



TAKSHASHILA UNIVERSITY

(Tamil Nadu State Private University)
ONGUR, TINDIVANAM TK, VILLUPURAM DT

FACULTY OF SCIENCES SCHOOL OF BASIC SCIENCES

Department of Biotechnology

**REGULATION 2025 NEP
CURRICULUM & SYLLABI
B.SC – BIOTECHNOLOGY**

Semester – II

VISION AND MISSION OF UNIVERSITY

VISION:

To create change makers and world leaders similar to the ancient Takshashila University

MISSION:

The brightest minds and the best resources are used to nurture and develop the leaders of tomorrow, where they are encouraged to be eternally curious and ethically sound.

DEPARTMENT VISION AND MISSION

VISION:

To be a globally recognized center of excellence in biotechnology education and research, fostering innovation and technological advancements that address real-world challenges in healthcare, agriculture, and the environment.

MISSION:

M1: Quality Education	To provide a dynamic curriculum integrated with hands-on laboratory training that meets international standards and prepares students for both industry and academia.
M2: Research and Innovation	To foster an environment that encourages interdisciplinary research, critical thinking, and problem-solving skills to drive scientific and commercial value.
M3: Entrepreneurship & Employability	To bridge the gap between academia and the biotech industry by developing professional competence, leadership qualities, and an aptitude for bio-business and startups.
M4: Ethics & Social Responsibility	To instill ethical values, environmental consciousness, and a commitment to utilizing biotechnological innovations for the betterment of society.

PROGRAMME OUTCOMES

PO1: Disciplinary Knowledge:

Demonstrate comprehensive understanding of core concepts, theories, and methodologies relevant to the chemistry discipline.

PO2: Analytical and Critical Thinking:

Formulate logical conclusions, evaluate evidence objectively, and use critical thinking to solve complex, real-world problems.

PO3: Problem Solving:

Identify, analyze, and devise data-driven solutions while considering societal and environmental impacts.

PO4: Effective Communication:

Articulate complex ideas clearly, prepare coherent reports, and make impactful presentations to diverse audiences.

PO5: Modern Tool Usage:

Select and apply modern IT tools, laboratory equipment, and predictive modeling techniques relevant to research and industry.

PO6: Ethics and Values:

Commit to professional ethics, environmental sustainability, and their responsibilities as informed citizens.

PO7: Teamwork and Leadership:

Function effectively as an individual and as a member or leader in multidisciplinary teams.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Professional Preparation

Equip graduates with fundamental theoretical and practical knowledge to excel in the biotechnology industry, pharmaceuticals, agriculture, and healthcare

PEO2: Research and Innovation

Foster skills in experimental design, data analysis, and advanced laboratory techniques. This enables graduates to pursue advanced studies or R&D careers.

PEO3: Interdisciplinary Problem Solving

Train students to address complex, real-world biological challenges using cutting-edge analytical tools, bioinformatics, and modern technology.

PEO4: Ethics and Sustainability

Inculcate an understanding of professional ethics, biosafety regulations, and environmental sustainability when developing biotechnological solutions.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Disciplinary Knowledge & Concept Application

Graduates will understand the fundamental principles of molecular biology, genetics, and biochemistry, and can apply these concepts to solve real-world problems in agriculture, medicine, and industry

PSO2: Practical Laboratory & Research Skills

Students will demonstrate proficiency in modern biotechnology techniques—such as recombinant DNA technology, cell culture, and bioprocessing—enabling them to design experiments and analyze scientific data.

PSO3: Industry & Higher Education

Graduates will be equipped with the analytical and professional skills required to meet the demands of the bioscience industry, pursue advanced master's/research programs, or explore entrepreneurial ventures.



**TAKSHASHILA
UNIVERSITY**

(Established under Tamil Nadu State Private Universities Act 2019 &
Recognized by UGC u/s 2(f) of the UGC Act, 1956)

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FACULTY OF SCIENCES

DEPARTMENT OF BIOTECHNOLOGY (B.Sc. BIOTECHNOLOGY)

(REGULATION 2025 NEP)

SEMESTER – II

Sl. No.	Course Code	Course Title	Category	Periods			Credits	Hrs.	Max. Marks									
				L	T	P			CAT I, II, III (Best of Two)	ASS	MCQ	ATT	SEM	PRA	CAM	ESM	Total	
1	U25BT04B	Genetics	DSC	3	0	2	4	75	20	5	5	5	5	50	40	60	150	
2	U25CH08B	Biochemistry	DSC	3	0	2	4	75	20	5	5	5	5	50	40	60	150	
3	U25BT05T	Agricultural Biotechnology for Food Security	IDC	3	1	0	4	60	20	5	5	5	5	-	40	60	100	
4	U25CS66T	Fundamentals of Python	MDC	1	0	2	2	45	-	-	-	-	-	-	100	-	100	
Total:							14	255										
5	U25TA05T	Tamizhum Illakkanamum	AEC	2	0	0	2	30	20	5	5	5	5	-	40	60	100	
6	U25EN07T	Functional English	AEC	1	0	2	2	45	20	5	5	5	5	-	40	60	100	
7	U25CH03T	Synthetic Chemistry Laboratory Techniques	SEC	1	0	2	2	45	-	-	-	-	-	-	100	-	100	
8	U25VA03B	Health Wellness and Yoga Education	VAC	2	0	0	2	45	-	-	-	-	-	-	100	-	100	
Total:							8	165										
Total:							22	420							100	500	300	900

Note:

L – Lecture

P – Practical

ESM – End Semester Exam Marks

ASS – Assignment

CAM – Continuous Assessment Marks

T – Tutorial

CAT – Continuous Assessment Test

ATT – Attendance

SEM – Seminar


BoS Chairman

U25BT04B	Genetics	L	T	P	C	Total
		3	0	2	4	75

COURSE OBJECTIVES:

• To Learn about the classical genetics and transmission of characters from one generation to the next
• To Obtain a strong foundation for the advanced genetics
• To Explain the properties of genetic materials and storage and processing of genetic information.
• To Acquire knowledge about the Mutagens, Mutations, DNA Repairs and Genetic disorders in human
• To Categories Eugenics, Euphenics and Euthenics and indepth Knowledge on population Genetics

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the fundamental principles of Mendelian genetics, gene interactions, multiple alleles, linkage, crossing over, and sex-linked inheritance.
CO2 :	Analyze chromosome mapping, cytoplasmic inheritance, sex determination, and the mechanisms of genetic recombination in prokaryotes and eukaryotes.
CO3 :	Describe the molecular basis of heredity, including gene structure, operon concept, DNA as the genetic material, and microbial genetics.
CO4 :	Evaluate the causes and consequences of mutations, chromosomal aberrations, DNA repair mechanisms, and apply pedigree analysis to human genetic disorders.
CO5 :	Apply the principles of population genetics to determine gene and genotype frequencies, interpret the Hardy–Weinberg equilibrium, and assess the significance of eugenics, euphenics, and euthenics in genetics.

UNIT I : PRINCIPLES OF MENDELIAN GENETICS	9 Hrs.
Mendel's experiments, Monohybrid cross, Dihybrid cross, Backcross or Testcross, Mendel's laws. Incomplete dominance. Interaction of Genes- Epistasis -lethal genes. Multiple alleles – In Drosophila, Rabbit and Blood group inheritance in man.	

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UNIT II : LINKAGE, CROSSING OVER AND CHROMOSOMAL INHERITANCE	9 Hrs.
Linkage - linkage in Drosophila- Morgan's experiments, factors affecting linkage. Crossing over- types, mechanism, significance of crossing over. Mapping of Chromosomes, interference and coincidence. Cytoplasmic inheritance -Carbon dioxide sensitivity in Drosophila and milk factor in mice. Sex –Linked Inheritance and Sex- Determination in Man.	

UNIT III: MOLECULAR GENETICS AND MICROBIAL GENETICS	9 Hrs.
Fine structure of the gene and gene concept, Operon Concept. Identification of the DNA as the genetic material- Griffith experiments, Avery, McLeod, McCarty and Hershey Chase experiment. Microbial Genetics- bacterial recombination, Conjugation, Transformation, Transduction and sexduction	

UNIT IV: MUTATION AND HUMAN GENETICS	9 Hrs.
Mutation – types of mutation, mutagens, DNA damage and Repair Mechanism. Chromosomal aberrations- Numerical and Structural, Pedigree Analysis-Mendelian inheritance in human. (Cystic Fibrosis, Muscular Dystrophy)	

UNIT V: Population Genetics	9 Hrs.
Population Genetics– Hardy Weinberg principle, gene frequency, genotype frequency and factors affecting gene frequency. Eugenics, Euphenics and Euthenics.	

Total Hours: 45

List of Experiments

1. Mitotic stages of onion (*Allium cepa*) root tip
2. Meiotic stages of cockroach testes/ Flower bud
3. Giant chromosomes from Chironomus larvae
4. Giant chromosomes from Drosophila salivary glands
5. Identification of Barr bodies from Buccal smear
6. Preparations of culture medium and culture of Drosophila – methods of maintenance
7. Identifications of mutants of Drosophila
8. Human karyotyping (Demo)

Total Hours: 30

TEXT BOOKS:

1.	Dr. Veer BalaRastogi, 2020, Elements of Genetics, 11 th Revised & Enlarged Edition, KedarNath Ram
2.	Nath Publications, Meerut,250001.www.knrnpublications.com, ISBN-978-81-907011-2-9
3.	Verma, P.S. and Agarwal, V.K., 1995. Genetics, 8 th edition, S.Chand& Co., New Delhi – 10055.
4.	Verma, P.S., and Agarwal, V.K., 1995. Cell and Molecular Biology, 8 th edition, S.Chand and Co., New Delhi, 110055.

REFERENCE BOOKS:

1.	Gardener E.J. Simmons M.J. Slustad D. P. 2006. Principles of Genetics
2.	Lewis, R.2001. Human Genetics- Concepts and application. 4 th edition. McGraw Hill.
3.	Griffiths, Miller, J.H., An Introduction to Genetic Analysis W.H.Freeman. New York.
4.	Winter, P.C., Hickey, G.J. and Fletcher, H.L.2000. Instant notes in Genetics. Viva books, Ltd
5.	Good enough U. 1985. Genetics. Hold Saunders international.

WEB REFERENCES:

1.	https://nptel.ac.in/courses/102/106/102106025/
2.	http://www.ocw.mit.edu
3.	http://enjoy.m.wikipedia.org
4.	https://www.acpsd.net


BoS Chairman

U25CH08B	Biochemistry	L	T	P	C	Total
		3	0	2	4	75

COURSE OBJECTIVES:

To provide an understanding of the major metabolic pathways of carbohydrates, proteins, and lipids.
To explain the principles of enzymology, enzyme kinetics, and their biological significance.
To familiarize students with common metabolic disorders and their biochemical basis.
To introduce the fundamental concepts of molecular biology, including DNA replication, transcription, and translation.
To develop knowledge of the biological functions of vitamins and minerals in maintaining normal physiological processes.

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the metabolic pathways of carbohydrates, proteins, and lipids and their role in cellular energy production.
CO2 :	Describe the biochemical basis of metabolic disorders and interpret their physiological significance.
CO3 :	Analyze enzyme classification, mechanisms of enzyme action, kinetics, inhibition, and their biological importance.
CO4 :	Explain the molecular mechanisms of DNA replication, transcription, translation, and the genetic code.
CO5 :	Evaluate the nutritional and physiological importance of vitamins and minerals in human health and metabolism.

UNIT I : METABOLISM OF BIOMOLECULE	9 Hrs.
Carbohydrate metabolism – Glycolysis – Tricarboxylic Acid (TCA) cycle – Hexose Monophosphate (HMP) shunt and energy yield – Protein metabolism – Deamination and transamination – SGOT and SGPT – Urea cycle – Lipid metabolism – Biosynthesis of fatty acids – β -oxidation of fatty acids.	

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UNIT II : METABOLIC DISORDERS	9 Hrs.
Biochemical basis of metabolic disorders – Jaundice – Hypoxia – Glycogen storage diseases – Pentosuria – Ketosis – Lipidosis – Edema – Gout – Dehydration: definition, causes, symptoms, and prevention.	

UNIT III: ENZYMOLOGY	9 Hrs.
Definition and classification of enzymes – Mechanism of enzyme action – Lock-and-key hypothesis – Induced-fit theory – Enzyme specificity – Isoenzymes – Factors affecting enzyme activity (pH, temperature, substrate concentration) – Michaelis–Menten equation – Enzyme inhibition: competitive, uncompetitive, and non-competitive inhibition – Biological functions of enzymes.	

UNIT IV: MOLECULAR BIOLOGY	9 Hrs.
DNA replication – Types and mechanism – Transcription – Translation – Genetic code – DNA and RNA as genetic material – Biological significance of nucleic acids.	

UNIT V: VITAMINS AND MINERALS	9 Hrs.
Classification, occurrence, and biological functions of vitamins – Macro and trace minerals (Na, K, Cl, Ca, P, I, Fe, Mg, and S) – Nutritional importance and deficiency disorders.	

Total Hours: 45

List of Experiments

1. Bacteria & carbohydrate fermentation tests: Glucose, Lactose, Sucrose and Mannitol.
2. Biochemical tests to identify bacterial isolates - IMViC test, Oxidase test, Catalase
3. test, Urease test, TSI test
4. Enzymatic Hydrolysis of Starch & Casein by selective bacterial isolates.
5. Bacterial (Escherichia coli) Growth curve: Cell count
6. Measurement of Microbial growth –Turbidity methods.
7. Studying the influence of temperature & pH on the growth of test bacteria.
8. Anaerobic bacterial cultivation - candle jar method

Total Hours: 30

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TEXT BOOKS:

- | | |
|----|--|
| 1. | Nelson, D. L. and Cox, M. M. (2021). <i>Lehninger Principles of Biochemistry</i> . 8th Edition. W.H. Freeman. |
| 2. | Murray, R. K., Bender, D. A., Botham, K. M., Kennelly, P. J., Rodwell, V. W. and Weil, P. A. (2021). <i>Harper's Illustrated Biochemistry</i> . 32nd Edition. McGraw-Hill Education. |

REFERENCE BOOKS:

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|----|---|
| 1. | De, A. K. (2014). <i>Biochemistry</i> . S. Chand & Company Ltd., New Delhi. |
| 2. | Shanmugam, A. (2016). <i>Biochemistry</i> . Published by the Author. |
| 3. | Kannan, C. (2019). <i>Biomolecules</i> . MJP Publishers, Chennai. |
| 4. | Voet, D., Voet, J. G. and Pratt, C. W. (2019). <i>Fundamentals of Biochemistry: Life at the Molecular Level</i> . 6th Edition. Wiley. |
| 5. | Jain, J. L., Jain, S. and Jain, N. (2018). <i>Fundamentals of Biochemistry</i> . 8th Edition. S. Chand & Company Ltd., New Delhi. |

WEB REFERENCES:

- | | |
|----|---|
| 1. | https://www.ncbi.nlm.nih.gov/ |
| 2. | https://www.kegg.jp/ |
| 3. | https://www.expasy.org/ |

K.V.L.
BoS Chairman

U25BT05B	Agricultural Biotechnology for Food Security	L	T	P	C	Total
		3	1	0	4	60

COURSE OBJECTIVES:

To Provide a comprehensive understanding of agricultural biotechnology and its role in ensuring global food security
To Familiarize students with molecular breeding, marker-assisted selection, and modern plant biotechnology techniques for crop improvement
To Develop knowledge of plant genetic transformation methods and the production of transgenic crops with improved agronomic traits
To Explain the applications of biotechnology in developing crops resistant to biotic and abiotic stresses and improving crop quality
To Introduce students to biosafety regulations, intellectual property rights, and ethical issues related to agricultural biotechnology

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the principles of agricultural biotechnology and evaluate its contribution to sustainable agriculture and food security.
CO2 :	Apply molecular markers and marker-assisted breeding techniques for crop improvement and plant breeding programmes.
CO3 :	Analyze plant genetic transformation methods and the development of transgenic plants for agricultural applications.
CO4 :	Evaluate the role of transgenic crops in enhancing resistance to biotic and abiotic stresses and improving crop quality.
CO5 :	Assess biosafety regulations, intellectual property rights, plant breeders' rights, and ethical considerations in agricultural biotechnology.

UNIT I : FOOD SECURITY AND AGRICULTURAL BIOTECHNOLOGY	12 Hrs.
Food and agriculture – Global and national food production scenarios – Population growth and food security – Indian farming systems – Major crop plants – Achievements and limitations of conventional plant breeding – Role of agricultural biotechnology in sustainable agriculture and food security.	

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UNIT II : MOLECULAR MAPPING AND MARKER-ASSISTED BREEDING	12 Hrs.
Marker-assisted plant breeding – Conventional breeding versus molecular breeding – Molecular polymorphism – Construction of genetic and physical maps – Marker-assisted selection (MAS) for agronomically important traits – Applications in crop improvement.	

UNIT III: PLANT BIOTECHNOLOGY AND GENETIC TRANSFORMATION	12 Hrs.
Historical perspectives of plant biotechnology – Development of transgenic plants – Advantages of transgenic technology over conventional breeding – Gene discovery – Gene transfer methods – Agrobacterium-mediated transformation – Ti plasmid disarming – Vector design – Selectable and screenable markers – Marker-free transformation – Chloroplast transformation.	

UNIT IV: TRANSGENIC CROPS FOR CROP IMPROVEMENT	12 Hrs.
Development of transgenic crops for resistance to viruses, fungi, insects, and pathogens – Engineering tolerance to drought, salinity, heat, cold, flooding, and submergence – Herbicide resistance – Post-harvest bioengineering – Nutritional quality improvement – Biofactories and engineering of economically important traits.	

UNIT V: BIOSAFETY, INTELLECTUAL PROPERTY RIGHTS AND REGULATIONS	12 Hrs.
Production and commercialization of transgenic crops – Biosafety principles and regulatory frameworks – Public and private sectors in plant biotechnology – Intellectual Property Rights (IPR) – Plant Breeders' Rights (PBR) – Farmers' Rights – Ethical, environmental, and socio-economic issues related to agricultural biotechnology.	

Total Hours: 60

TEXT BOOKS:	
1.	Stewart, C. N. Jr. (2016). Plant Biotechnology and Genetics: Principles, Techniques, and Applications. 2nd Edition, John Wiley & Sons, USA.
2.	Altman, A. and Hasegawa, P. M. (2011). Plant Biotechnology and Agriculture: Prospects for the 21st Century. Academic Press, USA.
3.	Chawla, H. S. (2019). Introduction to Plant Biotechnology. 3rd Edition, CRC Press, Boca Raton, USA.

K. S. S.

REFERENCE BOOKS:

- | | |
|----|---|
| 1. | Kirakosyan, A. and Kaufman, P. B. (2016). Recent Advances in Plant <i>Biotechnology</i> . Springer, USA. |
| 2. | Gurib-Fakim, A. (2014). Novel Plant Bioresources: Applications in Food, Medicine and Cosmetics. Wiley-Blackwell, USA. |
| 3. | Slater, A., Scott, N. W. and Fowler, M. R. (2008). Plant Biotechnology: The Genetic Manipulation of Plants. 2nd Edition, Oxford University Press, UK. |
| 4. | Bhojwani, S. S. and Dantu, P. K. (2013). Plant Tissue Culture: An Introductory Text. Springer, India. |

WEB REFERENCES:

- | | |
|----|---|
| 1. | https://www.fao.org/ |
| 2. | https://www.fao.org/ |
| 3. | https://icar.org.in/ |


BoS Chairman

U25CS66T	Fundamentals of Python	L	T	P	C	Total
		1	0	2	2	45

COURSE OBJECTIVES:

• To understand the fundamentals of Python programming language
• To learn Python syntax, variables, data types, and operators
• To develop programs using conditional statements
• To implement looping statements and perform operations on arrays
• To create modular programs using functions and recursion

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Explain the fundamentals of Python programming, including its history, features, identifiers, keywords, variables, data types, input/output statements, comments, and indentation.
CO2 :	Apply various Python operators such as arithmetic, relational, logical, assignment, bitwise, conditional operators, and operator precedence while solving programming problems.
CO3 :	Develop Python programs using decision-making constructs such as if, if-else, nested if, and if-elif-else statements.
CO4 :	Construct Python programs using looping statements, jump statements, and arrays to solve computational problems.
CO5 :	Design modular Python programs using user-defined functions, different types of function arguments, return statements, and recursion.

UNIT I : BASICS OF PYTHON PROGRAMMING	9 Hrs.
History of Python - Getting Started with Python - Features of Python – Constants – Variables – Identifiers – Keywords - Built-in Data Types - Output Statements - Input Statements – Comments - Indentation.	

UNIT II : OPERATORS	9 Hrs.
Arithmetic Operators - Relational Operators - Logical Operators - Assignment Operators - Bitwise Operators - Conditional Operators - Operator Precedence.	

UNIT III : CONDITIONAL STATEMENTS	9 Hrs.
If statement - if-else statement - nested if statement - if-elif-else statement.	

UNIT IV : LOOPING STATEMENTS AND ARRAYS	9 Hrs.
while loop - for loop - nested loops - break, continue, pass statements - Defining, Processing Arrays and Array Methods.	

UNIT V - FUNCTIONS	9 Hrs.
Function Definition - Function Call - Return Statement – Required – Keyword – Default - Variable-Length Arguments - Recursion.	

Total Hours: 45

TEXT BOOKS :	
1.	Python Programming: An Introduction to Computer Science, John M. Zelle, Franklin, Beedle & Associates Inc., 3rd Edition, 2017.
2.	Python for Everyone, Cay S. Horstmann & Rance D. Necaise, Wiley, 3rd Edition, 2023.
3.	Python Crash Course, Eric Matthes, No Starch Press, 3rd Edition, 2023.
4.	Learning Python, Mark Lutz, O'Reilly Media, 5th Edition, 2013.
5.	Think Python, Allen B. Downey, O'Reilly Media, 2nd Edition, 2015.

REFERENCE BOOKS :	
1.	Fundamentals of Python Programming, Richard L. Halterman, Southern Adventist University, 1st Edition, 2018.
2.	Introduction to Computation and Programming Using Python, John V. Guttag, MIT Press, 2nd Edition, 2016.
3.	Python Programming: Using Problem Solving Approach, Reema Thareja, Oxford University Press, 2nd Edition, 2019.
4.	Core Python Programming, R. Nageswara Rao, Dreamtech Press, 2nd Edition, 2019.
5.	Beginning Python, Magnus Lie Hetland, Apress, 3rd Edition, 2017.

WEB REFERENCES :

1. <https://www.programiz.com/python-programming>

2. <https://docs.python.org/3/tutorial/>

3. <https://www.w3schools.com/python/default.asp>

4. <https://www.geeksforgeeks.org/python/python-programming-language-tutorial/>

5. <https://www.tutorialspoint.com/python/index.htm>


BoS Chairman

U25TA05T	Tamizhum Ilakkanamum	L	T	P	C	Total
		2	0	0	2	30

பாடத்திட்டத்தின் நோக்கங்கள்

- தமிழ்மொழி மற்றும் இலக்கணப்பாடத்திட்டத்தின் முதன்மை நோக்கம் மாணவர்களிடம் மொழித்திறனை வளர்ப்பதும் பண்பாட்டு விழுமியங்களை புகுத்துவதாகும்
- ஒரு மொழியைப் பிழையின்றி பேசவும் எழுதவும் பழகதல்
- இலக்கண அறிவுக்கேற்றார் போல் அம்மொழியின் இலக்கியச் செழுமையை அறிய வைத்தல்
- இலக்கண அறிவு மற்றும் மொழி தூய்மையை அறிவதோடு இலக்கிய நயத்தையும் அழகியலையும் அறிதல்
- தமிழ் மொழியின் பண்பாடு மற்றும் வாழ்வியல் விழுமியங்களை மாணவர்கள் தெரிந்துக்கொள்ளுதல்

பாடத்தின் கற்றல் பயன்பாடு (COURSE OUTCOMES):

இப்பாடத்தை நிறைவு செய்யும்போது, மாணவர்களால் பின்வருவனவற்றைச் செய்ய இயலும்

CO1 :	தமிழ் மொழியின் ஜந்திலக்கணத்தின் அறிவைப் பெறுவதால் பிழையின்றி பேசவும் எழுதவும் கற்கின்றான்.
CO2 :	அற இலக்கியங்களைப் படிப்பதால் வாழ்வியல் நெறிகளை அறிந்துக்கொள்கிறான்.
CO3 :	தமிழ் அறிஞர்களின் வரலாற்றையும் இலக்கியத்தையும் தெரிந்துக்கொண்டு படைப்பிலக்கியத்திறனை வளர்த்துக்கொள்கிறான்.
CO4 :	எழுத்துப்பயிற்சி பெறுவதால் பிழையின்றி பேசுவதோடு கருத்துத்தெளிவும் சிந்தனை அறிவும் பெற்று மொழிக்கற்றலை அடைகின்றான்.
CO5 :	தமிழ் ஊடகங்களைக் கற்பதால் சமூகப்புரிதல் ,மொழி ஆளுமை மற்றும் வேலை வாய்ப்பைப் பெறுகிறான்.



அலகு I: ஐந்திலக்கணம்**6 மணிநேரம்**

எழுத்திலக்கணம் ,முதலெழுத்து, சார்பெழுத்து அறிமுகம்- சொல்லிலக்கணம் ,நால்வகைச் சொற்கள் அறிமுகம்- பொருளிலக்கணம் – அகப்பொருள்,புறப்பொருள் அறிமுகம் யாப்பிலக்கணம் அறிமுகம் - அணியிலக்கணம் அறிமுகம்.

அலகு II : அற இலக்கியம்**6 மணிநேரம்**

பதினெண் கீழ்க்கணக்கு நூல்கள் அறிமுகம் – அற நூல்கள்- அக நூல்கள், புற நூல்கள்- திருக்குறள் - நட்பு ஆராய்தல்- புறங்கூறாமை அதிகாரங்கள்.

அலகு III : தமிழ்த் தொண்டாற்றிய தமிழறிஞர்கள்**6 மணிநேரம்**

தெ.பொ.மீனாட்சிசுந்தரனார் - உ.வே.சாமிநாதய்யர் - சி.இலக்குவனார் – மறைமலையடிகள் - மு.வரதராசனார் - பிற தமிழறிஞர்கள்.

அலகு IV: எழுத்துப் பயிற்சி**6 மணிநேரம்**

மொழிக்கு முதலில் வரும் எழுத்துக்கள் - மொழிக்கு இறுதியில் வரும் எழுத்துக்கள் - வல்லினம் மிகுமிடங்கள் - மிகா இடங்கள் - அகர வரிசைப்படுத்தி எழுதுதல் - மரபுப் பிழைகள், பிறமொழிச் சொற்கள், ஒரெழுத்து ஒரு மொழி உரிய பொருளைக் கண்டறிதல்.

அலகு V- தமிழ் ஊடகங்கள்**6 மணிநேரம்**

செய்தித்தாள் - இதழ்கள் - தின இதழ்கள் - வார இதழ்கள் - பருவ இதழ்கள் தொடர்பான செய்திகள் - இதழ்களில் கட்டுரை எழுதும் பயிற்சி.

மொத்த மணிநேரம் : 30**பாடநூல்கள்:**

1. முனைவர் மு.அருணாசலம் & இராஜா வரதராஜா., தமிழ் இலக்கிய வரலாறு, அருண் பதிப்பகம், கண்டோன்மென்ட், திருச்சி, 2017.
2. இரா.இளங்குமரன்., இலக்கண வரலாறு, மணிவாசகர் பதிப்பகம், சென்னை, 2020.

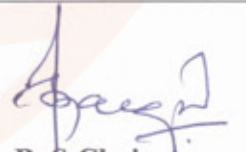
3.	எம்.ஏ. நுஃமான்., அடிப்படைத் தமிழ் இலக்கணம், அடையாளம் பதிப்பகம், புத்தாந்தம்,2007.
4.	தமிழண்ணல்., புதிய நோக்கில் தமிழிலக்கிய வரலாறு, மீனாட்சி புத்தக நிலையம், மதுரை, 1960.
5.	கி.இராசா., மக்கள் தகவல் தொடர்பியல், பாவை பதிப்பகம், சென்னை, 2022.

பார்வை நூல்கள்:

1.	தேவி. இராசேந்திரன் (தேவிரா)., தமிழ் இலக்கணம், நந்தினி பதிப்பகம், அண்ணாநகர், சென்னை,2012.
2.	மு.இராமசாமி, கு.முருகேசன், பெ.கோவிந்தசாமி (பதி.ஆசி)., இருபதாம் நூற்றாண்டுத் தமிழ் நாடகங்கள், உலகத் தமிழராய்ச்சி நிறுவனம், சென்னை,1999.
3.	முனைவர். இரா.தண்டாயுதம்., தற்காலத் தமிழ் இலக்கியம்., பாரி நிலையம், சென்னை,1985.
4.	முனைவர். துரை. இராஜாராம்., உரைநடைத் தமிழில் சங்க இலக்கியம் – எட்டுத்தொகை, நர்மதா பதிப்பகம், சென்னை,2018.
5.	தமிழ்ச் சிற்றிலக்கியங்கள்., இரா.சந்திரசேகரன்,கௌரா பதிப்பகம், சென்னை,2012.

இணையம்:

1.	https://www.tamilvu.org/courses/diploma/c021/c0211/html/c0211114.htm
2.	https://nandhinigunasekaran.blogspot.com/2016/01/blog-post_10.html
3.	https://shorturl.at/AC3yg
4.	https://shorturl.at/4XVyL
5.	https://kumaritamil.blogspot.com/2024/02/blog-post.html


BoS Chairman

U25EN07T	Functional English	L	T	P	C	Total
		1	0	2	2	45

COURSE OBJECTIVES:

• To use basic grammar and tenses for daily communication
• To build and apply new vocabulary effectively
• To engage in practical spoken interactions and presentations
• To write clear, short notes, messages, and descriptions
• To understand and navigate information in public and daily settings

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Communicate accurately in everyday spoken and written contexts.
CO2 :	Express ideas more precisely using an expanded vocabulary.
CO3 :	Handle common real-life conversations confidently.
CO4 :	Produce functional written pieces for practical needs.
CO5 :	Interpret and act on information in public and routine situations.

UNIT I : ESSENTIAL GRAMMAR	9 Hrs.
Parts of Speech (Noun, Verb, Adjective, Adverb), Subject-predicate; Basic Question Formation: Yes/No questions, Wh-questions; Practical application in describing routines, ongoing actions, past events, and future plans; Common errors in writing and speaking.	

UNIT II : LEXICAL SKILLS	9 Hrs.
Learning Vocabulary /Acquiring Vocabulary: Active & Passive Vocabulary, Reading & Speaking Vocabulary; Word Building (Affixation and Compounding); Content Words and Function Words; Types of Vocabulary: Jargons, Technical Vocabulary, Academic Vocabulary (AWC); Vocabulary for Daily Life.	

UNIT III: FUNCTIONAL ASPECTS OF SPEAKING SKILLS	9 Hrs.
Greetings, Self-introduction, Making requests, Asking for permission; Expressing opinions, Agreeing/disagreeing politely; Group Discussions (GD): Purpose and importance; Strategies for effective participation (initiating, expressing, interrupting, agreeing, disagreeing, concluding); Short Presentations/Show & Tell: Describing an object, a place, or a simple process using visual aids.	

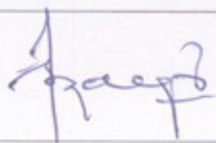
UNIT IV: FUNCTIONAL WRITING FOR PRACTICAL PURPOSES	9 Hrs.
Personal Notes and Messages: Writing short notes, leaving phone messages, informal emails/texts; Simple Descriptions: Describing people, places, and objects, Describing a simple event or experience; Vocabulary Building for Writing: Synonyms, antonyms, common collocations.	

UNIT V: NAVIGATING INFORMATION AND PUBLIC SPACES	9 Hrs.
Describing Work and Daily Routines: Talking about one's job, responsibilities; Role-playing Common Scenarios (at the doctor's office, at the bank, at a restaurant, asking for tourist information etc.); Interpreting information from public address systems (public meetings, interviews, train stations, airports, Signs, Notices).	

Total Hours: 45

TEXT BOOKS :	
1.	Syal, Pushpinder and D.V Jindal. An Introduction to Linguistics: Language, Grammar and Semantics. 2nd Ed. Delhi: PHI learning private Limited, 2016.
2.	Lightbown, Patsy and Nina Spada. How Languages are Learned. 4th Ed. Oxford: Oxford University Press, 2000.
3.	Robinson, Sarah. "A Context Driven Approach To Teaching Accademic Vocabulary." North Dakota: University of North Dakota, 2012. 1-46.
4.	Carnegie, Dale. The Art of Public Speaking. Random House, 2010.
5.	Sasikumar, V., P. Kiranmai Dutt, and Geetha Rajeevan. A Course in Listening and Speaking I. Cambridge University Press, 2007.

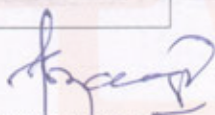
REFERENCE BOOKS :	
1.	Fisher, D., & Frey, N. (2010). Unpacking the Language Purpose: Vocabulary, Structure, and Function. TESOL Journal, 315-337.
2.	Spada, N. (2007). Communicative Language Teaching. In J. Cummins & C. Davison (Eds.), International Handbook of English Language Teaching (pp. 271-288). Springer US.



3.	Oliveira, L. C. D. (2015). A systemic-functional analysis of English language learners' writing. DELTA: Documentação de Estudos em Linguística Teórica e Aplicada, 31(1), 207-237.
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WEB REFERENCES :

1.	https://learnenglish.britishcouncil.org/
2.	https://www.oxfordlearnersdictionaries.com/
3.	https://www.bbc.co.uk/learningenglish
4.	https://www.cambridgeenglish.org/learning-english
5.	https://www.bbc.co.uk/learningenglish/english/features/english-at-work?utm_source=chatgpt.com


BoS Chairman

U25CH03T	Synthetic Chemistry Laboratory Techniques	L	T	P	C	Hrs
		1	0	2	2	45

COURSE OBJECTIVES:

• To familiarize and handle the glass wares
• To understand the separation and purification techniques
• To demonstrate the various chromatographic techniques
• To learn the basic instruments and characterization techniques
• To analyze the concepts in organic synthesis and various purification and characterization techniques

COURSE OUTCOMES:

After completion of the course, the students will be able to

CO1 :	Able to understand the basic glassware and handling methods
CO2 :	Understand the various separation techniques
CO3 :	Demonstrate the purification methods using chromatography techniques
CO4 :	Know the analytical techniques
CO5 :	Analyze the basic concepts in organic synthesis

UNIT I : GENERAL TECHNIQUES	9 Hrs.
Handling glassware, and equipment (furnace, oven), transferring methods, heating and cooling methods, filtration process.	

UNIT II : SEPARATION TECHNIQUES	9 Hrs.
Introduction to Rotary evaporation, distillation and different distillation process, distillation-set up and liquid-liquid extraction.	




UNIT III: PURIFICATION METHODS	9 Hrs.
Introduction to Chromatography, principles of chromatography –different types of Chromatography, Thin Layer Chromatography–Column Chromatography– crystallization methods.	

UNIT IV: ANALYTICAL TECHNIQUES	9 Hrs.
Introduction and basic principles of UV-Visible Spectrometry (demo), NMR and mass spectroscopy (Analysis of the spectrum to confirm the structure assignment).	

UNIT V: Organic Synthesis	9 Hrs.
Introduction to organic synthesis, Single step synthesis (involves preparation, reaction set-up, monitoring the progress, work-up, purification and introduction to various characterization techniques).	

TEXTBOOKS:	
1.	I. R. Gopalan, P.S.Subramanian, K.Rangarajan , Analytical Chemistry, New age, Sultan Chand & Sons Publishing Year: third edition 2003.
2.	Douglas A. Skoog and D.M.West, Principles of Instrumental Analysis, W.B. Saunders, New York, 1982.
3.	Vogel's Text book of quantitative chemical analysis-5 th edition.
4	F.G. Mann, B.C Saunders, Practical Organic Chemistry, 4th Edn., Pearson Education India, 2009.

REFERENCE BOOKS:	
1	Rober H. Hill, David C. Finster, Laboratory Safety for Chemistry Students 2Ed. John Wiley and Sons U.S.A. 2016
2	Puri B.R., Sharma L.R. and Pathania M.S., Principles of Physical Chemistry, 47th ed., New Delhi, Vishal Publishing Co.,2016.
3	D.A. Skoog, D.M. West, F.J. Holler, S.R. Crouch, Fundamentals of Analytical Chemistry, 8thEdn., Saunders College Pub., 2007.
4	Nad, A.K., Mahapatra, B., Ghoshal, A., An Advanced Course in Practical Chemistry, NewCentral Book Agency (P) Ltd., Kolkata, India, 2022.

WEB REFERENCES :

1.	https://ehs.ku.edu/sites/ehs/files/files/Lab%20Safety/Corning%20PYREX%20Care%20and%20Safe%20Handling_accessible.pdf
2.	https://www.slideshare.net/slideshow/distillation-211262763/211262763
3.	https://mlsu.ac.in/econtents/405_Unit%204-%20Different%20Chromatogrpahy%20techniques.pdf
4.	https://www.youtube.com/watch?v=zwfDCsrnGKw
5.	https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/synth2.htm


BoS Chairman



U25VA02B	Health Wellness and Yoga Education	L	T	P	C	Total
		1	0	2	2	45

COURSE OBJECTIVES:

• To introduce the knowledge systems of Indian traditional medicine and holistic healthcare practices.
• To develop understanding of the fundamental principles of Ayurveda and their application to health and wellness.
• To promote preventive healthcare through Ayurvedic lifestyle practices and healthy living.
• To familiarize students with the philosophy, traditions, and classical texts of Yoga.
• To cultivate ethical values, self-discipline, holistic personality development, and well-being through Yoga.

COURSE OUTCOMES:

After completion of the course- the students will be able to

CO1 :	Understand the knowledge framework, evolution, and significance of Indian Medical Systems.
CO2 :	Explain the basic principles of Ayurveda, including Tridosha, Dhatus, Malas, and holistic health concepts.
CO3 :	Apply Ayurvedic lifestyle practices such as Dinacharya, Ritucharya, and wellness principles for preventive healthcare.
CO4 :	Describe the philosophical foundations, classical texts, and traditions of Yoga.
CO5 :	Practice Yogic values, Ashtanga Yoga, and ethical principles for personal growth and social well-being.

UNIT I : KNOWLEDGE FRAMEWORK OF INDIAN MEDICAL SYSTEMS	9 Hrs.
Indian Medical Systems: Ayurveda – Unani – Siddha – Sowa Rigpa – Codified and non-codified medical knowledge in India – Historical development of Ayurveda – Classical Ayurvedic literature – Panchamahabhuta Siddhanta (Five Element Theory) and its significance in health and healing.	

UNIT II : FUNDAMENTAL CONCEPTS OF AYURVEDA	9 Hrs.
Introduction to Ayurveda: Ashtanga Ayurveda (Eight therapeutic specialties) – Tridosha Theory: Vata – Pitta and Kapha – Sapta Dhatus (Seven body tissues) – Malas (Excretory functions) and their role in maintaining health and well-being.	

UNIT III : AYURVEDIC LIFESTYLE AND WELLNESS PRACTICES	9 Hrs.
Prakriti: Body - mind constitution and healthcare implications – Trigunas: Sattva – Rajas – Tamas – Agni: Digestion and metabolism – Dinacharya (Daily regimen) – Ritucharya (Seasonal regimen) – Role of Ayurveda in wellness promotion and disease prevention.	

UNIT IV : FOUNDATIONS OF YOGA AND YOGIC PHILOSOPHY	9 Hrs.
Yoga : Definition – Importance of Yoga – Laukik and Adhyatmik benefits of Yoga – Myths and facts of Yoga – Hiranyagarbha as the Mula Pravakta of Yoga – Bharatiya Yoga Darshana: Patanjali Yoga Sutras and Vyasa Bhashya – Sankhya Darshana as the theoretical foundation of Yoga – Yoga in Bhagavad Gita and Upanishads (Katha and Svetashvatara) – Puranic Yoga (Kapila) – Jaina and Bauddha Yoga traditions – Introduction to Tantra, Mantra, Laya, and Kundalini Yoga.	

UNIT V : ASHTANGA YOGA, YOGA CULTURE AND VALUE EDUCATION	9 Hrs.
Ashtanga Yoga according to Patanjali Yoga Sutras: Yama – Niyama – Asana – Pranayama – Pratyahara – Dharana – Dhyana – Samadhi – Importance and practice of Dinacharya – Yoga culture and values – Paths of Yoga: Jnana – Bhakti – Karma – Raja Yoga – Daivi – Asuri Gunas (Bhagavad Gita, Chapter 16) – Principles of Jnana Yoga: Viveka – Vairagya – Shat Sampatti – Mumukshutva.	

Total Hours: 45 Hours

TEXT BOOKS :	
1.	Vasant C. Patil, <i>Principles and Practice of Ayurveda</i> , Chaukhamba Sanskrit Pratishthan, New Delhi, Latest Edition.
2.	Robert E. Svoboda, <i>Prakriti: Your Ayurvedic Constitution</i> , Lotus Press, Wisconsin, Latest Edition.
3.	B. K. S. Iyengar, <i>Light on Yoga</i> , HarperCollins Publishers, New Delhi, Latest Edition.
4.	Swami Vivekananda, <i>Raja Yoga</i> , Advaita Ashrama, Kolkata, Latest Edition.
5.	Ministry of AYUSH, <i>Yoga for Wellness</i> , Ministry of AYUSH, Government of India, New Delhi, Latest Edition.

K. V. M.

REFERENCE BOOKS :

1.	Vagbhatta, <i>Ashtanga Hridayam</i> (Translated by K. R. Srikantha Murthy), Chaukhambha Krishnadas Academy, Varanasi, Latest Edition.
2.	Sushruta, <i>Sushruta Samhita</i> (Translated by P. V. Sharma), Chaukhambha Vishvabharati, Varanasi, Latest Edition.
3.	Patanjali, <i>The Yoga Sutras of Patanjali</i> (Translated by Swami Vivekananda), Advaita Ashrama, Kolkata, Latest Edition.
4.	David Frawley, <i>Ayurveda and the Mind: The Healing of Consciousness</i> , Lotus Press, Wisconsin, Latest Edition.
5.	Swami Satyananda Saraswati, <i>Asana Pranayama Mudra Bandha</i> , Yoga Publications Trust, Munger, Latest Edition.

WEB REFERENCES :

1.	https://www.ttcn.co.in/Diglib/DELED/S5/unit1YOGA.pdf
2.	https://ucanapplym.s3.ap-south-1.amazonaws.com/RGU/notifications/E_learning/Online_study/PG%204th%20SEM%2C%20EDUPG4201%20%28Unit-1%29.pdf
3.	https://www.yogamdnny.nic.in/files/pdf/YogaforMentalHealth.pdf
4.	https://nptel.ac.in/courses/110101165
5.	https://www.ttcn.co.in/Diglib/DELED/S5/unit1YOGA.pdf


BoS Chairman

