CHHATTISGARH SWAMI VIVEKANADA TECHNICAL UNIVERSITY
BHILAI (C.G.)

SCHEME OF TEACHING AND EXAMINATION
B.E. (V SEMESTER) CHEMICAL ENGINEERING

S. No	Board of Study	Subject Code	Subject	Period per week			Scheme of Exam Theory/Practical			Total Marks	Credit L + (T+P)/2
				L	T	P	ESE	CT	TA		
1	Chemical Engineering	319551(19)	Fluid Flow Operations	4	1	-	80	20	20	120	4
2	Chemical Engineering	319552(19)	Heat Transfer Operations	4	1	-	80	20	20	120	4
3	Chemical Engineering	319553(19)	Computational Methods in Chemical Engineering	3	1	-	80	20	20	120	4
4	Chemical Engineering	319554(19)	Organic Process Technology	4	-	-	80	20	20	120	4
5	Chemical Engineering	319555(19)	Chemical Engineering Thermodynamics	4	-	-	80	20	20	120	4
6	Chemical Engineering	319556(19)	Bio Chemical Engineering	4	-	-	80	20	20	120	4
7	Chemical Engineering	319561(19)	Fluid Flow Operations Lab	-	-	3	40		20	60	2
8	Chemical Engineering	319562(19)	Heat transfer Operations Lab	-	-	3	40		20	60	2
9	Chemical Engineering	319563(19)	Organic Process Technology Lab	-	-	2	40		20	60	1
10	Chemical Engineering	319564(19)	Bio Chemical Engineering Lab	-	-	3	40		20	60	2
11	Humanities	300565 (46)	Personality Development	-	-	2	-		20	20	2
12	Chemical Engineering	319566 (19)	Practical Training/Seminar/Library	-	-	1			20	20	1
	Total			23	3	14	640	120	240	1000	35

L: Lecture   **T:** Tutorial   **P:** Practical

ESE: End Semester Examination   **CT:** Class Test   **TA:** Teacher's Assessment

* Industrial Training of eight weeks is mandatory for B.E. student. It is to be completed in two parts. The first part will be in summer after IV sem. after which students have to submit a training report which will be evaluated by the college teachers during B.E. V sem.

Name of the Programme: Bachelor of Engineering   ::::   Duration of the programme: Four Years

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Chemical Engineering**	Semester:	**V**
Subject:	**Fluid Flow Operations**	Code:	**319551 (19)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**
ESE Duration:	**Three Hours**		

Maximum Marks in ESE: **80**   Minimum Marks in ESE: **28**

Course Objective:
- To introduce the basic concepts of fluid mechanics and their applications in Chemical Engineering to design the equipment for measurement and transport of fluids in chemical plants and to design the related piping and control systems.
- To develop the ability to determine pressure and velocity variations in internal and external flow of fluids to identify the basic mechanisms, formulate problems and solve the problems by analysis or by application of experimental data.

Course Outcome:
The course is meant for understanding the design approaches and methods of scientific and engineering principles for designing fluid flow system in any process plant and measure and monitor the flow of fluids, be it a liquid or a gas.

UNIT I   Unit Systems, Fluids: Properties And Classification, Fluid Statics And Fluid Dynamics, Laminar, Transition And Turbulent Flows, Applications of Fluid Flow In Chemical Engg., Hydrostatic Equilibrium, Manometers: Simple, Differential And Inclined, Properties Of Manometric Liquids, Decanter: Continuous, Gravity And Centrifugal.

UNIT II   Fluid Flow Phenomena: Newtonian And Non-Newtonian Fluids, Viscosity And Momentum Flux, Laminar &Turbulent Flow In Boundary Layers, Friction Factor Chart, Friction Factor &Pressure Drop**,** Dimensional Analysis and Pie Theorem, Dimensional less groups.

UNIT III   Material & Energy Balance,Continuity Equation, Equation Of Motion, Bernoulli's Equation, Flow Of Incompressible Fluids, Flow Past Immersed Bodies, Packed And Fluidized Beds, Introduction To Fluidization, Minimum Fluidization Velocity.

UNIT IV   Pipes fitting and Valves: Pipe Sizing For Flow Of Liquids And Gasses, Joints And Fittings, Sudden Contraction And Expansion, Classification Of Valves And Pumps And Their Selection Criteria, Losses In Piping, Valves And Fittings, Performance Of Centrifugal Pumps, Characteristic Curves For Pumps, NPSH Calculation For Pumps, Fans And Blowers.

UNIT V   Flow And Control Devices, Control Valve, Valve Characteristics, Sizing Of Control Valves, Flow Measurement Using Venturi Meter, Orifice Meter, Rota Meter &Pitot Tube, Weir, V- Notches And Square Notches.

Text Books:

1. McCabe W.L., Smith J.C., Hariot P., "Unit Operations in Chemical Engineering", McGraw Hill International, 7th ed., 2005.
2. Badger W.L., Banchero J.T., "Introduction to Chemical Engineering", Tata McGraw Hill Publishing Co. Ltd.

Reference Books:

1. B.Mersey, Fluid Mechanics, Chapman, Landon.
2. Brown et al, " Unit Operation" John Wiley Sons.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Chemical Engineering**	Semester:	**V**
Subject:	**Heat Transfer Operations**	Code:	**319552 (19)**
Total Theory Periods:	**40**	Total Tutorial Periods:	**10**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**
ESE Duration:	**Three Hours**		

Maximum Marks in ESE: **80**   Minimum Marks in ESE: **28**

Course Objective:
- The course is designed to provide an overview of various modes of heat transfer, its mechanism, and the industrial aspects of conduction, convection and radiation.
- Condensation and evaporation phenomena, design and construction of equipment form an integral part of this course.

Course Outcome:
- After undergoing this course the students will acquire knowledge about various modes of heat transfer, its mechanism, and the industrial aspects of conduction, convection and radiation.
- After undergoing this course the students will understand about design and construction of heat transfer equipments.

UNIT I Classification of Heat Flow Processes, Concept of driving force and Resistance , Conductive Heat Transfer, Fourier's Law, Steady State Conduction, Compound Resistances in Series, Critical Insulation Thickness, Heat Flow Through a Cylinder and Sphere, Introduction to Unsteady State Heat Conduction, Numerical Problems based on the above.

UNIT II Principles of Heat Flow in Fluids, Natural and Forced Convection, Concept of films and Two film theory. Individual and Overall Heat Transfer Coefficients, Dirt factor, Controlling Resistance, Logarithmic Mean Temperature Difference, Dimensional Analysis and Dimensionless Groups in Heat Transfer, , Dittuse- Boelter Equation and other correlations, Numerical Problems based on the above.

UNIT III Heat Transfer from Condensing Vapors, Dropwise and Filmwise Condensation, Condensation of Superheated Vapors, Heat Transfer to Boiling Liquids, Critical, Heat Flux, Nucleate Film Boiling. Radiation Heat Transfer, Kirchoff's Law, Black body Radiation, Numerical Problems based on the above.

UNIT IV Heat Transfer Equipments ,Operation and Preliminary Design concepts of Heat Exchangers, Condensers, Double Pipe, Multipass Shell and Tube type Heat Exchangers, Transfer Units in Heat Exchangers, NTU and HTU, Numerical Problems based on the above.

UNIT V Evaporation, Types of Evaporators Performance of Tubular Evaporators, Duhring's Rule, Elevation in Boiling Point and Effect of Hydrostatic Head, Steam Economy, Enthalpy Balance, Multiple effect Evaporators, Methods of feeding, Numerical Problems based on the above.

Text Books:

1. W.L. McCabe and J.C. smith, "Unit Operations In Chemical Engineering",4thEdn., McGraw Hill publishing Co., 1985.
2. Badger and Bancharo, "Introduction to Chemical Engg." McGraw Hill.

Reference Books:

1. D. Q. Kern, "Process Heat Transfer", McGraw Hill publishing Co., New York 1950.
2. A.S.Foust, L. A. Wenzel, C.W. Clump, Louis Maus and L.B. Anderson, "Principles of Unit Operations", John Wiley, New York, 1959.
3. W.H.Mc Adams, "Heat Transmission", McGraw Hill publishing Co., New York 1954.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Chemical Engineering** Semester: **V**
Subject: **Computational Methods in Chemical Engineering** Code: **319553 (19)**
Total Theory Periods: **40** Total Tutorial Periods: **10**
No. of class Tests to be conducted: **2 (Minimum)** No. of assignments to be submitted: **2 (Minimum)**
ESE Duration: **Three Hours** Maximum Marks in ESE: **80** Minimum Marks in ESE: **28**

Course Objective:
- To get exposed to finite differences and interpolation
- To be thorough with the numerical differentiation and integration
- To find numerical solutions of ordinary differential equations and unsteady state heat and mass transfer problems.
- To find numerical solutions of partial differential equations

Course outcome:
- This course helps the students to develop analytical ability in solving mathematical problems as applied to the Chemical Engineering.
- This course helps the students to understand the applications of numerical techniques in chemical engineering calculations

UNIT I Treatment of Engineering Data:Graphical Representation, Empirical Equations, Interpolation, Newton's Formula, Extrapolation, Graphical Integration, Numerical Differentiation and Integration.

UNIT II Interpretation of Engineering Data: Propagation of Errors, Variance and Distribution of Random Errors, Properties of Variance, Confidence Limits for Small Samples, Analysis of Variance.

UNIT III Formulation of Ordinary Differential Equations: Functional Relationships, Mathematical Origin of Differential Equations, Ordinary Differential Equations, Partial Differential Equations, Application of Ordinary Differential Equations to Common Chemical Engineering Problems.

UNIT IV Formulation of Partial Differential Equation: Finite Difference Approximation, Classification of Second Order Equations, Linear Finite Difference Equation, Non-Linear Finite Difference Equations, Application of Ordinary Differential Equations to Common Chemical Engineering Problems.

UNIT V Numerical Solution of Ordinary Differential Equations: Second -Order Equations, Numerical -Solution Method, Picard's Method, Modified Euler Method, Method of W.E. Milne, Method of Runge - Kutta, Numerical-Solution of Equations of Higher Order, Application of Runge-Kutta Method to Higher-Order Equations.

Text Books:

1. Harold S. Mickley, Thomas S. Sherwood and Charles E. Reed, "Applied Mathematics in Chemical Engineering" Tata McGraw-Hill Publishing Company Ltd.
2. Dr. B .S. Grewal, "Numerical Methods in Engineering and Science" Khanna Publishers

Reference Books:

1. Chapra and Canale, "Numerical Methods for Engineers" McGraw-Hill International Edition
2. Dr. B.S.Grewal, "Higher Engineering Mathematics "Khanna Publishers

Name of the Programme: Bachelor of Engineering :::: Duration of the programme: Four Years

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Chemical Engineering**	Semester:	**V**
Subject:	**Organic Process Technology**	Code:	**319554 (19)**
Total Theory Periods:	**50**	Total Tutorial Periods:	**NIL**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**
ESE Duration:	**Three Hours**	Maximum Marks in ESE: **80**	Minimum Marks in ESE: **28**

Course Objective:
- The purpose of the organic process technology course is to improve knowledge of the chemical processes along with emphasis on recent technological development.
- The aim of the course is to study process technologies, availability of raw materials, production trends, preparation of flow sheets, engineering and environmental problems of various chemical industries.

Course Outcome:
- After undergoing this course the students will acquire knowledge regarding various technological aspects of chemical industries.
- After undergoing this course the students will understand about manufacturing process and technical problems associated with this.

UNIT I Nitration: Introduction, agents, liquid and vapour phase nitration, nitration equipments, mixed acid preparation. Dyes and Intermediates: Introduction, classification of dyes, manufacture of dyes.

UNIT II Halogenation: Types of halogenations reactions, preparation of chloral. Pesticides: Introduction of pesticides, classification of insecticides, manufacturing of BHC & DDT.

UNIT III Sulfonation and Sulfation: Introduction, agents, chemical & physical factors, sulfonation equipments, sulfonation of benzene.
Pulp and Paper: Raw materials, pulping processes, recovery of chemicals, stock preparation and paper making (production of paper from pulp).

UNIT IV Esterification: Esterification By organic acid, study of continuous esterification column. Manufacture of ethyl acetate, cellulose acetate & nitroglycerine.
Vegetable Oil: Types of oil, extraction and processing of vegetable oil, Types of animal's fat & oil. Types of waxes. Manufacturing of Soap & Detergent.

UNIT V Polymerization: Introduction, methods of polymerization, properties of polymers.

Text Books:

1. Groggins P. H. ,"Unit Processes in Organic Synthesis", McGraw-Hill Book Co.
2. Austin, G.T., "Shreve's Chemical Process Industries", McGraw-Hill Book Co.

Reference Books:

1. GopalaRao M. and Marshall S.," Dryden's Outlines of Chemical Technology ",East-West Press Pvt Ltd.
2. Pandey G. N., "A Text Book of Chemical Technology", Volume – II, Vikas Publishing House Pvt. Ltd.

Name of the Programme: Bachelor of Engineering   ::::   Duration of the programme: Four Years

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Chemical Engineering**	Semester:	**V**
Subject:	**Chemical Engineering Thermodynamics**	Code:	**319555 (19)**
Total Theory Periods:	**50**	Total Tutorial Periods:	**NIL**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**
ESE Duration:	**Three Hours**	Maximum Marks in ESE: **80**	Minimum Marks in ESE: **28**

Course Objectives:
- To familiarize with basic concepts and laws of thermodynamics
- To familiarize with volumetric properties of fluids
- To understand thermodynamic properties of fluids
- To be thorough with the numerical solution based on compression and refrigeration

Course outcomes:
1. This course helps the students to understand knowledge of thermodynamics and its application in process industries.
2. This will help to impart knowledge on the application of carnot principles in refrigeration cycle.
3. This course helps the students to understand the chemical equilibria.

UNIT I   First Law of Thermodynamics and its Application to a Closed System (Non-flow Processes):Isothermal Process, Isobaric Process, Isochoric Process, Adiabatic Process, and Polytropic Process, Ideal Gas Equation, Introduction to Cubic Equations of State: Vander Waal's Equation, Law of Corresponding State, Second Law of Thermodynamics and its Application

UNIT II   Entropy of Various Processes, Pressure Volume and Temperature Relation, General Thermodynamic Relations: Helmholtz Free Energy, Gibbs Free Energy, Coefficient of Volume Expansion, Isothermal Compressibility, Maxwell's Relation, Joule Thompson Effect., Third Law of Thermodynamics.

UNIT III   Compression: Reciprocating Air Compressors, Single stage compression, Clearance and Clearance Volume, Volumetric Efficiency, Multistage Reciprocating Air Compressor: Arrangement for Multistage with Intercooler, Power Requirement And Efficiency.

UNIT IV   Carnot and Reversed Carnot Cycle, Air cycle for Refrigeration: Bell Coleman air cycle, Reversed Brayton cycle, Vapour compression refrigeration cycle, cascade and Multistage refrigeration, Vapour Absorption cycle, Choice of Refrigerant.

UNIT V   Solution Thermodynamics: Partial Molal Properties; Chemical Potential; Gibbs-Duhem Equation; Fugacity and Fugacity Coefficient; Activity and Activity Coefficient; Excess Properties of Mixtures. Chemical Equilibria: Chemical Equilibrium Constants; Homogeneous Reactions; Standard Gibbs Free Energy Change; Equilibrium Conversion in Single and Multiple Reactions

Text Books:
1. J. M. Smith and H.C Van Ness" Introduction to Chemical Engineering Thermodynamics" McGraw-Hill International Editions (Fifth Edition)
2. Dr. R. Yadav, " Fundamentals of Engineering Thermodynamics" Central Publishing House

Reference Books:
1. Y. V. C. Rao, "Chemical Engineering Thermodynamics" Universities Press
2. P. L. Ballaney, "Thermal Engineering" Khanna Publishers

Name of the Programme: Bachelor of Engineering   ::::   Duration of the programme: Four Years

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Chemical Engineering**	Semester:	**V**
Subject:	**Bio Chemical Engineering**	Code:	**319556 (19)**
Total Theory Periods:	**50**	Total Tutorial Periods:	**NIL**
No. of class Tests to be conducted:	**2 (Minimum)**	No. of assignments to be submitted:	**2 (Minimum)**
ESE Duration:	**Three Hours**	Maximum Marks in ESE: **80**	Minimum Marks in ESE: **28**

Course Objective:
- The aim of the course is to study about basics of microbiology, cell constituents and chemicals of Life.
- The purpose of the course is to study the kinetics of enzyme and immobilization of enzymes.
- Major Metabolic Pathways: EMP pathway, TCA cycle and Respiratory chain.
- Microbial growth, study of bioreactors.
- Bio-product recovery and fermentation process.

Course Outcome:
- After undergoing this course the students will acquire knowledge regarding kinetics of Enzyme.
- After undergoing this course the students will acquire knowledge regarding major metabolicPathways ,bioreactors and bio-product recovery.

UNIT I   Introduction – Cellstructure, types; Microbiology: Bacteria, Yeasts, Molds, Algae; Chemical of Life: Carbohydrates, Lipids, Proteins; Nucleicacid: RNA and DNA; The hierarchy of cellular organization.

UNIT II   The Enzyme and Enzyme Kinetics –Introduction; Classification of enzymes; Mechanism and kinetics of enzymatic reactions; The enzyme substrate complex and enzyme action; Other influences on enzyme activity; Hydrolytic enzymes; Enzymes of industrial importance; Method of immobilization.

UNIT III   Metabolic Stoichiometry and Energetic –Energy production and coupling reactions: Glycolysis, TCA cycle, EMP pathway, Electron transport chain (Respiratory chain); Photosynthesis; Membrane transport; Fermentation: aerobic and anaerobic; Biosynthesis of carbohydrates (glycogen), Amino acids, Nucleotides.

UNIT IV   Biomass Production in Cell Cultures – Biomass and cell cultures; Cell population kinetics; Ideal reactors for measurement of kinetics: Batch and CSTR; Kinetics of balanced growth; Monod's growth kinetics; Transient growth kinetics; Thermal –Death kinetics of cells and spores.

UNIT V   Biological Reactors – Components of Bioreactors; Components of a fermentation process; Types of bioreactors for Bio-mass production; Down stream processing: removal of particulates, Cell disruption, Primary isolation, Purification ,Final product isolation, Membrane separation processes.

Text Books:

1. J. E. Bailey & D. F. Ollis, "Biochemical Engineering Fundamentals" , McGraw Hill Book Company.
2. Syed Tanveer Ahmed Inamdar, " Biochemical Engineering – Principles and Concepts" Prentice –Hall of India Pvt. Ltd.,New Delhi.

Reference Book:

1. M. L. Shuler & F. Kargi, "Bioprocess Engineering (Basic Concepts) "Prentice Hall of India.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Chemical Engineering**	Semester:	**V**
Subject:	**Fluid Flow Operations Laboratory**	Code:	**319561 (19)**
Total Lab Periods:	**36**	Batch Size:	**15**
Maximum Marks:	**40**	Minimum Marks:	**20**

List of Experiments (At least Eight experiments are to be performed by each student)

1. Determination of viscosity.

2. Experiment to determine characteristics of laminar and turbulent flow.

3. Flow through packed bed.

4. Flow through venture meter.

5. Flow through orifice meter.

6. Flow through pipe fitting (Minor Losses).

7. Determination of friction factor (Major Losses).

8. Characteristics of centrifugal pump

9. Verification of Stokes's law.

10. Verification of Bernoulli's theorem.

11. Calibration of Rotameter.

Equipment/Machines/Instruments/Tools Required:

1. Packed bed column

2. Orifice meter

3. Venturi meter

4. Rota meter

5. Bernoulli's apparatus

6. Viscometer

Recommended Books:

1. McCabe W.L., Smith J.C., Hariot P., "Unit Operations in Chemical Engineering", McGraw Hill International, 7th ed., 2005.

2. Badger W.L., Banchero J.T., "Introduction to Chemical Engineering", Tata McGraw Hill Publishing Co. Ltd.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Chemical Engineering**
Subject: **Heat Transfer Operations Laboratory**
Total Lab Periods: **36**
Maximum Marks: **40**

Semester: **V**
Code: **319562 (19)**
Batch Size: **15**
Minimum Marks: **20**

Experiment to be performed (Minimum Ten experiments are to be performed by each student):

1. Determination of Thermal Conductivity and Thermal Resistance of given compound resistances in series by Slab System.
2. Determination of Thermal Conductivity of insulating powder by Spherical Dome.
3. Determination of Heat Transfer Coefficient in Double Pipe Heat Exchanger for Counter-current Flow.
4. Determination of Heat Transfer Coefficient in Double Pipe Heat Exchanger for Co-current Flow.
5. Determination of Heat Transfer Coefficient in Shell & Tube Heat Exchanger for Co-current Flow.
6. Determination of Heat Transfer Coefficient in Shell & Tube Heat Exchanger for Counter-current Flow.
7. To study the temperature distribution along the length of Pin Fin in Natural Convection.
8. To study the temperature distribution along the length of Pin Fin in Forced Convection.
9. To study heat transfer characteristic of Single Effect Evaporator.
10. To study heat transfer characteristic of open pan evaporator.
11. To study heat transfer characteristic of horizontal tube condenser.
12. To study the steam PV cell pilot scale system

List of Equipments required:

1. Thermal Conductivity Apparatus
2. Pin Fin Apparatus
3. Double Pipe Heat Exchanger
4. Shell- Tube Heat Exchanger
5. Open pan evaporator
6. Compounded resistance set up of metal slabs
7. Horizontal Tube Condenser

Text Books:

1. McCabe, W.L., Smith, J.C., Harriot, P., " Unit Operations of Chemical Engineering", McGraw-Hill International Editions, 5th Ed., 1993

Reference Books:

1. Badger, W.L., Banchero, J.T. " Introduction to Chemical Engineering", Tata McGraw Hills Publishing Company Limited , 3rd Ed., 1997

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch:	**Chemical Engineering**	Semester:	**V**
Subject:	**Organic Process Technology Laboratory**	Code:	**319563 (19)**
Total Lab Periods:	**36**	Batch Size:	**15**
Maximum Marks:	**40**	Minimum Marks:	**20**

Experiment to be performed (Minimum Ten experiments are to be performed by each student):

1. To determine the acid value of given oil sample.

2. To determine the saponification value of given oil sample.

3. To determine the % of total fatty material present in given soap.

4. To determine the moisture content of the given soap sample.

5. To determine the esterification value of the given oil sample.

6. Manufacture of toilet soap.

7. To determine the moisture content of prepared toilet soap.

8. Preparation of phenol-formaldehyde resin.

9. Solvent Extraction of oil from oilseed by sohxlet apparatus

10. To determine the iodine value of the given oil sample.

11. To determine the % of oil in given oil bearing seed sample.

12. To determine free alkali content in given soap sample.

13. Manufacture of detergent.

14. Manufacture of phenyl.

15. Manufacture of paint.

Equipments/Machines/Instruments/Tools Required:

1. Oven
2. Electronic balance
3. Hot plate
4. Water bath
5. Agitator
6. Distillation unit

Recommended Books:

1. Groggins P. H. ,"Unit Processes in Organic Synthesis", McGraw-Hill Book Co.

2. Austin, G.T., "Shreve's Chemical Process Industries", McGraw-Hill Book Co.

3. GopalaRao M. and Marshall S.," Dryden's Outlines of Chemical Technology ",East-West Press Pvt Ltd.

4. Pandey G. N., "A Text Book of Chemical Technology", Volume – II, Vikas Publishing House Pvt. Ltd.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Branch: **Chemical Engineering**   Semester: **V**
Subject: **Bio Chemical Engineering Laboratory**   Code: **319564 (19)**
Total Lab Periods: **36**   Batch Size: **15**
Maximum Marks: **40**   Minimum Marks: **20**

Experiment to be performed (Minimum Ten experiments are to be performed by each student):

1. Identification of Carbohydrate in given sample.

2. Identification of Protein in given sample.

3. Identification of Fat in given sample.

4. Estimation of Carbohydrate.

5. Estimation of Protein.

6. Determination of Iodine value of fat.

7. Determination of Saponification value of given oil sample.

8. Separation of amino acid by paper chromatography.

9. Amylase production test.

10. Citric acid production by fermentation.

11. Study of various techniques of enzyme immobilization.

12. Study of various steps in enzyme engg.

Equipments/Machines/Instruments/Tools Required:

1. Centrifuge.

2. Colorimeter.

3. Refractometer

4. Spectrophotometer (UV-VIS)

5. Hot Air Oven

6. Electronic Balance

Recommended Books:

1. J. E. Bailey & D. F. Ollis, "Biochemical Engineering Fundamentals" , McGraw Hill Book Company.

2. M. L. Shuler & F. Kargi, "Bioprocess Engineering (Basic Concepts) "Prentice Hall of India.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of Program: **Bachelor of Engineering**
Branch: **Common to All Branches**   Semester: **V**
Subject: **Personality Development**   Code: **300565 (46)**
No. of Lectures: **2/Week**   Tutorial Period: **NIL**
Total Marks in ESE: **NIL**   Marks in TA: **20**
Minimum number of Class Tests to be conducted: **Two**

Objective: The course is introduced to develop one's outer and inner personality tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Personality Development is essential for overall development of an individual apart from gaining technical knowledge in the subject.

Course Objectives
Upon completion of this course, the student shall be able
- To understand the concept of personality and image;
- To develop leadership, listening and interacting skills;
- To develop attitudinal changes;
- To develop decision-making qualities; and
- To communication skill.

UNIT I   **Personality concepts:** What is Personality – its physical and psychic aspects. How to develop a positive self-image. How to aim at Excellence. How to apply the cosmic laws that govern life and personality. How to improve Memory – How to develop successful learning skills. How to develop and effectively use one's creative power. How to apply the individual MOTIVATORS that make you a self-power personality.

UNIT II   **Interpersonal Skills:** Leadership: Leaders who make a difference, Leadership: your idea, What do we know about leadership? If you are serious about Excellence. Concepts of leadership, Two important keys to effective leadership, Principles of leadership, Factors of leadership, Attributes. Listening: Listening skills, How to listen, Saying a lot- just by listening, The words and the music, How to talk to a disturbed person, Listening and sometimes challenging. How to win friends and influence people, How to get along with others. How to develop art of convincing others. How can one make the difference. How to deal with others particularly elders. Conflicts and cooperation.

UNIT III   **Attitudinal Changes: Meaning of attitude,** benefits of positive attitudes, How to develop the habit of positive thinking.
Negative attitude and wining: What is FEAR and how to win it. How to win loneliness. How to win over FAILURE. How to win over PAIN. How to win over one's ANGER and others anger. What is stress and how to cope up with it? The art of self-motivation. How to acquire mental well-being. How to acquire physical well-being.

UNIT IV   **Decision Making:** How to make your own LUCK. How to plan goals/objectives and action plan to achieve them. How to make RIGHT DECISION and overcome problems. How to make a Decision. Decision making: A question of style. Which style, when? People decisions: The key decisions. What do we know about group decision making? General aids towards improving group decision making.

UNIT V   **Communication Skills: Public Speaking:** Importance of Public speaking for professionals. The art of Speaking - Forget the fear of presentation, Symptoms of stage fear, Main reason for speech failure, Stop failures by acquiring Information; Preparation & designing of speech, Skills to impress in public speaking & Conversation, Use of presentation aids & media.
Study & Examination: How to tackle examination, How to develop successful study skills.
Group discussions: Purpose of GD, What factors contribute to group worthiness, Roles to be played in GD.

Course Outcomes:
- The students will be able to develop inner and outer personality exposure;
- The students will be able to develop effective leadership qualities and interacting skills;
- The students will be able to develop positive attitude, motivating skills and develop winning philosophies;
- The students will be able to develop decision-making tools; and
- The students will be able to develop group presentation, public speaking and impressive conversation.

Text Books:
1. Basic Managerial Skills for all by E. H. McGrawth, prentice Hall India Pvt. Ltd., 2006
2. Basic Employability Skills by P. B. Deshmukh, BSP Books Pvt. Ltd., Hyderabad, 2014

Reference Books:
1. How to Develop a Pleasing Personality by Atul John Rego, Better Yourself Books, Mumbai, 2000
2. How to Succeed by Brain Adams, Better Yourself Books, Mumbai, 1969
3. Personality: Classic Theories & Modern Research; Friedman ; Pearson Education, 2006
4. How to Win Friends and Influence People by Dale Carnigie, A. H. Wheeler 2006