., 2020. 4. J.W. Dale, M. Von Schantz and Plant, N. From Genes to Genomes: Concepts and Applications of DNA Technology. John Wiley & Sons. 2012. 					
Reference Books	<ol style="list-style-type: none"> 1. A. Brown, Genomes III. 4th Edition, Garland Science Publishing, 2017. 2. Klug, Cummings, Spencer, Palladino, Killan, Concepts of Genetics, 12th Edition Pearson Education, Inc., 2018. 3. Leland H. Hartwell, Leroy Hood, Michael L. Goldberg Ann E. Reynolds, Lee M. Silver, Genetics – From Genes to Genomes, 4th Edition, McGraw-Hill, Publishing, 2016. 					
Web. URLs	<ol style="list-style-type: none"> 1. https://genomebiology.biomedcentral.com/articles/10.1186/s13059-018-1586-y 2. https://www.slideshare.net/DeepakKumar2053/assignment-on-recombinant-dna-technology-and-gene-therapy 					
Tools for Assessment (20 Marks)						
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
4	4	5	2	2	3	20
Mapping						

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	M	M	H	M	H	H	M	H	L	M
CO2	H	H	M	H	M	H	M	H	H	L	M	L	M
CO3	H	H	H	M	H	H	M	H	H	M	H	L	M
CO4	H	H	M	M	M	M	M	H	H	L	L	L	L
CO5	H	H	M	H	M	H	M	H	M	L	L	M	M

H-High; M-Medium; L-Low

Course designed by	Verified by Chairman
Dr. S. Esath Natheer	Dr. M. Thangavel

Course Code	Title		
23U3MBC617	Core Paper XVII – Food and Dairy Microbiology		
Semester: VI	Credits: 3	CIA:20 Marks	ESE: 55 Marks
Course Objective	To understand and enable the students to isolate the microorganisms, methods of preservation of foods, Pasteurization, processing methods in the field of food and dairy microbiology		
Course Category	Employability		
Development Needs	Global		
Course Description	The students gain knowledge to working in the food and dairy industry as a quality controller, manager and to learn how to test the sample, aseptic packaging and their preservation methods to increase the shelf life of the products.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the history of food microbiology and various parameters affecting microbial growth	Flipped classroom/Lectures	Assignment
CO 2	Gain knowledge on food preservation techniques.	Lectures / Video Lessons	Seminar
CO 3	Diagnose specific types of microbial spoilage during various food shelf-life stages in dairy field	Lectures / Group Discussion	Quiz
CO 4	Know about the use of microorganisms in food industries for public health benefits.	Lectures / Video Lessons	Seminar / Assignment
CO 5	Gain knowledge on various Enforcement and control Agencies for food products	Lectures and Flipped classroom	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week : 5	
Unit	Description	Text Book	Chapter
I	Microorganism involved in Food: Common Food borne Pathogen-Bacteria, Mold and Significance of microorganisms in Foods. Types of food: Fruits and fruit products, Vegetables and vegetable products. Parameters Affecting Microbial Growth: Intrinsic, Extrinsic.	2	1
		3	5
		2	3
Instructional Hours			12
Suggested Learning Methods: Group learning			
II	Methods of food preservation. Use of high temperatures, freezing, ionizing Radiation, Microwave processing and aseptic packaging. Use of chemicals preservatives - organic acids, sulphur-dioxide, salts and high sugar concentration	1	5
		1	6
		3	4
Instructional Hours			12
Suggested Learning Methods: Quizzes			
III	Food borne diseases: Staphylococcal, <i>E. coli</i> , Salmonellosis, shigellosis, Listerial infections. Food in toxification <i>Clostridium botulinum</i> , <i>Clostridium perfringens</i> Brucella association with food. Fungal toxins, Aflatoxins Alternaria Toxins, Toxigenic Phyto planktons and viruses.	3	7
		3	8
Instructional Hours			12
Suggested Learning Methods: Group learning			

IV	Microbiology of Raw Milk: Introduction, initial Microflora of raw milk, Total raw milk bacterial count- SPC method.		4	8									
	Microorganism present in raw milk: Psychrotrophic microflora, Coliform bacteria		1	22									
	Fermented and Microbial Food: Cheese, Yogurt (curd), Spoilage of food (Skimmed Milk, Canned food, Vegetables, fruits, fish, poultry product, meat and meat products). Aseptic packing of food. QC check of milk. Antimicrobial activity of Lactic acid bacteria		2	9									
			3	4									
			3	9									
Instructional Hours				12									
Suggested Learning Methods: Lectures													
V	Enforcement and control Agencies: Food quality, food safety, food adulteration, international agencies, FDA, HACCP, FSSIA, Microbiological criteria for food, Protocols for CCP Deviations		1	11									
			3	11									
Instructional Hours				12									
Suggested Learning Methods: Lectures													
Total Hours				60									
Text Books	<ol style="list-style-type: none"> Frazier. W.C and D.C Westhoff. (1978). Food Microbiology. 3rd Ed. Tata Macgraw Hill publishing Co., New Delhi. Adams. M. R and M. D Moss. (1995). Food Microbiology. New Age International limited. Adams. M. R and M. D Moss. Maurice O Mass (2008). Food Microbiology. 3rded, RSC publishing International limited. Richard Robinson.K,(2002) Dairy Microbiology Hand book 3rd edition by John Wiley and Sons, Inc., New York 												
Reference Books	<ol style="list-style-type: none"> Roday. S. (1998). Food Hygeine and Sanitation. Tata Mcgraw Hill Publications. Pradeep Parihar and Leena Parihar.(2015). Dairy Microbiology Agrobios (INDIA). Jay.J.M., Loessener M.J and Golden. D. A. (2005). Modern Food Microbiology, Spinger 												
Web. URLs	http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/food_and_nutrition/02_food_safety_and_quality_control/21_international_and_national_food_regulatory_agencies/et/7359_et_et.Pdf												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	L	H	L	M	L	L	M	M	L	L	M
CO2	M	H	L	M	L	L	L	L	L	M	H	L	M
CO3	M	M	L	H	M	L	M	L	L	M	L	M	L
CO4	L	H	L	M	L	M	L	L	M	M	L	L	M
CO5	H	M	M	L	L	M	L	M	L	M	H	M	L
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. Dinesh M D							Dr. M. Thangavel						

Course Code	Title		
24U3MBP618	Core Paper XVIII – Industrial and Food Microbiology Practical		
Semester: VI	Credits: 3	CIA: 30 Marks	ESE: 45 Marks
Course Objective	To assimilate knowledge across Environment, agriculture and food microbiology discipline.		
Course Category	Skill Development / Employability		
Development Needs	Global		
Course Description	Students will develop skills on the isolation, enumeration and assessment of microorganisms from air, water, plants, food and milk samples.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	To get hands on exposure for the analysis of microorganisms present in air.	Lecture / Hands on	Behaviour & Performance
CO 2	To interpret the analysis of water to confirm the presence or absence of microorganisms.	Lecture / Hands on	Observation
CO 3	To acquire knowledge on isolation and identification of bacteria and fungi from the infected plant materials.	Lecture / Hands on	Performance
CO 4	To develop skills on isolation and enumeration of bacteria and fungi from spoiled foods.	Lecture / Hands on	Performance
CO 5	To understand the assessment methods involved in checking the quality of milk.	Lecture / Hands on	Observation
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 5	
Exp No	Experiments		
1.	Production of Wine from grapes		
2.	Alcohol fermentation by <i>Saccharomyces cerevisiae</i>		
3.	Starch (Amylase), casein (Protease) and lipid (Lipase) hydrolyses tests		
4.	Most Probable number count method for estimation of water quality		
5.	MBRT (Methylene Blue Reductase test) for the detection of milk quality		
6.	Antibiotic susceptibility test using Muller Hinton Agar		
7.	Isolation of casein from the given milk products		
8.	Isolation and Identification of the given bacterial populations from the given fruit juice		
9.	Alcohol estimation of the given wine sample by using dichromate oxidation method		
10.	Microbiological examination of foods - Isolation and enumeration of bacteria and fungi from fresh and spoiled fruits and vegetables		
11.	Detection of bacterial spoilage of canned food.		
12.	Isolation of probiotics from the given milk sample		

13.	Isolation and enumeration of fungal populations from the given meat products.													
											Total Hours	60		
Text Books	<ol style="list-style-type: none"> 1. Rajan, S. and R. Selvi Christy. Experimental Procedures in Life Sciences. Anajana Book House, Chennai, 2015. 2. James G Cappuccino and N. Sherman. Microbiology - A Laboratory Manual (4th edition). The Benjamin publishing company, New York. 2016. 3. Okafor, N. Environmental Microbiology of Aquatic & Waste Systems. 1st edition, Springer, New York, 2011. 													
Reference Books	<ol style="list-style-type: none"> 1. Dubey, R.C. and D.K. Maheshwari. Practical Microbiology. S Chand and Co. Ltd., New Delhi, 2002. 2. Aneja, K.R. Experiments in Microbiology, and Biotechnology. New Age International (P) Limited Publishers, 2010. 3. Gunasekaran P. Laboratory Manual in Microbiology. New Age International, 2007. 													
Web. URLs	<ol style="list-style-type: none"> 1. https://microbenotes.com/fields-of-microbiology/ 2. https://bio.libretexts.org/Bookshelves/Microbiology/Book%3AMicrobiology_(Boundless)/1%3A_Introduction_to_Microbiology/1.3%3A_The_Science_of_Microbiology/1.3B_Applied_Microbiology 													
Tools for Assessment (30 Marks)														
Laboratory Performance						Test - I	Test - II	Observation notebook	Total					
Level of engagement in lab	Preparation	Result												
4	4	4	7	7	4	30								
Mapping														
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	M	H	M	H	H	M	M	H	H	M	M	L	H	
CO2	H	M	M	H	H	H	H	H	H	M	L	L	M	
CO3	M	M	M	H	M	L	L	M	M	H	M	M	H	
CO4	M	M	M	H	H	M	M	M	H	M	L	M	H	
CO5	H	H	H	H	H	M	M	M	H	L	L	L	M	
H-High; M-Medium; L-Low														
Course designed by							Verified by Chairman							
Dr. S. Esath Natheer							Dr. M. Thangavel							

Course Code	Title		
24U4MBV619	Project and Viva voce		
Semester: VI	Credits: 4	CIA: 40 Marks	ESE: 60 Marks
Course Objective	To equip students with problem-solving skills and practical knowledge by identifying, analyzing, and addressing challenges in microbiology related industry through hands-on training and research.		
Course Category	Employability, Entrepreneurship		
Development Needs	Local, National and Global		
Course Description	This course offers experiential learning through industry exposure, enabling students to investigate real-world problems, develop innovative solutions, and gain insights in various fields of Microbiology		
Course Outcomes		Assessment Methods	
CO 1	Identify the Microbiology related problems in the society	Presentation	
CO 2	Formulate suitable measures to analyze the problem.	Presentation	
CO 3	Plan suitable methodology.	Presentation	
CO 4	Propose suitable solution for problem identifying.	Presentation	
CO 5	Apply a suitable solution to resolving the problem.	Project	
Offered by	Microbiology		
Course Content			
S. No.	Experiment		
	The Students should undergo training at any one area listed and submit a Report		
1.	Medical Industry		
2.	Pharmaceutical		
3.	Leather Industry		
4.	Dairy Industry		
5.	Food Industry		
6.	Beverage Industry		
7.	Quality controller		
8.	Any other related to Microbiology domain		
Total Hours : 90			

Tools for Assessment (40 Marks)

Review I (Last Week of December)	Review II (Last Week of January)	Review III (Last Week of February)	Documentation (First Week of March)	Total
10	10	10	10	40

Mapping

PO/PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	H	H	H	M	H	H	H	L	M	H
CO2	H	M	H	M	L	H	H	M	M	M	M	H	H
CO3	M	H	M	L	L	H	H	H	H	L	H	H	H
CO4	M	H	H	L	M	M	H	H	H	L	H	H	M
CO5	H	L	M	M	H	M	M	H	M	M	L	M	M

H-High; M-Medium; L-Low

Course designed by	Verified by
Dr. Dinesh. M.D	Dr. M. Thangavel

Review	Description
Review 1	<p>Project Proposal and Initial Research</p> <ul style="list-style-type: none"> • Project Proposal: Submit a detailed project proposal outlining objectives, expected outcomes, and timeline. • Initial Research: Conduct background research, reviewing literature, relevant case studies, or existing solutions. • Weekly Log Submission: Document research activities and begin compiling references.
	<p>Project Planning and Framework Development</p> <ul style="list-style-type: none"> • Define Scope and Methodology: Clarify the project's scope, and outline a methodology or framework. • Resource and Sample Collection: Identify and collect resources, such as datasets, software, materials, and equipment. • First Interim Report: Submit a report covering the scope, methodology, and initial findings.
Review 2	<p>Execution and Data Analysis</p> <ul style="list-style-type: none"> • Project Execution: Implement the planned methodology or framework, conducting experiments, coding, or data analysis as needed. • Sample Collection and Analysis: Collect and analyze sample based on project requirements. • Mid-Term Review: Present findings, challenges, and progress to the advisor.
Review 3	<p>Project Completion and Testing</p> <ul style="list-style-type: none"> • Final Stages of Execution: Complete the project and conduct any necessary testing, validation, or quality checks. • Prepare Final Report and Presentation: Begin drafting the final report and prepare for the presentation. • Final Interim Submission: Submit a summary report of completed work and testing outcomes.
	<p>Submission and Presentation</p> <ul style="list-style-type: none"> • Final Report Submission: Submit the final project report, covering all stages, results, and conclusions. • Final Presentation: Present project findings, process, and outcomes to a panel of faculty members for evaluation.

Course Code	Title		
23U3MBE604	Discipline Specific Elective Paper II – Group A – Biosafety and Intellectual Property Rights		
Semester: VI	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	This course helps to adhere to the ethical practices appropriate to the discipline at all times, adopt safe working practices relevant to the industries and in research field.		
Course Category	Skill Development		
Development Needs	Global		
Course Description	To describe the biosafety regulations and ethical concepts in biotechnology. Understand the patent process and recognize the parts of a patent document and their significance		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Identify potential hazardous biological materials and the risks associated with them.	Lecture	Assignment
CO 2	Describe the biosafety regulations and ethical concepts in biotechnology.	Lecture	Assignment
CO 3	Disseminate knowledge on patents, patent regime in India and abroad.	Video Lessons	Quiz
CO 4	Understand the patent process and recognize the parts of a patent document and their significance.	Tutorial	Seminar
CO 5	Explicate patent agreements.	Lecture	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 5	
Unit	Description	Text Book	Chapters
I	Biosafety: Introduction; biosafety issues in biotechnology; Biological Safety Cabinets & their types; Primary Containment for Biohazards; Biosafety Levels of Specific Microorganisms	1	8
Instructional Hours			12
Suggested Learning Methods : Video lectures			
II	Biosafety Guidelines: Biosafety guidelines and regulations (National and International); GMOs/LMOs- Concerns and Challenges; Role of Institutional Biosafety Committees (IBSC), RCGM, GEAC etc. for GMO applications in food and agriculture; Environmental release of GMOs; Risk Analysis; Risk Assessment.	1	11&12
Instructional Hours			12
Suggested Learning Methods: Model and presentation			
III	Introduction to Intellectual Property: Patents, Types, Trademarks, Copyright & Related Rights, Industrial Design and Rights, Traditional Knowledge, Geographical Indications- importance of IPR – patentable and non-patentables – patenting life – legal protection of biotechnological inventions – World Intellectual Property Rights Organization (WIPO).	2	1
Instructional Hours			12
Suggested Learning Methods : Video lectures			

IV	Grant of Patent and Patenting Authorities: Types of patent applications: Ordinary, PCT, Conventional, Divisional and Patent of Addition; An introduction to Patent Filing Procedures; Patent licensing and agreement; Patent infringement- meaning, scope, litigation, case studies, Rights and Duties of patent owner.		1	4,5									
Instructional Hours				12									
Suggested Learning Methods: Group chart													
V	Agreements and Treaties: GATT, TRIPS Agreements; Role of Madrid Agreement; Hague Agreement; WIPO Treaties; Budapest Treaty on international recognition of the deposit of microorganisms; Indian Patent Act 1970 & recent amendments		3	2									
Instructional Hours				12									
Suggested Learning Methods: Video lectures													
Total Hours				60									
Text Books	<ol style="list-style-type: none"> Goel D & Prashar S., IPR, Biosafety and Bioethics. Pearson, 2013. Parashar, Shomini, IPR, Biosafety & Bioethics, 2013. Sree Krishna V, Bioethics and Biosafety in Biotechnology, New age international Pvt., Ltd., Publishers, 1st Edition, 2007. 												
Reference Books	<ol style="list-style-type: none"> Bare Act, Indian Patent Act 1970 Acts & Rules, Universal Law Publishing Co. Pvt. Ltd., New Delhi, 2007 Kankanala C., Genetic Patent Law & Strategy, 1st Edition, Manupatra Information Solution Pvt. Ltd., New Delhi, 2007. Mittal, D.P., Indian Patents Law, Taxmann, Allied Services (P) Ltd, 1999. <p>Singh K K., (2015). Biotechnology and Intellectual Property Rights: Legal and Social Implications, Springer India, 2015.</p> <p>Senthil Kumar Sadhasivam and Mohammed Jaabir, M. S., IPR, Biosafety and Biotechnology Management. Jasen Publications, Tiruchirappalli, India, 2008</p>												
Web. URLs	https://ipindia.gov.in/writereaddata/Portal/IPOAct/1_31_1_patent-act-1970-11march2015.pdf												
Tools for Assessment (25 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
5	5	6	3	3	3	25							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	M	L	M	L	L	L	M	M	H	L	M	L
CO2	L	M	L	L	L	H	M	L	L	L	M	H	M
CO3	L	H	L	M	L	L	H	L	L	M	L	M	M
CO4	M	H	L	M	L	L	M	M	M	M	L	L	M
CO5	L	M	M	H	M	M	H	L	L	M	L	L	M
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. Thulasi Sivaraman							Dr. M. Thangavel						

Course Code	Title		
23U3MBE605	Discipline Specific Elective Paper II – Group B – Plant Pathology		
Semester: VI	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	The objectives of the Plant Pathology are the study on: the living entities that cause diseases in plants; the non-living entities and environmental conditions that cause disorders in plants; the mechanisms by which the disease-causing agents that produce diseases; the interactions between the disease-causing agents.		
Course Category	Employability		
Development Needs	Global		
Course Description	Learn about the biology and ecology of plant pathogenic organisms, plant disease epidemiology, evolution, phylogenetics and systematics of plant pathogens, defense mechanism in plants and plant disease management strategies.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand about the early development of plant diseases.	Lecture / Video lessons	Assignment
CO 2	Recognize the etiological agents of diseases.	Lecture /	Assignment
CO 3	Familiarize students with the basic plant disease spread and their control.	Lecture / Video Lessons	Seminar
CO 4	Gain knowledge on processes of infection and colonization of the host by the pathogens.	Lecture / Video Tutorial	Quiz
CO 5	Describe the aspects of integrated pest management and recognize the etiological agents of diseases.	Lecture / Model presentation	Seminar / Model presentation
Offered by	Microbiology		
Course Content		Instructional Hours / Week : 5	
Unit	Description	Text Book	Chapters
I	Introduction and history of plant pathology: The herbalists, the systematics, beginning of the modern period, Doctrine of spontaneous generation, discovery of Bordeaux mixture, plant pathology in 20 th century, genetics of the host and pathogen, environment in relation to plant disease, nature of disease resistant, biochemistry and physiology of diseased host plant, molecular biology of pathogenesis and induced systemic resistance, tissue culture in plant pathology, history and development of plant pathology in India.	2	2
Instructional Hours			12
Suggested Learning Methods: Video lectures			

	Pathogenesis: Penetration and entry by plant pathogens, pre-penetration, entry through natural openings, direct penetration, entry through wounds, wounds caused by other fungus, wound caused by nematodes, entry through root hairs and buds, development inside host tissues.	2	3
II	Important plant diseases giving emphasis on its etiological agent, symptoms, epidemiology and control measures - Important diseases caused by fungi White rust of crucifers <i>Albugo candida</i> , Downy mildew of onion – <i>Peronospora destructor</i> , Late lack stem rust of wheat – <i>Puccinia graminis</i> f. Sp. <i>tritici</i> , Looses mut of wheat – <i>Ustilago nuda</i> . Wilt of tomato – <i>Fusarium oxysporum</i> f.sp. <i>lycopersici</i> . Important diseases caused by viruses: Papaya ring spot.	4	6-8
Instructional Hours			12
Suggested Learning Methods: Online tutorial			
III	Plant disease epidemiology: Introduction, theories of epidemic development, development of disease in time, development of disease in space, fitting disease progress curves to epidemiological data, the role of the pathogen, sources of inoculum, vectors, the role of the host, host-plant distribution, the effect of host resistance on inoculums multiplication, the role of the environment, the soil, the atmosphere.	1	3
Instructional Hours			12
Suggested Learning Methods: Model presentation			
IV	Defense Mechanisms in Plants - Concepts of constitutive defense mechanisms in plants, inducible structural defenses (histological cork layer, abscission layer, tyloses, gums), inducible biochemical defenses [hypersensitive response (HR), systemic acquired resistance (SAR), phytoalexins, pathogenesis related (PR) proteins, plant bodies, phenolics, quinones, oxidative bursts].	2	4-6
Instructional Hours			12
Suggested Learning Methods: Video lectures			
V	Plant Disease Management: Cultural practices for disease management - pathogen free propagation material, removal of infected plants, soil treatment, hygiene, crop rotation, fertilization, quarantine, chemical plant disease control - fungicides, biological control of plant diseases.	3	15-17
Instructional Hours			12
Suggested Learning Methods: Model presentation and video lectures			
Total Hours			60

Text Books	<ol style="list-style-type: none"> 1. Richard N. Strange, Introduction to Plant Pathology, John Wiley & Sons Ltd., 2006. 2. Mehrotra, R.S., Ashok Aggarwal. Fundamentals of Plant Pathology, McGraw Hill Education India Pvt., Ltd., 2013. 3. Anne M.T., B. David, Collinge, A. Djurle., Plant Pathology and Plant Diseases, CAB international, 2020. 4. Sambamurthy, Text Book of Plant Pathology, 1st Edition, I.K. International Pvt., Ltd., 2010.
Reference Books	<ol style="list-style-type: none"> 1. Christian, J.R. and Cumagun, Plant Pathology, Published by In Tech., 2012. 2. Singh, R.S. Introduction to Principles of Plant Pathology, 4th Edition, Oxford & IBH Publishing Co. Pvt. Ltd., 2009.
Web. URLs	<ol style="list-style-type: none"> 1. http://ipm.ucanr.edu/PMG/diseases/diseaseslist.html 2. http://www.hillagric.ac.in/edu/coa/ppath/lect/plpath111/Lect.%207%20PI%20Path%20111-%20%20DEFENCE%20IN%20PLANTS.pdf 3. file:///C:/Users/Admin/Downloads/Plant-Pathogens-Principles-of-Plant-Pathology.pdf

Tools for Assessment (25 Marks)

CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total
5	5	6	3	3	3	25

Mapping

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	L	M	M	M	H	M	M	M	H	M	H	H
CO2	H	H	H	H	M	M	H	M	M	H	L	L	H
CO3	M	M	M	H	H	M	H	H	L	H	L	L	M
CO4	H	H	M	H	M	H	H	M	L	M	M	M	M
CO5	H	H	H	H	M	M	M	H	L	M	H	M	H

H-High; M-Medium; L-Low

Course designed by	Verified by Chairman
Dr. B. David Jayaseelan	Dr. M. Thangavel

Course Code	Title		
23U3MBE606	Discipline Specific Elective Paper II – Group C Microbial Quality Control in Food and Pharmaceutical Industries		
Semester: VI	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	This course impart skills to students in the area of Quality Control for food and pharmaceutical industries to ensure that their final products are consistent, safe, effective and predictable		
Course Category	Skill Development		
Development Needs	Global		
Course Description	This course aims to introduce the essential elements of quality control and various aspects of microbiological quality control including Bioburden estimation, sterility testing, specific pathogens detection, environmental monitoring, personal hygiene monitoring, etc. with theoretical discussions and practical demonstrations		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Acquire knowledge about Good Laboratory Practices and biosafety.	Flipped classroom/Lectures	Assignment
CO 2	Gain an in-depth knowledge in Determining Microbes in Food.	Lectures / Video Lessons	Seminar
CO 3	Understand the concepts of determining Microbes in Pharmaceutical.	Lectures / Group Discussion	Quiz
CO 4	Acquire knowledge about Pathogenic Microorganisms.	Lectures / Video Lessons	Seminar / Assignment
CO 5	Outline the basic steps about Food Safety and Microbial Standards.	Lectures and Flipped classroom	Seminar
Offered by	Microbiology		
Course Content	Instructional Hours / Week: 5		
Unit	Description	Text Book	Chapter
I	Microbiological Laboratory and Safe Practices: Good laboratory practices, Good microbiological practices. Biosafety cabinets – Working of biosafety cabinets, using protective clothing, specification for BSL-1, BSL-2, BSL-3. Discarding biohazardous waste – Methodology of Disinfection, Autoclaving & Incineration.	1	1
Instructional Hours			12
Suggested Learning Methods : Group learning			
II	Methods for Determining Microbes: Culture and microscopic methods - Standard plate count, Most probable numbers, Biochemical and immunological. Concepts of food safety. Methods of preventing food contaminants.	1	4,5
Instructional Hours			12
Suggested Learning Methods : Quizzes			
III	Determining Microbes in Pharmaceutical: Methods: Limulus lysate test for endotoxin, gel diffusion, sterility testing for pharmaceutical products. Concepts of quality management. Molecular methods - Nucleic acid probes, PCR based detection, biosensors.	1	6-9
Instructional Hours			12
Suggested Learning Methods: Group learning			

IV	Pathogenic Microorganisms of importance in Food & Water: Detection of specific microorganisms - on XLD agar, Salmonella Shigella Agar, Manitol salt agar, EMB agar, MacConkey Agar, Saboraud Agar. Ascertaining microbial quality of milk by MBRT, Rapid detection methods of microbiological quality of milk at milk collection centres (Resazurin assay).							2	6				
Instructional Hours								12					
Suggested Learning Methods: Lectures													
V	HACCP for Food Safety and Microbial Standards: Hazard analysis of critical control point (HACCP) - Principles, flow diagrams, limitations Microbial Standards for Different Foods and Water – BIS standards for common foods and drinking water. Application of quality assurance in food industry.							3	3				
Instructional Hours								12					
Suggested Learning Methods: Lectures													
Total Hours								60					
Text Books	<ol style="list-style-type: none"> Baird RM, Hodges NA and Denyer SP. Handbook of Microbiological Quality Control in Pharmaceutical and Medical Devices, Taylor and Francis Inc., 2005. Cangliang Shen and Yifan Zhang, Food Microbiology Laboratory for the Food Science Student: A Practical Approach, Springer Publications, 2017. Martin Cole, A simplified guide to understanding and using Food Safety Objectives and Performance Objectives, International Commission on Microbiological Specifications for Foods (ICMSF), 2002. 												
Reference Books	<ol style="list-style-type: none"> Jay JM, Loessner MJ, Golden DA. Modern Food Microbiology, 7th Edition, Springer, 2005. Garg N, Garg KL and Mukerji KG. Laboratory Manual of Food Microbiology, IK International Publishing House Pvt. Ltd., 2010. 												
Web. URLs	<ol style="list-style-type: none"> https://www.biologydiscussion.com/food-microbiology/microbiological-quality-control-of-food-microbiology/59564 												
Tools for Assessment (25 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
5	5	6	3	3	3	25							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO2	PSO 3	PS O4	PSO5
CO1	H	H	L	L	H	L	H	L	L	H	L	L	M
CO2	H	L	H	M	L	L	M	H	M	L	M	M	L
CO3	H	L	L	M	H	H	H	L	M	H	M	H	M
CO4	H	L	H	M	H	H	M	H	M	H	M	L	L
CO5	H	M	H	H	H	M	L	H	H	H	H	L	M
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. R. Kasimani							Dr. M. Thangavel						

Course Code	Title		
23U3MBE607	Discipline Specific Elective Paper III- Group A – Nanobiotechnology		
Semester: VI	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	The course focuses on the insight of the fundamentals of nanotechnology in biological and biomedical research. The course also gives the knowledge on how the nanomaterials are employed in analytical and medicinal rationales.		
Course Category	Employability and Skill Development		
Development Needs	Global		
Course Description	Nanotechnology is an interdisciplinary field and attracts students from various disciplines. This course provides basic overview of nanomaterials and their applications. This course begins with a review of various types of nanomaterials and an introduction to general terminologies.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the basics of Biotechnology- Nano sized structures.	Flipped classroom/Lectures	Quiz
CO 2	Explain the interaction between biomolecules and nanoparticle surface and its applications.	Lectures / Video Lessons	Seminar
CO 3	Optimize the synthesis of Biocompatibility of Nanomaterials	Lectures / Group Discussion	Assignment
CO 4	Analyze different types of DNA based Nanostructures	Lectures / Video Lessons	Seminar / Assignment
CO 5	Identify drug delivery system and mechanism of drug delivery using nanoparticles.	Lectures and Flipped classroom	Seminar
Offered by	Microbiology		
Course Content	Instructional Hours / Week :5		
Unit	Description	Text Book	Chapters
I	Introduction to the science of nano as nanobiotechnology Development of nanobiotechnology - timelines and progress, overview. Basics of biology - cell, organelles and nucleic acids as genetic material. Bio macromolecules - Carbohydrates, lipids, proteins, and Nucleic acids.	5, 2	1,2
Instructional Hours			12
Suggested Learning Methods: Group learning			
II	Nanomaterial in biotechnology - nanoparticles, quantum dots, nanotubes and nanowires. Biosensors; different classes -molecular recognition elements, transducing elements.	3	22
Instructional Hours			12
Suggested Learning Methods: Group learning			
III	Applications of molecular recognition elements in nanosensing of different analytes. Application of various transducing elements as part of nanobiosensors. Miniaturized devices in nanobiotechnology - types and applications, lab on a chip concept.	2	19, 20
Instructional Hours			12
Suggested Learning Methods: Video lectures			

IV	Biological nanoparticles production - plants and microbial. Nanobiotechnological applications in health and disease - infectious and chronic. Nanobiotechnological applications in Environment and food - detection and mitigation							4	14				
Instructional Hours								12					
Suggested Learning Methods: Lectures and Animations													
V	Drug Nanoparticles- Structure and Preparation, Liposomes, Characterization- Nanoparticles for crossing biological membranes. Fundamentals- Physicochemical Principles of Nanosized Drug Delivery Systems-Nanotubes, Nanorods, Nanofibers, and Fullerenes for Nanoscale Drug Delivery, Carbon nanotubes biocompatibility and drug delivery							2	24				
Instructional Hours								12					
Suggested Learning Methods: Lectures													
Total Hours								60					
Text Books	<ol style="list-style-type: none"> Jain K.K, Nanobiotechnology in Molecular Diagnostics –Current Techniques and Applications, Taylor and Francis Publications 2006. P. Boisseau, P. Houdy, M. Lahmani Nanoscience Nanobiotechnology and Nanobiology, springer press, 2007 Nanobiotechnology: Concepts, Applications and Perspectives (2004), Christof M. Niemeyer (Editor), Chad A. Mirkin (Editor), Wiley VCH. Nanobiotechnology - II more concepts and applications. (2007) - Chad A Mirkin and Christof M. Niemeyer (Eds), Wiley VCH. Nanotechnology in Biology and Medicine: Methods, Devices, and Applications 												
Reference Books	1. Textbook of Nanoscience and Nanotechnology B.S. Murthy, P. Shankar, Baldev Raj, B B Rath, James Murday Springer press, 2013												
Web. URLs	<ol style="list-style-type: none"> https://www.nanowerk.com/nanobiotechnology.php https://ocw.snu.ac.kr/sites/default/files/NOTE/8751.pdf https://jnanobiotechnology.biomedcentral.com/articles/10.1186/1477-3155-10-31. 												
Tools for Assessment (25 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz	Total							
5	5	6	3	3	3	25							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	L	L	H	H	L	L	L	L	M	M	L	H
CO2	L	L	L	H	H	L	L	M	L	M	L	L	H
CO3	L	L	L	H	H	L	L	M	L	M	M	M	M
CO4	L	L	L	H	H	L	L	M	H	M	M	L	H
CO5	L	L	L	H	M	M	M	H	H	M	M	H	H
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. K. E. Vivekanandan							Dr. M. Thangavel						

Course Code	Title		
23U3MBE608	Discipline Specific Elective Paper III Group B - Microbiology and Entrepreneurship		
Semester : VI	Credits : 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	Gain advanced knowledge on designing, launching and running a new business using potential microorganisms.		
Course Category	Employability		
Development Needs	Global		
Course Description	Students have the ability on entrepreneurship that enable to combine science with business skills and give way for employability.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the basic concepts of entrepreneurship and become a young women Entrepreneur.	Lecture / Video lessons	Assignment
CO 2	Get knowledge in mushroom cultivation and other value added products.	Demo / Model Preparation	Model Preparation
CO 3	Attain technical knowledge on different composting technology.	Demo / Model Preparation	Model Preparation
CO 4	Interpret the production of biopesticides and biopesticides.	Lecture / Video Tutorial	Seminar
CO 5	Summarize the details of patents and processing of patents.	Lecture	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week : 5	
Unit	Description	Text Book	Chapters
I	History and concept of Entrepreneurship: Characteristics & Functions and types of Entrepreneurs. Entrepreneurship – role in economic development. common problem in Entrepreneurship – Factors affecting entrepreneurial growth. Management concepts, Marketing Strategies	1	1
Instructional Hours			12
Suggested Learning Methods: Video lectures			
II	Mushroom cultivation: Edible mushroom morphology, Nutritional and medicinal value. Preparation of spawn, types of spawning. Preparation of substrate - Casing – harvesting. Storage, Preservation and marketing. Mushroom diseases and its management Value added products: Cookies, Soup, Omlette, Samosa, Noodles, Pickles and Curry, Plate making and Marketing.	2	2-5
Instructional Hours			12
Suggested Learning Methods: Online tutorial			
III	Vermicomposting: Biology and ecological classification of earthworm. Physical and chemical effects of earthworm on soil, Vermicomposting - species employed, methods and types of production – preparation of vermin wash – Field application and crop response, Storage and marketing of composts. Vermi Brick preparation.	3	3-9

Instructional Hours											12				
Suggested Learning Methods: Model presentation															
IV	Biofertilizer: Rhizobium, BGA, Azolla, VAM – bioinoculum, mass production- carriers, field application and crop response and Liquid biofertilizers. Biopesticide – bacteria and fungi. Production of SCP – Spirulina and Yeast.										4	2			
	Instructional Hours													12	
Suggested Learning Methods: Video lectures															
V	Patents and process: History of Indian patent system, Patenting authorities, requirements of patenting, types of patents, types of patent applications in India, farmer's rights.										5	16			
	Instructional Hours													12	
Suggested Learning Methods: Model presentation and video lectures															
Total Hours											60				
Text Books		<ol style="list-style-type: none"> 1. Khanka S.S. Entrepreneurial Development. S. Chand & Company, New Delhi. 3rd Edition, 2003. 2. Kanniyar.S and Ramaswamy K. A. Handbook of Edible Mushrooms. Today's and Tomorrow's Printers, New Delhi, 1980. 3. Rhonda Sherman, The Worm Farmer's Handbook. Chelsea Green Publishing, 2018. 4. Panda H, Manufacture of Biofertilizer and Organic Farming, Asia Pacific Business Press, 2011. 5. Sateesh MK., Bioethics and Biosafety, I.K. International Publishing House Pvt. Ltd., 2008. 													
Reference Books		<ol style="list-style-type: none"> 1. Vasant Desai. Dynamics of Entrepreneurial Development and Management. Himalaya Publishing House, New Delhi, 2001. 2. Chang S.T and Hayes W.A. Biology and Cultivation of Mushrooms. Academic Press, New York, 1978. 													
Web. URLs		<ol style="list-style-type: none"> 1. https://aggie-horticulture.tamu.edu/food-technology/food-processing-entrepreneurs/microbiology-of-food/ 													
Tools for Assessment (25 Marks)															
CIA I			CIA II			CIA III		Assignment		Seminar		Demo		Total	
5			5			6		3		3		3		25	
Mapping															
CO \ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5		
CO1	H	M	M	M	H	M	M	H	H	M	L	L	H		
CO2	H	H	H	M	M	H	M	H	H	H	L	L	M		
CO3	H	M	M	H	H	M	M	M	M	M	L	L	M		
CO4	M	M	H	H	M	H	M	H	H	M	M	M	L		
CO5	H	H	M	H	H	H	H	H	H	M	L	L	M		
H-High; M-Medium; L-Low															
Course designed by							Verified by Chairman								
Dr. B. David Jayaseelan							Dr. M. Thangavel								

Course Code	Title		
23U3MBE609	Discipline Specific Elective Paper III Group C – Microbial Diagnosis in Health Clinics		
Semester: VI	Credits: 4	CIA: 25 Marks	ESE: 75 Marks
Course Objective	Gain advanced knowledge on Importance of diagnosis of diseases.		
Course Category	Employability		
Development Needs	Global		
Course Description	Students have the ability several diagnostic methods used ranging from direct methods, by directly detecting the microorganism causing the infection, such as microscopy, cultures, specific gene detection and antigen detection, to indirect methods, such as serology, in which the levels of specific antibodies against certain microorganism helps in employability.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Understand the basic concepts of Microscopic examination and culture methods.	Lecture / Video lessons	Assignment
CO 2	Get knowledge about Importance of diagnosis of diseases.	Demo / Model Preparation	Seminar
CO 3	Attain technical knowledge on knowledge on Collection of Clinical Samples.	Demo / Model Preparation	Assignment
CO 4	Separate different the Serological, Molecular method.	Lecture / Video Tutorial	Seminar
CO 5	Apply methods of testing for Antibiotic sensitivity in Bacteria.	Lecture	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week : 5	
Unit	Description	Text Book	Chapters
I	Microscopic examination and culture methods: Examination of sample by staining - Gram stain, Ziehl - Neelson staining for tuberculosis, Giemsa-stained thin blood film for malaria. Preparation and use of culture media - Blood agar, Chocolate agar, Lowenstein-Jensen medium, MacConkey agar.	2	13
Instructional Hours			12
Suggested Learning Methods: Video lectures			
II	Importance of diagnosis of diseases : Bacterial, Viral, Fungal and Protozoan Diseases of various human body systems, clinical samples for diagnosis of infectious disease	2	6
Instructional Hours			12
Suggested Learning Methods: Online tutorial			

III	Collection of Clinical Samples: How to collect clinical samples (oral cavity, throat, skin, Blood, CSF, urine and faeces) and precautions required. Method of transport of clinical samples to laboratory and storage.	2	1										
Instructional Hours			12										
Suggested Learning Methods: Model presentation/ Video lectures													
IV	Serological, Molecular methods and Kits for rapid Detection of Pathogens: Serological Methods - Agglutination, ELISA, immunofluorescence, Nucleic acid based methods - PCR, Nucleic acid probes. Typhoid, Dengue and HIV, Swine flu, RPR, Non Invasive testing, Serology.	2	10										
Instructional Hours			12										
Suggested Learning Methods: Video lectures													
V	Testing for Antibiotic sensitivity in Bacteria: Importance, Determination of resistance/sensitivity of bacteria using disc diffusion method, Determination of minimal inhibitory concentration (MIC) of an antibiotic by serial double dilution method.	1	11										
Instructional Hours			12										
Suggested Learning Methods: Model presentation and video lectures													
Total Hours			60										
Text Books	<ol style="list-style-type: none"> Ananthanarayan R and Paniker CKJ (2009) Textbook of Microbiology, 8th edition, Universities Press Private Ltd. Patricia, M.T. Bailey and Scott's Diagnostic Microbiology, 13th Edition, Mosby, Inc. Publishers, China. 2014. 												
Reference Books	<ol style="list-style-type: none"> Tille P (2013) Bailey's and Scott's Diagnostic Microbiology, 13th edition. Mosby. Collee JG, Fraser, AG, Marmion, BP, Simmons A (2007) Mackie and Mc cartney Practical Medical Microbiology, 14th edition, Elsevier. Randhawa, VS, Mehta G and Sharma KB (2009) Practicals and Viva in Medical Microbiology 2nd edition, Elsevier India Pvt Ltd. 												
Web. URLs	https://www.ncbi.nlm.nih.gov/books/NBK8014/												
Tools for Assessment (25 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Demo	Total							
5	5	6	3	3	3	25							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	M	H	M	M	H	H	M	L	L	H
CO2	H	H	H	M	M	H	M	H	H	H	L	L	M
CO3	H	M	M	H	H	M	M	M	M	M	L	L	M
CO4	M	M	H	H	M	H	M	H	H	M	M	M	L
CO5	H	H	M	H	H	H	H	H	H	M	L	L	M
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. B. David Jayaseelan							Dr. M. Thangavel						

Course Code	Title		
23U4MBS604	Skill Enhancement Course X – Techniques in Clinical Diagnosis		
Semester: VI	Credits: 3	CIA: 20 Marks	ESE: 55 Marks
Course Objective	Medical laboratory science professionals are vital healthcare detectives, competent in the collection, processing and analysis of biological specimens, the performance of lab procedures, the maintenance of instruments, and relating lab findings to common diseases/conditions that assist physicians in patient diagnosis and treatment, as well as in disease monitoring or prevention		
Course Category	Skill Development / Employability		
Development Needs	Global		
Course Description	The course combines lecture and laboratory practice, to allow students to demonstrate professionalism and interpersonal skills while achieving competence with common laboratory procedures. Students will be given the opportunity to demonstrate knowledge in making solutions, using aseptic techniques, and handling laboratory equipment.		
Course Outcomes		Teaching Methods	Assessment Methods
CO 1	Basic understanding about Human health and Diseases with knowledge about the various diagnosis.	Lecture / Chalk and talk	Assignment
CO 2	Comply with laboratory safety protocols by demonstrating proper technique	Lectures / Video Lessons	Seminar
CO 3	Demonstrate skill with the microscope, centrifuge, and other laboratory equipment	Lectures / Tutorial	Quiz
CO 4	Basic understanding of haematology, immunology	Lectures / Group Discussion	Seminar / Assignment
CO 5	Basic understanding of clinical chemistry with emphasis placed on point of care testing in all areas of the laboratory.	Lecture / Tutorial	Seminar
Offered by	Microbiology		
Course Content		Instructional Hours / Week: 5	
Unit	Description	Text Book	Chapters
I	Role of laboratory in Health care, delivery - Human health & Diseases, a) Types of diagnosis, b) Process of diagnosis. Laboratory at different levels. Duties & responsibility.	1	
Instructional Hours			12
Suggested Learning Methods: Video lectures about the Importance of Human health.			
II	Laboratory organization - General principles, Components & Functions of laboratory, Staffing the laboratory, Job descriptions, Job Specifications and Work schedule.	2	6
Instructional Hours			12
Suggested Learning Methods: Prepare a flow chart or diagrammatic representation on Functioning of laboratory.			

III	Specimen handling -General principles, Collection techniques and containers for specimen. Types of specimens, Specimen entry, Specimen transport, Specimen transfer and distribution & reassignment, Specimen Disposal, Specimen preservation.	3											
Instructional Hours			12										
Suggested Learning Methods: Practice for working with clinical specimens and acquire knowledge about instrumentation handling.													
IV	Hematology & Immunology - Blood Cells, White Blood Cell Morphology, Red Blood Cell Morphology, Laboratory Procedure: Identification of Blood Cells Under the Microscope, ABO & RH Blood Types of Laboratory Procedure: ABO/Rh Typing.	2											
Instructional Hours			12										
Suggested Learning Methods: Video lectures on the Blood and its cell components.													
V	Basic Principles of Clinical Chemistry - Clinically Significant Pathogen vs. Normal Flora, Glucose Metabolism and Regulation, Diseases Associated with Glucose Metabolism, Laboratory Procedure: Glucose and Cholesterol Analysis.	3											
Instructional Hours			12										
Suggested Learning Methods: Video lectures and group project													
Total Hours			60										
Text Books	<ol style="list-style-type: none"> 1. Linne and Ringsrud. CLINICAL LABORATORY SCIENCE: Concepts, Procedures, and Clinical Applications 7th Edition. Elsevier. ISBN 978-0-323-22545-8 2. Jahan Singh Chuhan. Text book of Clinical Diagnostics and Treatment. Sumit Prakasan Publishers ISBN – 8187251042. 3. <u>Haren Ram Chiary & H.S. Singh</u>. The text Book of Medical Diagnostics. I K International Publishers. ISBN: 9789385909788. 												
Reference Books	<ol style="list-style-type: none"> 1. William J. Marshall, Márta Lapsley , Andrew Day, Kate Shipman. Clinical Chemistry 9th Edition, Kindle Edition. 9th edition. ISBN: 978-0702079368. 												
Web. URLs	https://www.amazon.com/dp/B0892PV76F?tag=uuid10-20&asin=B0892PV76F&revisionId=dfd2b489&format=1&depth=1												
Tools for Assessment (20 Marks)													
CIA I	CIA II	CIA III	Assignment	Seminar	Quiz/Chart Preparation	Total							
4	4	5	2	2	3	20							
Mapping													
CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	M	M	L	H	H	H	M	H	H
CO2	M	M	M	H	M	M	H	H	H	H	H	M	H
CO3	H	H	H	M	H	M	M	M	H	M	H	H	H
CO4	H	H	M	M	H	M	M	H	H	H	H	H	M
CO5	M	H	H	H	H	H	H	M	H	M	M	H	M
H-High; M-Medium; L-Low													
Course designed by							Verified by Chairman						
Dr. Dinesh M. D							Dr. M. Thangavel						

SELF STUDY
PAPERS

Course Code		Title		
23UMBSS01		Self-Study Paper I–Solid Waste Management		
Semester: II to V		Credits: 1	ESE: 50 Marks	
Course Objective		Gain advanced knowledge on Solid wastes and its management. Planning and programs of the waste management systems.		
Course Category		Employability		
Development Needs		Global		
Course Description		Students have the ability on entrepreneurship that enable to develop business skills on the set up of solid waste management consultation and give way for employability.		
Course Outcomes		Teaching Methods	Assessment Methods	
CO 1	Understand the basic concepts of waste generation and waste management strategies.	Lecture / Video lessons	Assignment	
CO 2	Get knowledge about the planning of the programs for the management of municipal wastes	Lecture / Video lessons	Model Preparation	
CO 3	To have knowledge on the characterization of solid waste and its disposal techniques	Demo / Model Preparation	Model Preparation	
CO 4	To understand the sources and methods of solid wastes and the various Acts on SWM	Lecture / Video Tutorial	Seminar	
CO 5	Understand the method of SW collection and the recycling techniques.	Lecture	Seminar	
Offered by	Microbiology			
Course Content				
Unit	Description	Text Book	Chapters	
I	Waste generation and management: Issues in solid waste management, Integrated waste management, Implementing integrated waste management strategies, Typical costs for major waste management options.	1	1	
II	Planning for municipal solid waste management programs: State solid waste management planning, Local and regional solid waste management planning.	1	4	
III	Solid waste stream characteristics: Municipal solid waste, Methods of characterizing municipal solid waste, Municipal solid waste management, Discards of municipal solid waste by volume, The variability of municipal solid waste generation	3	3-9	
IV	Source Reduction, Waste Minimization and Environmental Laws: Hierarchy of Waste Management, Principles of Life Cycle, Costs of Environmental Management, Waste Minimization at Work, NEPA, RCRA, Clean Air Act, Clean Water Act, CERCLA, Emergency Planning and Community Right-To-Know Act, Oil Pollution Act, Pollution Prevention Act, Safe Drinking Water Act, Toxic Substances Control Act	4	2	
V	Collection of solid waste: Types of waste collection services, Types of collection systems, equipment, and personnel requirements, Collection routes, Management of collection systems, Collection system economics, Recycling- Development and implementation of Materials recovery facilities.	1	7	

Text Books	<ol style="list-style-type: none"> 1. George T chobanoglous, Frank Kreith. Handbook of Solid Waste Management, 2nd edition, The McGraw–Hill, 2002. 2. Cheremisinoff, Nicholas P. Handbook of Solid Waste Management and Waste Minimization Technologies. Elsevier Science (USA), 2003 		
Reference Books	<ol style="list-style-type: none"> 1. Nag, K. Vizayakumar, Environmental Education and Solid Waste Management, New Age International Ltd., Publishers, 2005. 2. Samuel Stucki, Christian Ludwig (auth.), Dr. Christian Ludwig, Dr. Stefanie Hellweg, Dr. Samuel Stucki. Municipal Solid Waste Management: Strategies and Technologies for Sustainable Solutions, 1st edition, Springer-Verlag Berlin Heidelberg, 2003 		
Web. URLs	<ol style="list-style-type: none"> 1. https://courses.lumenlearning.com/suny-monroe-environmentalbiology/ 2. https://www.epa.gov/sites/production/files/2020/documents/master_swmg_10-20-20_0.pdf 		
Course designed by		Verified by Chairman	
Dr. R. Kasimani		Dr. M. Thangavel	

Course Code		Title		
23UMBSS02		Self-Study Paper II -Human Anatomy and Physiology		
Semester–II to V		Credit:1	ESE: 50 Marks	
Course Objective		Gain advanced knowledge. On the Human Anatomy and physiology		
Course Category		Skill and Knowledge		
Development Needs		Global		
Course Description		Students have the ability to develop the knowledge in the Human anatomy and Physiological mechanisms of the body.		
Course Outcomes		Teaching Methods	Assessment Methods	
CO 1	Understand the basic concepts of cell and organization of the Human body	Lecture / Video lessons	Assignment	
CO 2	Get knowledge about the Circulatory and Hart system and its functions	Lecture / Video Preparation	Model Preparation	
CO 3	Acquire knowledge on the Respiratory, Nervous and Endocrine systems and its functions	Lecture / Video Preparation	Model Preparation	
CO 4	To understand the anatomy and functioning of the digestive system	Lecture / Video Tutorial	Seminar	
CO 5	Explain the role of each body system in maintaining homeostasis	Lecture	Seminar	
Offered by		Microbiology		
Course Content				
Unit	Description	Text Book	Chapters	
I	Introduction to the human body , chemical and tissue level of organization: The body and its constituents, Introduction to the human body, Introduction to the chemistry of life, The cells, tissues and organization of the body.	2	1-4	
II	Circulatory and cardiac system : The blood, The cardiovascular system.	1	7,8	
III	Body communication and respiration : The nervous system, endocrine system, and respiratory system.	2	12- 8,23	
IV	Digestive system : Activity, organization, organs, mouth, pharynx, esophagus, structure of digestive system, process of digestion	4	2	
V	Protection and survival : The tissue, skin, skeleton, muscular, renal and reproductive systems	5	16	
Text Books		1. IanPeate, Muralitharan Nair, Fundamentals of Anatomy and Physiology for Nursing and Health care Students, 2 nd edition, WileyBalckwell,2017. 2. Gerard J. Tortora, Bryan H. Derrickson, Principles of Anatomy and Physiology, 14 th Edition, Wiley, 2014.		
Reference Books		1. Anne Waugh, Allison Grant, Ross & Wilson Anatomy and Physiology in Health and Illness , 13 th edition, Elsevier, 2018. 2. Frederic H. Martini, JudiL. Nath, Edwin F. Bartholomew. Fundamentals of Anatomy & Physiology , 9 th edition, Benjamin Cummings,2012.		
Web. URLs		https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/nursing_students/LN_human_anat_final.pdf https://www.drnaiktrivedi.com/index.php/notes/anatomy-physiology-notes/		
Course designed by		Verified by		
Dr. B. David Jayaseelan		Dr. M. Thangavel		