

Discipline: <b>Biotechnology</b>	<b>Semester: 5th</b>		Name of the teaching faculty: <b>JYOTI PATRA &amp; POONAM PANDA</b>
<b>Subject:TH 1 Entrepreneurship and Management &amp; Smart Technology</b>	<b>No. of Days/per week class allotted: 4</b>		<b>From Date: 15-09-2022 To 22-12-2022 No.of Weeks: 15</b>
<b>Week</b>	<b>SN</b>	<b>Class Day</b>	<b>Theory Topics</b>
<b>UNIT 1:- Entrepreneurship [10 Periods]</b>			
1st	1	1 <sup>st</sup>	Concept and need of Entrepreneurship
	2	2 <sup>nd</sup>	Characteristics and Qualities of entrepreneur
	3	3 <sup>rd</sup>	Types and Functions of entrepreneur
	4	4 <sup>th</sup>	Barriers in entrepreneurship,Entrepreneurs vs. Manager
2nd	5	1 <sup>st</sup>	Forms of Business Ownership: Sole proprietorship, partnership forms and others
	6	2 <sup>nd</sup>	Forms of Business Ownership: others
	7	3 <sup>rd</sup>	Types of Industries, Concept of Start-ups
	8	4 <sup>th</sup>	Entrepreneurial support agencies at National, State, District Level: DIC, NSIC,OSIC
3rd	9	1 <sup>st</sup>	Entrepreneurial support agencies: SIDBI, NABARD, Commercial Banks, KVIC etc
	10	2 <sup>nd</sup>	Technology Business Incubators and Science and Technology Entrepreneur Parks
	<b>UNIT 2:- Market Survey and Opportunity Identification (Business Planning) [8 Periods]</b>		
	11	3 <sup>rd</sup>	Business Planning
	12	4 <sup>th</sup>	SSI, Ancillary Units, Tiny Units, Service sector Units
4th	13	1 <sup>st</sup>	Time schedule Plan for Project Implementation
	14	2 <sup>nd</sup>	Agencies to be contacted for Project Implementation
	15	3 <sup>rd</sup>	Assessment of Demand and supply
	16	4 <sup>th</sup>	Potential areas of Growth
5th	17	1 <sup>st</sup>	Identifying Business Opportunity
	18	2 <sup>nd</sup>	Final Product selection
	<b>UNIT 3:- Project report Preparation [4 Periods]</b>		
	19	3 <sup>rd</sup>	Preliminary project report
	20	4 <sup>th</sup>	Detailed project report
6th	21	1 <sup>st</sup>	Techno economic Feasibility
	22	2 <sup>nd</sup>	Project Viability
	<b>UNIT 4:- Management Principles [5 Periods]</b>		
	23	3 <sup>rd</sup>	Definitions of management
	24	4 <sup>th</sup>	Principles of management

7th	25	1 <sup>st</sup>	Functions of management (planning, organising, staffing)
	26	2 <sup>nd</sup>	Functions of management (directing and controlling etc.)
	27	3 <sup>rd</sup>	Level of Management in an Organisation
	<b>UNIT 5:- Functional Areas of Management [10 Periods]</b>		
8th	28	4 <sup>th</sup>	a) Production management:Functions, Activities,Productivity,Quality control
	29	1 <sup>st</sup>	Production Planning and control
	30	2 <sup>nd</sup>	b) Inventory Management:Need and Techniques of Inventory management
	31	3 <sup>rd</sup>	c) Financial Management:Functions,Management of Working capital,Costing
9th	32	4 <sup>th</sup>	Break even Analysis,Brief idea about Accounting Terminologies
	33	1 <sup>st</sup>	d) Marketing Management:Concept of Marketing and Marketing Management
	34	2 <sup>nd</sup>	Marketing Techniques (only concepts), Concept of 4P's
	35	3 <sup>rd</sup>	e) Human Resource Management:Functions of Personnel Management
10th	36	4 <sup>th</sup>	Manpower Planning, Recruitment, Sources of manpower, Selection process,
	37	1 <sup>st</sup>	Method of Testing, Methods of Training & Development, Payment of Wages
	<b>UNIT 6:-Leadership and Motivation [6 Periods]</b>		
	38	2 <sup>nd</sup>	Leadership :Definition and Need/Importance,Qualities and functions of a leader
	39	3 <sup>rd</sup>	Manager Vs Leader,Style of Leadership (Autocratic, Democratic, Participative)
11th	40	4 <sup>th</sup>	b) MotivationDefinition and characteristics,Importance, Factors affecting motivation
	41	1 <sup>st</sup>	Theories of motivation (Maslow),Methods of Improving Motivation
	42	2 <sup>nd</sup>	Importance of Communication in Business
	43	3 <sup>rd</sup>	Types and Barriers of Communication
12th	<b>UNIT 7:- Work Culture, TQM &amp; Safety [5 Periods]</b>		
	44	4 <sup>th</sup>	Human relationship and Performance in Organization
12th	45	1 <sup>st</sup>	Relations with Peers, Superiors and Subordinates
	46	2 <sup>nd</sup>	TQM concepts: Quality Policy, Quality Management, Quality system
	47	3 <sup>rd</sup>	Accidents and Safety, Cause, preventive measures
	48	4 <sup>th</sup>	General Safety Rules , Personal Protection Equipment(PPE)

13th	<b>UNIT 8:- Legislation [6 Periods]</b>		
	49	1 <sup>st</sup>	a)Intellectual Property Rights(IPR),
	50	2 <sup>nd</sup>	Patents
	51	3 <sup>rd</sup>	Trademarks
	52	4 <sup>th</sup>	Copyrights
14th	53	1 <sup>st</sup>	b) Features of Factories Act 1948 with Amendment (only salient points)
	54	2 <sup>nd</sup>	c) Features of Payment of Wages Act 1936 (only salient points)
	<b>UNIT 9:- Smart Technology [6 Periods]</b>		
	55	3 <sup>rd</sup>	Concept of IOT, How IOT works
	56	4 <sup>th</sup>	Components of IOT, Characteristics of IOT
15th	57	1 <sup>st</sup>	Categories of IOT
	58	2 <sup>nd</sup>	Applications of IOT- Smart Cities, Smart Transportation
	59	3 <sup>rd</sup>	Applications of IOT- Smart Home, Smart Healthcare, Smart Industry,
	60	4 <sup>th</sup>	Applications of IOT- Smart Agriculture, Smart Energy Management etc.

<b>DISCIPLINE:</b> <b>BIOTECHNOLOGY</b>	<b>SEMESTER:5<sup>th</sup></b>	<b>NAME OF THE TEACHING FACULTY:</b> <b>SWETANGINI NAIK</b>
<b>SUBJECT: (TH-2)</b> <b>Genetic Engineering</b>	<b>NO. OF DAYS/PER WEEK</b> <b>CLASS ALLOTTED:4</b>	<b>FROM DATE: 15-09-2022</b> <b>TO DATE: 22-12-2022</b> <b>NO OF WEEK: 15</b>
<b>WEEK:</b>	<b>CLASS DAY:</b>	<b>THEORY/PRACTICAL TOPICS:</b>
1 <sup>st</sup>	1 <sup>st</sup>	1.1 Concept of Genetic Engineering.
	2 <sup>nd</sup>	Genes
	3 <sup>rd</sup>	Genome
	4 <sup>th</sup>	RDT, Basic steps of RDT.
2 <sup>nd</sup>	1 <sup>st</sup>	RDT, Basic steps of RDT.
	2 <sup>nd</sup>	Tools of RDT
	3 <sup>rd</sup>	Discussion about Restriction Endo nuclease enzyme.
	4 <sup>th</sup>	Discussion about Restriction Endo nuclease enzyme.
3 <sup>rd</sup>	1 <sup>st</sup>	Ligase enzyme and ligation
	2 <sup>nd</sup>	Plasmid
	3 <sup>rd</sup>	DNA modifying enzymes
	4 <sup>th</sup>	necessary role of RDT.
4 <sup>th</sup>	1 <sup>st</sup>	Application of RDT
	2 <sup>nd</sup>	Application of RDT
	3 <sup>rd</sup>	Vector system
	4 <sup>th</sup>	2.1 Gene cloning Vectors.
5 <sup>th</sup>	1 <sup>st</sup>	Gene cloning Vectors.
	2 <sup>nd</sup>	Gene cloning Vectors.
	3 <sup>rd</sup>	Plasmids and their properties.
	4 <sup>th</sup>	Plasmids and their properties.
6 <sup>th</sup>	1 <sup>st</sup>	Bacteriophage
	2 <sup>nd</sup>	Bacteriophage vectors for E. coli.
	3 <sup>rd</sup>	Bacteriophage vectors for E. coli.
	4 <sup>th</sup>	Life cycle of M13
7 <sup>th</sup>	1 <sup>st</sup>	Life cycle of M13
	2 <sup>nd</sup>	lambda phage in E. coli.
	3 <sup>rd</sup>	lambda phage in E. coli.
	4 <sup>th</sup>	Cosmids
8 <sup>th</sup>	1 <sup>st</sup>	Cosmids
	2 <sup>nd</sup>	Shuttle Vectors
	3 <sup>rd</sup>	Shuttle Vectors
	4 <sup>th</sup>	YAC vectors.
9 <sup>th</sup>	1 <sup>st</sup>	YAC vectors.
	2 <sup>nd</sup>	3.1 Integration of DNA insert in to vector.
	3 <sup>rd</sup>	Integration of DNA insert in to vector.

	4 <sup>th</sup>	Linkers
10 <sup>th</sup>	1 <sup>st</sup>	Linkers
	2 <sup>nd</sup>	adaptors
	3 <sup>rd</sup>	Homo polymer tailing.
	4 <sup>th</sup>	Homo polymer tailing.
	1 <sup>st</sup>	cDNA and Genomic Libraries.
11 <sup>th</sup>	1 <sup>st</sup>	cDNA and Genomic Libraries.
	2 <sup>nd</sup>	Introduction of foreign DNA into host cells.
	3 <sup>rd</sup>	Transformation- Griffith Effect, Infection, Transfection.
	4 <sup>th</sup>	Sequence based screening – colony hybridization
12 <sup>th</sup>	1 <sup>st</sup>	Sequence based screening – colony hybridization
	2 <sup>nd</sup>	Sequence based screening – colony hybridization
	3 <sup>rd</sup>	Chromosome walking
	4 <sup>th</sup>	Chromosome walking
13 <sup>th</sup>	1 <sup>st</sup>	Concept of chromosome Jumping
	2 <sup>nd</sup>	Concept of chromosome Jumping
	3 <sup>rd</sup>	Screening by PCR
	4 <sup>th</sup>	Screening by PCR
14 <sup>th</sup>	1 <sup>st</sup>	Gene Tagging
	2 <sup>nd</sup>	Blotting Techniques (Southern & Western blotting)
	3 <sup>rd</sup>	Blotting Techniques (Southern & Western blotting)
	4 <sup>th</sup>	Genetic finger printing.
15 <sup>th</sup>	1 <sup>st</sup>	Microarray Technology.
	2 <sup>nd</sup>	Different molecular genetic marker RFLP,RAPD only
	3 <sup>rd</sup>	Different molecular genetic marker RFLP,RAPD only
	4 <sup>th</sup>	Revision and Class test

DISCIPLINE: Biotechnology	SEMESTER:5 <sup>th</sup> Sem	NAME OF THE TEACHING FACULTY: Sunil Biswajit Maharana
SUBJECT: (Th. 3 ) PLANT BIOTECHNOLOGY	NO. OF DAYS/ PER WEEK CLASS ALLOTTED:04	FROM DATE: 15-09-2022 TO DATE: 22-12-2022 NO. OF WEEKS:15
WEEK	CLASS DAY	THEORY/ PRACTICAL TOPICS
1 <sup>st</sup>	1 <sup>st</sup>	1.1 What is Biotechnology.
	2 <sup>nd</sup>	1.1 Concept of Plant Biotechnology.
	3 <sup>rd</sup>	1.1 Concept of Plant Biotechnology.
	4 <sup>th</sup>	1.2 What is plant Tissue culture.
2 <sup>nd</sup>	1 <sup>st</sup>	1.2 Tissue culture laboratory .
	2 <sup>nd</sup>	1.2 Tissue culture laboratory (Equipments).
	3 <sup>rd</sup>	1.2 Tissue culture laboratory (glass wares ).
	4 <sup>th</sup>	1.2 Tissue culture laboratory (chemicals).
3 <sup>rd</sup>	1 <sup>st</sup>	1.2 Tissue culture (Equipments, glass wares & chemicals)& sterilization.
	2 <sup>nd</sup>	1.3 What is Sterilization?
	3 <sup>rd</sup>	1.3 What is Aseptic condition?
	4 <sup>th</sup>	1.3 How to maintain Sterilization & Aseptic condition.
4 <sup>th</sup>	1 <sup>st</sup>	1.4 Applications of plant tissue culture.
	2 <sup>nd</sup>	1.4 Applications of plant tissue culture.
	3 <sup>rd</sup>	1.4 Applications of plant tissue culture.
	4 <sup>th</sup>	2.1 What is culture media?
5 <sup>th</sup>	1 <sup>st</sup>	2.1Types of culture media.
	2 <sup>nd</sup>	2.1preparation of culture media.
	3 <sup>rd</sup>	2.2 What is Callus?
	4 <sup>th</sup>	2.2 Techniques of callus culture.
6 <sup>st</sup>	1 <sup>st</sup>	2.2Different types and nature of Callus.
	2 <sup>nd</sup>	2.3 What is Protoplast?
	3 <sup>rd</sup>	2.3 Techniques for Isolation of protoplast.
	4 <sup>th</sup>	2.3 Techniques for fusion of protoplast.
7 <sup>th</sup>	1 <sup>st</sup>	2.3 Culture of protoplast.
	2 <sup>nd</sup>	2.4 What is Somatic Embryogenesis?
	3 <sup>rd</sup>	2.4 Protocols for inducing Somatic Embryogenesis.
	4 <sup>th</sup>	2.4 Importance Somatic Embryogenesis.
8 <sup>th</sup>	1 <sup>st</sup>	2.5 What is Single cell culture.
	2 <sup>nd</sup>	2.5 Methods of Single cell culture.
	3 <sup>rd</sup>	2.6What is Embryo culture?
	4 <sup>th</sup>	2.6 Methods of Embryo culture.
9 <sup>th</sup>	1 <sup>st</sup>	2.7 What is Somatic hybridization and Cybridization.
	2 <sup>nd</sup>	2.7 Methods of Somatic hybridization and Cybridization..
	3 <sup>rd</sup>	2.7 Importance of Somatic hybridization and Cybridization.
	4 <sup>th</sup>	3.1What is Vector?
10 <sup>th</sup>	1 <sup>st</sup>	3.1 Vector mediated Gene transfer.
	2 <sup>nd</sup>	3.1Mthod of Vector mediated Gene transfer.
	3 <sup>rd</sup>	3.1 Method of Vector mediated Gene transfer.
	4 <sup>th</sup>	3.2 What is Agro bacterium..
11 <sup>st</sup>	1 <sup>st</sup>	3.2Types of Agro bacterium mediated gene transfer methods.
	2 <sup>nd</sup>	3.2Types of Agro bacterium mediated gene transfer methods.
	3 <sup>rd</sup>	3.2 Importance of Agro bacterium mediated gene transfer .

	4 <sup>th</sup>	3.3 Ti-plasmid & Ri plasmid
12 <sup>th</sup>	1 <sup>st</sup>	3.3 Ti-plasmid & Ri plasmid
	2 <sup>nd</sup>	3.4 What is transgenic plant
	3 <sup>rd</sup>	3.4 Formation of transgenic plant
	4 <sup>th</sup>	3.4 Importance of transgenic plant.
13 <sup>th</sup>	1 <sup>st</sup>	3.5 Transposon & Transposable elements .
	2 <sup>nd</sup>	3.5 Transposon & Transposable elements ..
	3 <sup>rd</sup>	4.1 Flavor ,Savor (tomato)
	4 <sup>th</sup>	4.1 Flavor ,Savor (tomato)
14 <sup>th</sup>	1 <sup>st</sup>	4.1 Application of Flavor ,Savor (tomato).
	2 <sup>nd</sup>	4.2 What is BT cotton?
	3 <sup>rd</sup>	4.2 Technique of BT cotton.
	4 <sup>th</sup>	4.2 Application of BT cotton.
15 <sup>th</sup>	1 <sup>st</sup>	4.3 What is BT Brinjal?
	2 <sup>nd</sup>	4.3 Importance of BT Brinjal
	3 <sup>rd</sup>	4.4 What is Golden Rice?
	4 <sup>th</sup>	4.4 Importance of Golden Rice

<b>DISCIPLINE: Biotech</b>	<b>SEMESTER: 5<sup>th</sup></b>	<b>NAME OF THE TEACHING FACULTY: Dr. Sasmita Panigrahi</b>
<b>SUBJECT: (Th-4) Biochemistry</b>	<b>NO. OF DAYS/ PER WEEK CLASS ALLOTTED: 04</b>	<b>FROM DATE: 15-09-2022 TO DATE: 22-12-2022 NO. OF WEEKS: 15</b>
<b>WEEK</b>	<b>CLASS DAY</b>	<b>THEORY TOPICS</b>
1 <sup>st</sup>	1 <sup>st</sup>	About organic Chemistry
	2 <sup>nd</sup>	Basics of Biochemistry
	3 <sup>rd</sup>	Functions of Carbohydrates
	4 <sup>th</sup>	Structure and function of monosaccharides
2 <sup>nd</sup>	1 <sup>st</sup>	Structure and function of disaccharides
	2 <sup>nd</sup>	Structure and function of polysaccharides
	3 <sup>rd</sup>	Proteoglycans
	4 <sup>th</sup>	Glycoprotein with glycolipids
3 <sup>rd</sup>	1 <sup>st</sup>	Some commercially important carbohydrates
	2 <sup>nd</sup>	Amino acids, Peptides and proteins
	3 <sup>rd</sup>	Structure and function of amino acids
	4 <sup>th</sup>	Classification of amino acids
4 <sup>th</sup>	1 <sup>st</sup>	Functional group of amino acids
	2 <sup>nd</sup>	Biological activity of small peptides
	3 <sup>rd</sup>	Biosynthesis of amino acids
	4 <sup>th</sup>	Structure and function of protein
5 <sup>th</sup>	1 <sup>st</sup>	Different types of protein with respect to their structure and function
	2 <sup>nd</sup>	Nucleotides and Nucleic Acid
	3 <sup>rd</sup>	Structure and function of nucleotides
	4 <sup>th</sup>	Properties of nucleotide bases that affect the structure of nucleic acid
6 <sup>th</sup>	1 <sup>st</sup>	Chemistry of nucleic acid
	2 <sup>nd</sup>	Structure of nucleic acid
	3 <sup>rd</sup>	Lipids and Fats
	4 <sup>th</sup>	Storage lipids.
7 <sup>th</sup>	1 <sup>st</sup>	Structural lipids
	2 <sup>nd</sup>	Lipids with specific biological activities
	3 <sup>rd</sup>	Lipid Bilayer
	4 <sup>th</sup>	Amphipathic nature of membrane lipids that form the bilayer.
8 <sup>th</sup>	1 <sup>st</sup>	Role of lipid in plasma membrane
	2 <sup>nd</sup>	Function of protein
	3 <sup>rd</sup>	Nucleotide and nucleoside formation
	4 <sup>th</sup>	About DNA structure
9 <sup>th</sup>	1 <sup>st</sup>	DNA synthesis
	2 <sup>nd</sup>	RNA structure
	3 <sup>rd</sup>	RNA synthesis
	4 <sup>th</sup>	Protein synthesis
10 <sup>th</sup>	1 <sup>st</sup>	Chemistry of nucleic acid
	2 <sup>nd</sup>	Properties of nucleotide bases
	3 <sup>rd</sup>	Structure of nucleic acid
	4 <sup>th</sup>	Test 1



11 <sup>th</sup>	1 <sup>st</sup>	Storage lipid & Diststructural lipids
	2 <sup>nd</sup>	Biological function of lipid
	3 <sup>rd</sup>	Test 2
	4 <sup>th</sup>	Plasma membrane structure
12 <sup>th</sup>	1 <sup>st</sup>	Plasma membrane functions
	2 <sup>nd</sup>	Cell and biosynthesis
	3 <sup>rd</sup>	Amphipathic nature of membrane
	4 <sup>th</sup>	Adipose tissuer
13 <sup>th</sup>	1 <sup>st</sup>	Fat biosynthesis
	2 <sup>nd</sup>	Mono- glycerides & Di-glyceride structure
	3 <sup>rd</sup>	Lipid bilayer & Lipid biosynthesis
	4 <sup>th</sup>	Determination of pH color comparison pH meter determination of PKa value
14 <sup>th</sup>	1 <sup>st</sup>	Qualitative tests on carbohydrates and proteins
	2 <sup>nd</sup>	Estimation of total sugar by anthrone method
	3 <sup>rd</sup>	Estimation of reducing sugar by Benedict's test
	4 <sup>th</sup>	Fatty acid titration
15 <sup>th</sup>	1 <sup>st</sup>	Verification of Beer Lambert's law
	2 <sup>nd</sup>	Determine iodine value of different fat samples
	3 <sup>rd</sup>	Quantify amino acid using ninhydrin reaction
	4 <sup>th</sup>	Test 3

<b>DISCIPLINE: Biotech</b>	<b>SEMESTER: 5<sup>th</sup></b>	<b>NAME OF THE TEACHING FACULTY: Dr. Sasmita Panigrahi</b>
<b>SUBJECT: (Th-5) Instrumentation &amp; Chemical Analysis</b>	<b>NO. OF DAYS/ PER WEEK CLASS ALLOTTED: 04</b>	<b>FROM DATE: 15-09-2022 TO DATE: 22-12-2022 NO. OF WEEKS: 15</b>
<b>WEEK</b>	<b>CLASS DAY</b>	<b>THEORY TOPICS</b>
1 <sup>st</sup>	1 <sup>st</sup>	Instrument
	2 <sup>nd</sup>	Instruments and its importance
	3 <sup>rd</sup>	Standards of measurement
	4 <sup>th</sup>	Functional elements of instruments
2 <sup>nd</sup>	1 <sup>st</sup>	Performance characteristics of an instrument
	2 <sup>nd</sup>	Measurements of characteristics
	3 <sup>rd</sup>	Measurement of viscosity by Red Wood Viscometer
	4 <sup>th</sup>	Measurement of viscosity by Falling Sphere Viscometer
3 <sup>rd</sup>	1 <sup>st</sup>	Measurement of viscosity by Continuous Viscometer
	2 <sup>nd</sup>	Principle and uses of spectrophotometer
	3 <sup>rd</sup>	Principle and uses of polarimeter
	4 <sup>th</sup>	Measurement of refractive index by Refractometer
4 <sup>th</sup>	1 <sup>st</sup>	pH & Conductivity Measurement
	2 <sup>nd</sup>	Measurement of pH
	3 <sup>rd</sup>	Measurement of electrical conductivity
	4 <sup>th</sup>	Temperature Measurement
5 <sup>th</sup>	1 <sup>st</sup>	Different temperature scales
	2 <sup>nd</sup>	Different methods of temperature measurement
	3 <sup>rd</sup>	Temperature measurement by liquid in glass thermometer
	4 <sup>th</sup>	Temperature measurement on electrical phenomena – like thermocouple, resistance thermometer, optical pyrometer, radiation pyrometer.
6 <sup>th</sup>	1 <sup>st</sup>	Test 1
	2 <sup>nd</sup>	Basic reasons of pressure
	3 <sup>rd</sup>	Pressure Measurement
	4 <sup>th</sup>	Different types of pressure
7 <sup>th</sup>	1 <sup>st</sup>	Different methods of measurement of pressure
	2 <sup>nd</sup>	Pressure measurement by Bourdon tube, Bellows
	3 <sup>rd</sup>	Maintenance and repair of pressure measuring instruments
	4 <sup>th</sup>	Automatic control
8 <sup>th</sup>	1 <sup>st</sup>	Automatic control system
	2 <sup>nd</sup>	Application of Automatic control system
	3 <sup>rd</sup>	Elementary idea about transfer functions for a first order system
	4 <sup>th</sup>	Elementary idea about transfer functions for a time constant.
9 <sup>th</sup>	1 <sup>st</sup>	Block diagram
	2 <sup>nd</sup>	Components of Process Control system
	3 <sup>rd</sup>	Types of process control system
	4 <sup>th</sup>	Advantages and disadvantages of process control system

10 <sup>th</sup>	1 <sup>st</sup>	Test 2
	2 <sup>nd</sup>	Elementary idea about different types of automatic controllers
	3 <sup>rd</sup>	Principle of PLC
	4 <sup>th</sup>	Computer Aided measurement and control
11 <sup>th</sup>	1 <sup>st</sup>	Modern analytical instruments for measuring process parameters
	2 <sup>nd</sup>	Fatty acid titration
	3 <sup>rd</sup>	instruments used in the process industry
	4 <sup>th</sup>	Principles of measuring instruments.
12 <sup>th</sup>	1 <sup>st</sup>	Verification of Beer Lamberb's law
	2 <sup>nd</sup>	Structure of Industrial Instrumentation in Real Time Applications
	3 <sup>rd</sup>	Measurement of physical variables such as flow, temperature, level, or pressure
	4 <sup>th</sup>	Separation of Iron using solvent extraction technique
13 <sup>th</sup>	1 <sup>st</sup>	Determine pH and conductivity of a given solution by pH-meter
	2 <sup>nd</sup>	Concentration of sugar in sugar solution by Polarimeter
	3 <sup>rd</sup>	Refractive index of different liquids by Abbe's Refractometer
	4 <sup>th</sup>	Maximum wavelength of a solution of cobalt chloride
14 <sup>th</sup>	1 <sup>st</sup>	Beer's Law and apply it to find the concentration of the given unknown solution by Spectrophotometer
	2 <sup>nd</sup>	Beer's law of solution of KMnO <sub>4</sub> and K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> using calorimeter
	3 <sup>rd</sup>	Demonstrate different types of pressure gauges and temperature measuring devices
	4 <sup>th</sup>	Determine the viscosity of an Oil by Red Wood Viscometer at different temperature
15 <sup>th</sup>	1 <sup>st</sup>	Plotting a graph between viscosity and temperature
	2 <sup>nd</sup>	Calibration of a thermocouple
	3 <sup>rd</sup>	Demonstrate function of digital multi-meter
	4 <sup>th</sup>	Test 3

<b>DISCIPLINE: Biotech</b>	<b>SEMESTER: 5<sup>th</sup></b>	<b>NAME OF THE TEACHING FACULTY: Dr. Sasmita Panigrahi</b>
<b>SUBJECT: (Pr-1) Instrumentation &amp; Chemical Analysis</b>	<b>NO. OF DAYS/ PER WEEK CLASS ALLOTTED: 03</b>	<b>FROM DATE: 15-09-2022 TO DATE: 22-12-2022 NO. OF WEEKS: 15</b>
<b>WEEK</b>	<b>CLASS DAY</b>	<b>PRACTICAL TOPICS</b>
1 <sup>st</sup>	1 <sup>st</sup>	Instrument
	2 <sup>nd</sup>	Discuss about Instrumentation
	3 <sup>rd</sup>	Difference between solvent and solute
2 <sup>nd</sup>	1 <sup>st</sup>	Separation of Iron using solvent extraction technique
	2 <sup>nd</sup>	Repeat
	3 <sup>rd</sup>	Repeat
3 <sup>rd</sup>	1 <sup>st</sup>	Disuss about pH
	2 <sup>nd</sup>	About pH meter and its electrode
	3 <sup>rd</sup>	Conductivity discussion
4 <sup>th</sup>	1 <sup>st</sup>	Determination of pH and conductivity of a given solution by pH meter
	2 <sup>nd</sup>	Result and discussion
	3 <sup>rd</sup>	Repeat
5 <sup>th</sup>	1 <sup>st</sup>	Writing of record
	2 <sup>nd</sup>	Record checking
	3 <sup>rd</sup>	Discuss about Polari meter
	1 <sup>st</sup>	Concentration sugar preparation
	2 <sup>nd</sup>	Determine of Concentration of sugar in sugar solution by Polari meter
	3 <sup>rd</sup>	Abbs refracto meter
6 <sup>th</sup>	1 <sup>st</sup>	Refractive index
	2 <sup>nd</sup>	Relation between refractive index values
	3 <sup>rd</sup>	Determine the refractive index by different liquids by Abbs refracto meter
7 <sup>th</sup>	1 <sup>st</sup>	Beers Law
	2 <sup>nd</sup>	Lamberts Law
	3 <sup>rd</sup>	Web length discussion
8 <sup>th</sup>	1 <sup>st</sup>	Study of Spectro photo meter
	2 <sup>nd</sup>	Cobalt chloride b preparation
	3 <sup>rd</sup>	Measurement of different solution of Cobalt chloride
9 <sup>th</sup>	1 <sup>st</sup>	Repeat
	2 <sup>nd</sup>	Repeat
	3 <sup>rd</sup>	Record writing
10 <sup>th</sup>	1 <sup>st</sup>	Record checking
	2 <sup>nd</sup>	Record checking
	3 <sup>rd</sup>	Verify Beers law by using KMNO4 solution
11 <sup>th</sup>	1 <sup>st</sup>	Verification Beers Law by using K2Cr2O7 using Calori meter
	2 <sup>nd</sup>	Demonstrate different types of pressure gauge and temperature measuring devices
	3 <sup>rd</sup>	Discuss about Viscosity
12 <sup>th</sup>	1 <sup>st</sup>	Viscometer its parts and use
	2 <sup>nd</sup>	Determine the viscosity of an oil by Redwood

		viscometer at different temperature
	3 <sup>rd</sup>	Graph preparation
13 <sup>th</sup>	1 <sup>st</sup>	Calibration of thermo couples
	2 <sup>nd</sup>	Function of digital multi meter
	3 <sup>rd</sup>	Writing of record
14 <sup>th</sup>	1 <sup>st</sup>	Repeat
	2 <sup>nd</sup>	Record checking
	3 <sup>rd</sup>	Record checking
15 <sup>th</sup>	1 <sup>st</sup>	Doubt Clear session
	2 <sup>nd</sup>	Repeat
	3 <sup>rd</sup>	Repeat

<b>DISCIPLINE: Biotech</b>	<b>SEMESTER: 5<sup>th</sup></b>	<b>NAME OF THE TEACHING FACULTY: Dr. Sasmita Panigrahi</b>
<b>SUBJECT: (Pr-2) Biochemistry</b>	<b>NO. OF DAYS/ PER WEEK CLASS ALLOTTED: 06</b>	<b>FROM DATE: 15-09-2022 TO DATE: 22-12-2022 NO. OF WEEKS: 15</b>
<b>WEEK</b>	<b>CLASS DAY</b>	<b>PRACTICAL TOPICS</b>
1 <sup>st</sup>	1 <sup>st</sup>	About pH meter
	2 <sup>nd</sup>	Determination of Pka value
	3 <sup>rd</sup>	Relation between pH and Pka
	4 <sup>th</sup>	Numericals
	5 <sup>th</sup>	Numericals
	6 <sup>th</sup>	Numericals
2 <sup>nd</sup>	1 <sup>st</sup>	Qualitative tests demonstration
	2 <sup>nd</sup>	Test for Carbohydrates
	3 <sup>rd</sup>	Test for protein
	4 <sup>th</sup>	Results and discussions
	5 <sup>th</sup>	Results and discussions
	6 <sup>th</sup>	Results and discussions
3 <sup>rd</sup>	1 <sup>st</sup>	Repeat Exp- 1
	2 <sup>nd</sup>	Repeat Exp- 1
	3 <sup>rd</sup>	Repeat Exp- 1
	4 <sup>th</sup>	Checking of records
	5 <sup>th</sup>	Checking of records
	6 <sup>th</sup>	Checking of records
4 <sup>th</sup>	1 <sup>st</sup>	Anthrone reagent preparation
	2 <sup>nd</sup>	Preparation of stock
	3 <sup>rd</sup>	Preparation of stock
	4 <sup>th</sup>	Results and discussions
	5 <sup>th</sup>	Results and discussions
	6 <sup>th</sup>	Results and discussions
5 <sup>th</sup>	1 <sup>st</sup>	Repeat Exp- 2
	2 <sup>nd</sup>	Repeat Exp- 2
	3 <sup>rd</sup>	Repeat Exp- 2
	4 <sup>th</sup>	Checking of records
	5 <sup>th</sup>	Checking of records
	6 <sup>th</sup>	Checking of records
6 <sup>th</sup>	1 <sup>st</sup>	Discussion about reducing sugar
	2 <sup>nd</sup>	Benedicts reagent preparation
	3 <sup>rd</sup>	Discuss about colorimeter
	4 <sup>th</sup>	Discuss about Spectro meter
	5 <sup>th</sup>	Discuss about visible length of light
	6 <sup>th</sup>	Discuss about visible length of light
7 <sup>th</sup>	1 <sup>st</sup>	Estimation of reducing sugar
	2 <sup>nd</sup>	Estimation of reducing sugar by Benedicts test
	3 <sup>rd</sup>	Estimation of reducing sugar by Benedicts test
	4 <sup>th</sup>	Repeat Exp- 3
	5 <sup>th</sup>	Repeat Exp- 3
	6 <sup>th</sup>	Repeat Exp- 3
8 <sup>th</sup>	1 <sup>st</sup>	Checking of records

	2 <sup>nd</sup>	Checking of records
	3 <sup>rd</sup>	Checking of records
	4 <sup>th</sup>	Discuss about fatty acid
	5 <sup>th</sup>	Fatty acid seponification
	6 <sup>th</sup>	Titration
9 <sup>th</sup>	1 <sup>st</sup>	Fatty acid titration with use of oil
	2 <sup>nd</sup>	More About titration
	3 <sup>rd</sup>	Results
	4 <sup>th</sup>	Repeat Exp- 4
	5 <sup>th</sup>	Repeat Exp- 4
	6 <sup>th</sup>	Checking of records
10 <sup>th</sup>	1 <sup>st</sup>	Beer Lambarts Law
	2 <sup>nd</sup>	Colorimeter using for Beers Law
	3 <sup>rd</sup>	Verification of Beer Lambarts Law
	4 <sup>th</sup>	Repeat Exp- 5
	5 <sup>th</sup>	Repeat Exp- 5
	6 <sup>th</sup>	Repeat Exp- 5
11 <sup>th</sup>	1 <sup>st</sup>	Checking of records
	2 <sup>nd</sup>	Checking of records
	3 <sup>rd</sup>	Checking of records
	4 <sup>th</sup>	About Iodine value
	5 <sup>th</sup>	Discuss about fats
	6 <sup>th</sup>	Determine the Iodine value of different fat samples
12 <sup>th</sup>	1 <sup>st</sup>	Repeat Exp- 6
	2 <sup>nd</sup>	Repeat Exp- 6
	3 <sup>rd</sup>	Repeat Exp- 6
	4 <sup>th</sup>	Checking of records
	5 <sup>th</sup>	Checking of records
	6 <sup>th</sup>	Checking of records
13 <sup>th</sup>	1 <sup>st</sup>	Discuss about Amino acid
	2 <sup>nd</sup>	Structure of Amino acid
	3 <sup>rd</sup>	Classification of Amino acid
	4 <sup>th</sup>	Ninhydrin reagent preparation
	5 <sup>th</sup>	Quantify Amino acid using in ninhydrine reagent
	6 <sup>th</sup>	Quantify Amino acid using in ninhydrine reagent
14 <sup>th</sup>	1 <sup>st</sup>	Repeat Exp- 7
	2 <sup>nd</sup>	Repeat Exp- 7
	3 <sup>rd</sup>	Repeat Exp- 7
	4 <sup>th</sup>	Checking of records
	5 <sup>th</sup>	Checking of records
	6 <sup>th</sup>	Checking of records
15 <sup>th</sup>	1 <sup>st</sup>	Repeat Exp- 8
	2 <sup>nd</sup>	Repeat Exp- 8
	3 <sup>rd</sup>	Repeat Exp- 8
	4 <sup>th</sup>	Checking of records
	5 <sup>th</sup>	Checking of records
	6 <sup>th</sup>	Checking of records

<b>DISCIPLINE: Biotechnology.</b>	<b>SEMESTER: 5<sup>th</sup></b>	<b>NAME OF THE TEACHING FACULTY: Mr.Sunil Biswajit Maharana</b>
<b>SUBJECT: (Pr-3) Tissue culture laboratory</b>	<b>NO. OF DAYS/ PER WEEK CLASS ALLOTTED: 03</b>	<b>FROM DATE: 15-09-2022 TO DATE: 22-12-2022 NO. OF WEEKS: 15</b>
<b>WEEK</b>	<b>CLASS DAY</b>	<b>PRACTICAL TOPICS</b>
1 <sup>st</sup>	1 <sup>st</sup>	Instrument
	2 <sup>nd</sup>	Discuss about Instrumentation
	3 <sup>rd</sup>	Dry heat Sterilization
2 <sup>nd</sup>	1 <sup>st</sup>	Steam Sterilization
	2 <sup>nd</sup>	Flame Sterilization
	3 <sup>rd</sup>	Filter Sterilization
3 <sup>rd</sup>	1 <sup>st</sup>	Repeated
	2 <sup>nd</sup>	Repeated
	3 <sup>rd</sup>	Discussion and writing record
4 <sup>th</sup>	1 <sup>st</sup>	Record checking
	2 <sup>nd</sup>	Discussion about media
	3 <sup>rd</sup>	Sterilization of glassware's
5 <sup>th</sup>	1 <sup>st</sup>	Collection of distil water
	2 <sup>nd</sup>	Preparation of chemicals
	3 <sup>rd</sup>	Preparation of chemicals
6 <sup>th</sup>	1 <sup>st</sup>	Preparation of chemicals
	2 <sup>nd</sup>	Preparation of media
	3 <sup>rd</sup>	Preparation of media and sterilization.
7 <sup>th</sup>	1 <sup>st</sup>	Discussion and writing record
	3 <sup>rd</sup>	Instrument
8 <sup>th</sup>	1 <sup>st</sup>	Discuss about Instrumentation
	2 <sup>nd</sup>	Preparation of chemicals
	3 <sup>rd</sup>	Sterilization of instruments
8 <sup>9</sup> <sup>h</sup>	1 <sup>st</sup>	Discussion about surface sterilization.
	2 <sup>nd</sup>	Inoculation process
	3 <sup>rd</sup>	Repeat
10 <sup>th</sup>	1 <sup>st</sup>	Repeat
	2 <sup>nd</sup>	Record writing
	3 <sup>rd</sup>	Record checking
11 <sup>th</sup>	1 <sup>st</sup>	Instrument
	2 <sup>nd</sup>	Discussion about callus
	3 <sup>rd</sup>	Discussion about suspension culture.
12 <sup>th</sup>	1 <sup>st</sup>	Sterilization of glassware's
	2 <sup>nd</sup>	Collection of distil water
	3 <sup>rd</sup>	Preparation of chemicals
13 <sup>th</sup>	1 <sup>st</sup>	Preparation of chemicals
	2 <sup>nd</sup>	Preparation of media
	3 <sup>rd</sup>	Preparation of media
14 <sup>th</sup>	1 <sup>st</sup>	Sterilization of media
	2 <sup>nd</sup>	Inoculation of explant
	3 <sup>rd</sup>	Inoculation of explant
15 <sup>th</sup>	1 <sup>st</sup>	Observation of growth of explant
	2 <sup>nd</sup>	Record writing.
	3 <sup>rd</sup>	Record checking



DISCIPLINE: Biotechnology	SEMESTER: 5th Sem.	NAME OF THE TEACHING FACULTY: Dr. Sasmita Panigrahi
SUBJECT: Project phase-I	NO. OF DAYS/ PER WEEK CLASS ALLOTTED:04	SEMESTER FROM DATE: 15-09-2022 TO DATE: 22-12-2022 NO. OF WEEKS:15
<b>PROJECT TITLE- <i>IN VITRO</i> REGENERATION OF PLANTLETS OF BANANA</b>		
WEEK	CLASS/ DAY	THEORY/ PRACTICAL TOPICS
1 <sup>st</sup>	1 <sup>st</sup>	Discussion about the project.
	2 <sup>nd</sup>	Discussion about the project.
	3 <sup>rd</sup>	Discussion about the project.
	4 <sup>th</sup>	Discussion about the project.
2 <sup>nd</sup>	1 <sup>st</sup>	Collection of research article regarding project.
	2 <sup>nd</sup>	Collection of research article regarding project.
	3 <sup>rd</sup>	Planning of project work.
	4 <sup>th</sup>	Preparation of distil water.
3 <sup>rd</sup>	1 <sup>st</sup>	Preparation of distil water.
	2 <sup>nd</sup>	Sterilization of glass wares
	3 <sup>rd</sup>	Preparation of chemicals.
	4 <sup>th</sup>	Preparation of chemicals.
4 <sup>th</sup>	1 <sup>st</sup>	Preparation of chemicals.
	2 <sup>nd</sup>	Preparation of MS media with different hormone combination for growth of callus.
	3 <sup>rd</sup>	Preparation of MS media with different hormone combination for growth of callus.
	4 <sup>th</sup>	Preparation of MS media with different hormone combination for growth of callus.
5 <sup>th</sup>	1 <sup>st</sup>	Preparation of MS media with different hormone combination for growth of callus.
	2 <sup>nd</sup>	Preparation of MS media with different hormone combination for growth of callus.
	3 <sup>rd</sup>	Inoculation of explants
	4 <sup>th</sup>	Inoculation of explants
6 <sup>st</sup>	1 <sup>st</sup>	Inoculation of explants
	2 <sup>nd</sup>	Observation of growth.
	3 <sup>rd</sup>	Observation of growth.
	4 <sup>th</sup>	Observation of growth.
7 <sup>th</sup>	1 <sup>st</sup>	Observation of growth.
	2 <sup>nd</sup>	Observation of growth.
	3 <sup>rd</sup>	Observation of growth.
	4 <sup>th</sup>	Observation of growth.
8 <sup>th</sup>	1 <sup>st</sup>	Observation of growth.

	2 <sup>nd</sup>	Observation of growth.
	3 <sup>rd</sup>	Observation of growth.
	4 <sup>th</sup>	Observation of growth.
9 <sup>th</sup>	1 <sup>st</sup>	Review of the project work.
	2 <sup>nd</sup>	Review of the project work.
	3 <sup>rd</sup>	Review of the project work.
	4 <sup>th</sup>	Preparation of MS media with different hormone combination for shooting..
10 <sup>th</sup>	1 <sup>st</sup>	Preparation of MS media with different hormone combination for shooting.
	2 <sup>nd</sup>	Preparation of MS media with different hormone combination for shooting.
	3 <sup>rd</sup>	Inoculation of Callus.
	4 <sup>th</sup>	Inoculation of Callus.
11 <sup>st</sup>	1 <sup>st</sup>	Inoculation of Callus.
	2 <sup>nd</sup>	Observation of growth.
	3 <sup>rd</sup>	Observation of growth.
	4 <sup>th</sup>	Observation of growth.
12 <sup>th</sup>	1 <sup>st</sup>	Observation of growth.
	2 <sup>nd</sup>	Observation of growth.
	3 <sup>rd</sup>	Observation of growth.
	4 <sup>th</sup>	Observation of growth.
13 <sup>th</sup>	1 <sup>st</sup>	Observation of growth.
	2 <sup>nd</sup>	Observation of growth.
	3 <sup>rd</sup>	Observation of growth.
	4 <sup>th</sup>	Observation of growth.
14 <sup>th</sup>	1 <sup>st</sup>	Review of the project work.
	2 <sup>nd</sup>	Review of the project work.
	3 <sup>rd</sup>	Review of the project work.
	4 <sup>th</sup>	Writing of project.
15 <sup>th</sup>	1 <sup>st</sup>	Writing of project.
	2 <sup>nd</sup>	Writing of project.
	3 <sup>rd</sup>	Discussion and presentation.
	4 <sup>th</sup>	Discussion and presentation.