INTEGRAL UNIVERSITY
LUCKNOW

SYLLABUS

of

B.TECH.
FOOD-TECHNOLOGY
2015-16

B. TECH. BIOTECHNOLOGY
SEMESTER I (Common to all Branches)

S. No	Course Code	Subject	Periods			Evaluation Scheme				Subject Total
						Sessional			Exam.	
		Theory	L	T	P	CT	TA	Total	ESE	
1.	**BFYC119** / CH-101	Physics/Chemistry	03	01	00	30	20	50	100	150
2.	**BFYC 102/ BFYC111**	Professional Communication-I/ Environmental Studies	03	01	00	30	20	50	100	150
3.	**BFYC120**	**Mathematics-I for Bioengineering**	03	01	00	30	20	50	100	150
4.	IEN-101/ **BFYC 113**	Basic Electrical Engineering/ Basic Mechanical Engineering	03	01	00	30	20	50	100	150
5.	EC-101/ **BFYC 114**	Basic Electronics/ Computer Programming	03	01	00	30	20	50	100	150
6.	EL-101/ ME-102	English Language & Grammar/ Manufacturing Process	02	01	00	15	10	25	75	100
Practical / Design / Drawing										
7.	**BFYL 106 / BFYL-115**	Physics Lab/ Chemistry Lab	0	0	02	10	10	20	30	50
8.	IEN-151/ **BFYL 116**	Electrical Engineering/ Mechanical Engineering	0	0	02	10	10	20	30	50
9.	**BFYL 109** / **BFYL117**	Workshop Practice/ Computer Programming Lab	01	0	03	10	10	20	30	50
10.	**BFYL 108/ BFYL 118**	Engineering Graphics/ Professional Communication lab	01	0	03	10	10	20	30	50
11.	GP-101	General Proficiency	-	-	-	-	-	50	-	50
		Total	**19**	**06**	**10**	**-**	**-**	**380**	**695**	**1100**

B. TECH.
SEMESTER – I

CHEMISTRY
ICH-101
w.e.f. Session 2014-15

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UNIT I

1. Molecular theory of heterodiatomic molecules, Band theory of bonding in metals, Hydrogen bonding.
2. Solid state chemistry: Radius ratio rule, Space lattice (only cubes), Type of unit cell, Bragg's Law, Calculation of density of unit cell. One and Two Dimensional solids, Graphite as two dimensional solid and its conducting properties. Fullerene and its applications.

UNIT II

1. Basic principles of spectroscopic methods. The use of UV, Visible, IR, ^{1}HNMR, for the determination of structure of simple organic compounds.
2. Characteristics and classification of polymers.
3. Structures of the polymers: Natural and synthetic rubbers, Polyamides and polyester fibers, Polymethylmethacrylate, Polyacrylonitrile and Polystyrene. A brief account of conducting polymers (polypyrrole and polythiophene) and their applications**.**

UNIT III

1. Stability of reaction intermediates, *e.g.* Carbanions, Carbocations and free radicals. Types of organic reactions, and mechanism of nucleophilic substitution reactions.
2. Mechanism of following reactions.

(i) Aldol condensation (ii) Cannizzaro reaction (iii) Beckmann rearrangement (iv) Hofmann rearrangement and (v) Diels-Alder reaction.

3. E-Z Nomenclature. Optical isomerism of organic compounds containing one chiral center. Examples of Optically active compounds without chirality. Conformations of n-butane.

UNIT IV

1**.** Order and molecularity of reactions. First and second order reactions. Energy of activation.

1. Phase Rule, its application to one component system (water).
2. Equilibrium potential, electrochemical cells (galvanic and concentration cells), Electrochemical theory of corrosion and protection of corrosion.

UNIT V

1. Classification of fuels, Coal, Biomass and Biogas. Determination of gross and net calorific values using Bomb Calorimeter.
2. First law of thermodynamics and its mathematical statement, heat, energy and work; Heat content or Enthalpy of a system; Thermochemistry: Hess's law of constant heat summation, Heat of reaction, Heat of combustion, Heat of neutralization, Heat of formation, Heat of fusion, Heat of vaporization, Heat of sublimation, Heat of solution and Heat of dilution (only definition and explanation).
3. Hardness of water, softening of water by Lime-Soda process, Zeolites and ion-exchange resins process and Reverse Osmosis. Treatment of boiler feed water by Calgon process,.

REFERENCE BOOK:

1. Engineering Chemistry by Jain and Iain.
2. Engineering Chemistry by R. K. Agrawal

Revised w.e.f. July, 2015

SYLLABUS of
ENVIRONMENTAL STUDIES (B. Tech.)
Subject Code - BFYC111/211

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Unit-I

Multidisciplinary nature of Environmental studies. Definition, Scope and Importance, Need for public awareness.

Natural resources:
Renewable and non-renewable resources:
Natural resources and associated problems.

a. Forest Resources: Use and over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b. Water Resources: Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems.

c. Mineral Resources: Use and exploitation, environmental effects of extracting and using minerals resources, case studies.

d. Food Resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer -pesticide problems, water logging, Salinity, case studies.

e. Energy Resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, case studies.

f. Land Resources: Land as a resource, Land degradation, Man induced landslides, Soil erosion and desertification.

- Role of an individual in conservation of natural resources
- Equitable use of resources for sustainable life styles.

10hrs

Unit-II

Ecosystems

- Concept of an Ecosystem.
- Structure and Function of an Ecosystem.
- Producer Consumer and decomposers.
- Energy flow in the Ecosystem.

- Ecological Succession.
- Food chains, Food webs and Ecological Pyramids.
- Introduction, types, characteristics features ,structure and function of the following ecosystem:

(a) Forest Ecosystem
(b) Grassland Ecosystem
(c) Desert Ecosystem,
(d) Aquatic Ecosystem: (Ponds, streams, lakes, rivers, oceans, estuaries)

8hrs

Unit-III
Biodiversity and its conservation

- Introduction - Definition: Genetic, Species and Ecosystem diversity.
- Bio-Geographical classification of India,
- Value of Bio-diversity: Consumptive use, productive use, Social, ethical, aesthetic and option values.
- Biodiversity at Global, National & Local levels.
- India as a Mega Diversity Nation.
- Hotspots of Biodiversity
- Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts.
- Endangered and endemic species of India.
- Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity.

6hrs

Unit-IV
Environmental Pollution

Definition

- Causes, effects and control measures of

  a) Air Pollution
  b) Water Pollution
  c) Soil Pollution
  d) Marine Pollution
  e) Noise Pollution
  f) Thermal Pollution
  g) Nuclear Hazards

- Solid Waste Management: Causes, effects and control measures of urban and Industrial Wastes.
- Role of an Individual in prevention of pollution.
- Pollution case studies
- Disaster Management: floods, earthquake, cyclones and landslides.

8hrs

Unit-V

Social Issues and the Environment

- From unsustainable development to sustainable development.
- Urban problems related to Energy.
- Water conservation, Rain water Harvesting, Watershed management.
- Resettlement and Rehabilitation of people; its problems and concerns, case studies.
- Environmental ethics: issues and possible solutions.
- Green house effect and global Warming, effects of acid Rain and their remedial measures and ozone Layer depletion.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment protection Act, Air (prevention and control of Pollution) Act, Water(prevention and control of Pollution) Act, wildlife protection Act, Forest conservation Act, Issues involved in Enforcement of Environmental Legislation, Public Awareness, case studies.

Human Population and the Environment

- Population growth variation among nations, Population Explosion, Family welfare programme.
- Environment and Human Health.
- Human Rights.
- Value education.
- HIV/AIDS, Women and Child welfare.
- Role of Information Technology in Environment and Human Health, Case studies.

8hrs

Suggested field work

Visit to local area to document environment assets river/ forest/ grassland/ hill/ mountain, visit to local polluted site urban/ rural/ industrial/ agricultural, study of common plants, insects, birds, study of simple ecosystems pond river, hill slopes etc.

References:

Agarwal, K.C. 2001 Environmental; Biology, Nidi Pub. Ltd.Bikaner.

Bharaucha Erach, The Biodiversity of India, Mappin Pub. Pvt. Ltd., Ahemdabad-380, India.

Brunner R.C. 1989. Hazardous waste incineration, Mc Graw Hill.

Clark R.S. Marine Pollution, Clanderon Press Oxford (TB).

Cunningham W.P.2001.Cooper, T.H. Gorhani, E&Hepworth, Environmental encyclopedia, Jaicob Publication House, Mumbai.

De. A.K. Environmental chemistry Willey Eastern Limited.

Down to Earth, Centre for Science and Environment(R).

Glick,H.P..1993 water in crisis,Pacific Institute for studies in dev, Environment & security,Stockholm Env, Institute, Oxford Univ, Press 473 p.

Hawkins R.E.Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R).

Heywood,V.H.& watson ,R.T.1995.Global biodiversity Assessment .Cambridge Univ.Press 1140 p.

Jadhave,H.and Bhosale,V.M.1995 Environmental protection and laws, Himalaya pub, house,Delhi.284 p.
Mckinnery,M.L.and school ,R.M.1996 Environmental science systems and solutions, web enhanced edition 639 p.
Mhaskar A.K.Matter Hazardous, Techno Science Pub (TM)
Miller T.G.Jr,Environmentals Ecology,W.B.Saunders Co.USA,574 p.
Odum, E.P.1997. Fundamental chemistry, Goel Pub House Meerut.
Survey of the Environment, The Hindu (M).
Sharma B.K.2001.Environmental Chemistry, Goel Pub .House Meerut.
Survey of the Environment, The Hindu (M).
Townsend C,Harper J, and Michel Begon, Essentials of Ecology, Blackwell Science (TB).

Integral University, Lucknow
Department of Mathematics

B. Tech. 1st year **I st sem**

Subject: Mathematics-I for Bioengineering (For BT & FT) Subject Code: BFYC120
(Revised w.e.f. July 2015)

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Unit-I **[8]**

Algebra: Properties of determinants, solution of simultaneous equations by Cramer's rule. Matrices: Properties of matrices, Linear dependence, Rank of matrix, consistency of linear equations and solution of linear system of equations. Characteristic equation, Cayley-Hamilton's theorem, Eigen-values and Eigen vectors.

Unit-II **[8]**

Set Theory, Solution of cubic equations: Sets and their representations, finite and infinite sets, subsets, empty set, universal set, complement of a set, difference of sets, Venn diagram, ordered pairs, Cartesian product .Solution of cubic equations by Cardon's method.

Unit-III **[8]**

Trigonometry: Measurement of angle. T-ratio, addition, subtraction and transformation formulae. T-ratios of multiple, submultiples, allied and certain angles.

Unit-IV **[8]**

Analysis of plain geometry: Co-ordinate systems, distance between two points. Area of triangle. Locus of a point. Equation of straight line, slope and intercept form. General equation of first degree. Angle between two lines, equation of parallel and perpendicular lines to given lines. Distance between two parallel lines. Equation of second degree, Circle, Different forms of equation of circle, equation of chord of contact. Length of tangent circle.

Unit-V: **[8]**

Differential Calculus: Limits and functions, Definition of differential coefficients differentiation of standard functions, Function of function, parametric differentiation.

Integral Calculus: Integration as inverse of differentiation. Indefinite integrals of standard form, Integration by parts, Substitution and partial fractions form, evaluation of definite integrals.

Reference Books:

1. Mathematics: NCERT.
2. Mathematics: R.D. Sharma.
3. Higher Engineering Mathematics: B. V. Ramana. Tata McGraw Hill Publishers.
4. Mathematics: R.S. Agarwal.
5. Higher Engineering Mathematics, B.S, Grewal, Khanna Publisher.

BASIC MECHANICAL ENGINEERING
BFYC 113 / BFYC 213

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A. FUNDAMENTALS OF THERMODYNAMICS

UNIT – I

Fundamental Concepts and Definitions:
Definition of Thermodynamics, System, surrounding and universe, Phase, Concept of continuum, Macroscopic & microscopic point of view. Density, Specific volume, Pressure, temperature. Thermodynamic equilibrium, Property, State, Path, process, Cyclic process, Energy and its form, Work and heat, Enthalpy.
3

Laws of thermodynamics:
Zeroth law: Concepts of Temperature, Zeroth law. **1**
First law: First law of thermodynamics. Concept of processes, Flow processes and control volume, Flow work, Steady flow energy equation, Mechanical work in a steady flow of process. **3**
Second law : Essence of second law, Thermal reservoir, Heat engines, COP of heat pump and refrigerator. Statements of second law, Carnot cycle, Clausius inequality. Concept of Entropy. **3**

UNIT – II

Properties of steam and thermodynamic cycles :
Properties of steam, Use of property diagram, Steam tables, Processes involving steam in closed and open systems. Rankine cycle
Introduction to I.C. Engines: Two, four stoke S.I. and C.I. engines. Otto cycle, Diesel cycle. **6**

B. MECHANICS AND STRENGTH OF MATERIALS

UNIT - III

Force system and Analysis:
Basic Concept: Laws of motion. Transfer of force to parallel position, Resultant of planer force system. Free Body diagrams, equilibrium and its equation. **4**
Friction: Introduction, Laws of Coulomb friction, Equilibrium of bodies involving dry friction, belt friction. **2**

UNIT – IV

Structure Analysis :
Beams: Introduction, Shear force and bending moment, Shear and bending moment diagram for statically determinate beams. **4**
Trusses: Introduction, Simple Trusses, Determination of forces in simple trusses members, methods of joints and method of section. **4**

UNIT - V

Stress and Strain Analysis :
Simple Stress and strain: Introduction, Normal shear stresses, Stress-strain diagrams for ductile and brittle materials, Elastic constants, One dimensional loading of members of varying cross sections, Strain Energy. **4**

Pure Bending of Beams
Introduction, Simple bending theory, Stress in beams of circular,rectangular and triangular cross section. **2**
Torsion: Introduction, Torsion of shafts of circular section, Torque and Twist, Shear stress due to Torque. Comparison of hollow and solid circular shafts. **4**

Reference:

1. Van Wylen G.J. & Sonnlog R.E. Fundamentals of Classical Thermodynamics, John Wiley & Sons, Inc. NY.
2. Wark Wenneth: Thermodynamics (2nd edition) Mc Graw Hill Book Co. NY.
3. Holman, J.P.: Thermodynamics, Mc Graw Hill Book Co.NY.
4. Shames I.H., Engineering Mechanics, P.H.I.
5. D.S. Kumar, Mechanical Engineering, S.K. Katarial & Sons.
6. Bhavi Katti S.S., Engineering Mechanics, New Age Pub.
7. P.K. Bharti: Engineering Mechanics, Kataria and Sons.
8. R.K. Rajput, Mechanical Engineering, Laxmi Pub.

COMPUTER PROGRAMMING

BFYC 114/ BFYC 214

Total Credit = 04

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Course Objectives:

1. This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code.
2. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
3. Developing competencies for the design, coding and debugging of computer programs.
4. Have the ability to write a computer program to solve specified problems.
5. Be able to use the C programming to create, debug and run simple programs.
6. The nature of C language is emphasized in the wide variety of examples and applications. To learn and acquire art of computer programming.

Course Outcomes:

1. Understand the basic terminology used in computer programming
2. Write, compile and debug programs in C language.
3. Use different data types in C.
4. Design programs involving decision structures, loops and functions.
5. Explain the concept of Array, Structure, Union etc.
6. Understand the dynamics of memory by the use of pointers.

UNIT -1 **[09]**

Introduction to Computers: Generation of computers, Characteristic and classifications of computers.

Components of Computer: CPU, Various I/O Devices, **Memory & its types** , (Memory Hierarchy, Storage Media), Computer Software and their types, Operating System.

Computer Networks & Communication: LAN, MAN, WAN, Network Topologies, Modes of Data Communication.

Introduction to Internet and its Safeguard: Internet Addresses, Domain Name System, URL, Web Browsers Search Engines, Firewalls , Anti-Virus.

Algorithm and flowchart: Algorithm and flow chart characteristics, Sketching Flowcharts of various problems.

Unit 2

[08]

Starting C: Standard I/O in 'C', 'C' Fundamental, C Character set, Constants, Variables, Keywords and Identifiers, Data types, Declaration. Operators and Expressions, Conditional statements (If, If-else), Nesting of if- else statement, switch statement, The**?:** operator, goto statement.

Decision making and Looping (While, Do-While, for), Break and Continue statements, Case Control Structures (Switch), **C programs based on above concepts**.

Unit 3

[09]

Introduction to pointers: declaration and initialization of pointers, accessing the address of the variable, accessing the variable through the pointer, chain of pointers, pointers operators, pointer arithmetic

Introduction to Functions: Need of "C" function, User Defined and Library Functions, Prototype of Function, Call by Value; Call by Reference; Nesting of Functions, Recursion. Pointers with function, **C program based on above concept**

Unit 4 **[10]**

Array: Concept of One Dimensional and Multi Dimensional arrays, Declaration,
Operations: insert, delete, search, traverse, and merge, matrix operations, **Sorting**: Bubble sort, merge sort, insertion sort.
Character array and strings: declaring and initializing strings variable, reading and writing a character, reading and writing strings from terminal, Arithmetic operations on characters, string handling functions. Application of pointers, and function on array, **C program based on above concept**

Unit 5 **[08]**

Structures: Defining Structure, Declaration of Structure Variable, Accessing Structure members, copying and comparing structure variable, operation on individual member, nesting of structures, Array of structures. Application of pointers and function on Structures.
Union Defining Union Declaration of Union, difference between structure and Union, **Introduction of Static and Dynamic memory allocation-** The process of Dynamic memory allocation, , **C program based on above concept.**

References:

1. Foundation of Information Technology by 'D.S. Yadav'- New age International
2. Programming in 'C' by 'E Balagurusamy'.-TMH Publication.
3. Let us 'C' by 'Yashwant Kanitkar'-BPB Publication.
4. The C Programming Essentials by Dey- Pearson Publication.

Chemistry Lab. (BFYL-115/215)
Revised w.e.f. July-2015
List of Experiments

1. To determine the Iron content in the given iron ore by using external indicator.
2. To determine the Alkalinity in the given water sample.
3. To determine the Chloride content in the given water sample by Mohr's method. (Argentometric method)
4. To determine the Percentage of Available Chlorine in the given sample of Bleaching powder iodometrically.
5. To determine the temporary and permanent hardness in water sample by Complexometric titration using EDTA as standard solution.
6. To determine the Equivalent weight of Iron by Chemical Displacement method. (Equivalent weight of Copper is 63.5)
7. To determine the strength of given HCl solution by titrating it against NaOH solution using pH meter.
8. To determine the iron concentration in the given water sample by Spectrophotometer using potassium thiocyanate as colour developing agent.
9. To detect the presence of functional groups in the given organic compound.
10. To detect the presence of Elements in the given organic compound.

BIOLOGY LAB
IBT 151

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1. Enzyme: salivary amylase test.
   - Degradation of starch into glucose.
   - Starch – Iodine test
   - Glucose – Glucose strip test
2. Contamination experiment:
   - Free medium – Contamination
   - Medium+ antibiotic/Antimicrobial agent – No contamination
   - Study of contaminants – Bacterial
   - Fungal etc.
3. Denaturation of enzyme / amylase by heating
4. Determination of starch/polysaccharide content in various food seeds (cereals)
5. Protein content in various food seeds.
6. Difference between monosacchrides, disacchrides and polysaccharide.
7. Handling and use of various types of microscope
   - Simple (SM)
   - Compound (CM)
   - Stereomicroscope
   - Inverted (IM)
8. Cellular staining of a microbial cell: microscopic observations and morphology (CM).
9. Cellular staining of a plant cell: microscopic observations and morphology (C.M.)
10. Cellular staining of an animal cell: microscopic observation and morphology (C.M.)
11. Visual observations of various internal organs in frog and mouse etc.
12. Difference between mitosis and meiosis
13. Cytogenic aspects in microscopic view:
    - Somatic cells –Leaf etc
    - Reproductive cells – Anthers, sectioning ovules

COMPUTER PROGRAMMING LAB

BFYL117/ BFYL 217

Total Credit = 01 **L T P**

0 0 2

Course Objectives and Outcomes:

1. Developing comprehensive knowledge about the fundamental principles, concepts and constructs of computer programming.
2. Developing competencies for the design, coding and debugging of computer programs.
3. Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming
4. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
5. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
6. Role of Functions involving the idea of modularity.
7. Concept of Array and pointers dealing with memory management.
8. Structures and unions through which derived data types can be formed

List of Experiments

1. Programs based on basic concepts of C. (e.g. Addition, Subtraction, Multiplications, Swapping of numbers, Conversions, area calculation, interest calculation…etc)
2. Programs based on Conditional statement.
3. Programs based on loop Conditions (FOR, WHILE, DO- WHILE).
4. Programs based on Single & Two dimensional Array (Insertion, deletion, Multiplication, searching, etc...).
5. Programs based on Pointers.
6. Programs based on Function call (Call by value and call by reference).
7. Programs based on recursion.
8. Programs based on Strings and its operations.
9. Programs based on Structures and its operations.
10. Programs based on Miscellaneous Concepts.

Integral University
Department of English
B.Tech. (English)
Syllabus for Professional Communication Lab. w.e.f. July 2015
Subject Code: BFYL 118/218

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Introductions (Instructors, Students and Curriculum)

Listening exercises

Framing Questions

Making Small talks

Presentation Making- tips, do's and don'ts/ group presentations

Group presentations

Phonetic alphabet

Phonetic transcription

Intonation

Stress

Working on Negotiations

Situational conversational section- Social language, emergency situations/ seeking help, inquiries, communicating bad news

Exercise on cross-cultural communication