STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI COURSE PLAN June - November 2024

Department : BIOTECHNOLOGY

Name/s of the Faculty : DR. ARUNA SHARMILI S
Course Title : IMMUNOTECHNOLOGY

Course Code : 23BY/PC/IM34

Shift : II

COs	Description	CL
CO1	describe and discuss the study of immunology	K1, K2
CO2	apply immune-specific cells, structures, and concepts in the field of immunology	K3
CO3	categorize features unique to the immune system	K4
CO4	critically evaluate and estimate the effectiveness of the immune system	K5
CO5	begin to integrate concepts from immunity into real-world applications	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	Concepts of Immune System				Participatory Learning Methods: Power Point Presentation	MCQ
		1.1 Introduction, Concepts of Innate and Adaptive Immunity 1.2 Humoral and Cell-	K1-K3	4	1-2		
		Mediated Immunity	K1-K4	1	1-3		
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	Concepts of Immune System				Participatory Learning Methods: Power Point Presentation	MCQ
		1.2 Humoral and Cell- Mediated Immunity	K1-K4	1	1-3		
		1.3 Cells of the Immune System	K1-K5	2	1- 4		
		1.4 Tissues and Organs of the Immune System	K1-K6	2	1-5		
July 5 – 12, 2024 (Day Order 1 - 6)	1	Concepts of Immune System Tissues and Organs of the Immune System	K1-K6	2	1-5	Participatory Learning Methods: Power Point Presentation and videos	Group discussion
	2	Immune cells and Molecules					
		2.1 B Cell: Development, Activation, Differentiation, Memory Generation	K1-K4	3	1-3		

July 15 – 23, 2024 (Day Order 1 - 6)	2	Immune cells and Molecules				Participatory Learning Methods: Power Point Presentation and videos	Group discussion
		2.2 T Cell: Development, Activation, Helper Subset Differentiation, T Cell Memory	K1-K4	3	1-3	Tresentation and videos	
		2.3 Antigens, Epitopes, Haptens, Adjuvants, Pattern Recognition Receptors	K2-K5	2	1-4		
July 24 – 31, 2024 (Day Order 1 - 6)	2	Immune cells and Molecules				Participatory Learning Methods: Power Point Presentation	Quiz
		2.3 Antigens, Epitopes, Haptens, Adjuvants, Pattern Recognition Receptors	K2-K5	2	1-4	T Tesentation	
		2.4 Immunoglobulin	K2-K6	3	1-5		Seminar Presentation
Aug 1 – 5, 2024 (Day Order 1 - 3)	2	Immune cells and Molecules				Participatory Learning Methods: Power Point Presentation	Short Test
		2.4 Multigene Organization of Immunoglobulin Genes, Basis of Antibody Diversity	K2-K6	2	1-5		
Aug 6 – 10, 2024			C.	A. Test - I		1	

Aug 12 – 14, 2024 (Day Order 4-6)	2	Immune cells and Molecules 2.4 Multigene Organization of Immunoglobulin Genes, Basis of Antibody Diversity	K1-K4	1	1-3	Participatory Learning Methods: Power Point Presentation	MCQ
	3	Immune Responses 3.1 Cytokines: Properties, Types, Receptors	K1-K4	2	1-3		
Aug 16 – 23, 2024 (Day Order 1-6)	3	Immune Responses 3.2 Major Histocompatibility Complex - General Organization, Structure, Antigen Processing and Presenting Pathways	K2-K4	3	1-3	Participatory Learning Methods: Power Point Presentation	Short test
		3.3 Complement System- Components- Activation Pathways	K3-K6	2	2-5		
Aug 27 – Sep 3, 2024 (Day Order 1-6)	3	Immune Responses 3.3 Complement System- Functions	K3-K6	1	2-5	Participatory Learning Methods: Power Point Presentation	Short test
	4	3.4 Hypersensitivity Reactions - Type I, II, III, IV	K3-K6	4	2-5		

Sep 4 – 11, 2024 (Day Order 1-6)	4	Immunopathology 4.1 Autoimmunity, Transplantation Immunology	K1-K4	4	1-3	Participatory Learning Methods: Power Point Presentation	Seminar Presentation
		4.2 Tumor Immunology	K2-K4	1	1-3		
Sep 12 - 20, 2024 (Day Order 1-6)	4	Immunopathology 4.2 Tumor Immunology	K2-K4	1	1-3	Participatory Learning Methods: Power Point Presentation	Seminar Presentation
		4.3 Immunodeficiency Diseases	K2-K5	2	1-4		
		4.4 Infectious Diseases and Vaccines	K2-K6	2	1-5		
Sep 23 - 26, 2024 (Day Order 1-4)	4	Immunopathology 4.4 Infectious Diseases and Vaccines	K2-K6	2	1-5	Participatory Learning Methods: Power Point Presentation	Seminar Presentation
	5	Experimental systems and methods					
		5.1 Antibody Generation: Polyclonal Antibodies	K1-K4	1	1-3		III Component Assignment
Sep 27 – Oct 3, 2024			1	C	C.A. Test - II	1	

Oct 4 – 5, 2024	5	Experimental systems and methods				Experiential Learning Methods: Experiments,	MCQ
(Day 5 & 6)		5.1 Antibody Generation: Monoclonal Antibodies	K1-K4	1	1-3	Videos Videos	
		5.2 Cross-Reactivity, Precipitation Reactions Agglutination Reactions, RIA, ELISA, Western Blotting	K2-K6	1	1-5		
Oct 7 - 15, 2024	5	Experimental systems				Experiential Learning	MCQ
(Day Order 1 to 6)		and methods 5.2 Cross-Reactivity, K Precipitation Reactions Agglutination Reactions, RIA, ELISA, Western Blotting	K2-K6	3	1-5	Methods: Experiments, Videos	
		5.3 Immunocytochemistry and Immunohistochemistry, Immunofluorescence	K3-K6	2	2-5		
Oct 16 - 22, 2024	5	Experimental systems				Experiential Learning	MCQ
(Day Order 1 to 6)		and methods				Methods: Experiments, Videos	
		5.3 Flow Cytometry	K3-K6	1	2-5		
		5.4 Animal Experimental Systems	K3-K6	4	2-5		
Oct 23 - 24, 2024				•	REVISION	1	
(Day Order 1 to 2)							

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI COURSE PLAN June - November 2024

Department : Biotechnology

Name/s of the Faculty : Dr. J. Anbumalarmathi and Dr. S. Jeyashree

Course Title : BIOPROCESS AND FERMENTATION TECHNOLOGY

Course Code : 23BY/PC/BF34

Shift : II

COs	Description	CL
CO1	recall and relate the fundamentals of bioprocess and fermentation technology	K1, K2
CO2	show the methods in bioprocess and fermentation technology	K3
CO3	analyse the different steps in upstream and downstream process of fermentation technology	K4
CO4	evaluate the principles of fermentation technology to retrieve the bioproducts	K5
CO5	design the industrially important techniques for fermentation technology	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	Fundamentals of Bioprocess Isolation, Screening Bioreactors	K1-K3	2	1-2	Participatory Learning Methods: PowerPoint presentation	Test (short answers)
	2	2.1 Basic Configuration and Ancillaries of Fermenter	K1-K4	3	1-3	Experiential Learning Method: Experiment	Quiz
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	Fundamentals of Bioprocess Maintenance of Industrially Important Microbes	K1-K3	1	1-2	Participatory Learning Methods: PowerPoint presentation	Test (short answers)
	1	1.2 Media Design and Inoculum Development	K1-K3	1	1-2	Participatory Learning Methods: PowerPoint presentation	Test (short answers)
	2	2.2 Types of Bioreactors I - Stirred tank, Air Lift bioreactor	K2-K6	3	1-5	Experiential Learning Method: Model building	Test (short answers)
July 5 – 12, 2024 (Day Order 1 - 6)	1	1.2 Media Design and Inoculum Development	K1-K3	2	1-2	Experiential Learning Method: Experiments	Test (Short answers)
	2	2.2 Photobioreactor2.3 Types of Bioreactors IIPacked Bed bioreactor	K2-K6	3	1-5	Experiential Learning Method: Model building	Test (detailed answers)

July 15 – 23, 2024 (Day Order 1 - 6)	1	1.3 Sterilization Methods - Batch Sterilization, Continuous Sterilization	K2-K6	2	1-5	Experiential Learning Method: Experiments	Quiz
	2	2.3 Fluidized Bed Bioreactor 2.4	K2-K6	3	1-5	Experiential Learning Method: Model building	Quiz
		Enzyme Immobilization Methods	K3-K6		2-5		
July 24 – 31, 2024 (Day Order 1 - 6)	1	1.4 Sterilization Methods - Filter Sterilization	K2-K6	1	1-5	Experiential Learning Method: Experiments	Test (short answers)
		1.5 Types of Fermentation - Solid State, Submerged, Batch,	K3-K6	1	2-5	Participatory Learning Method: Presentation	Test (short answers)
	2	2.4 Immobilization of Microbial Enzymes - Principles and Applications	K3-K6	3	2-5	Participatory Learning Method: Group discussion	Test (short answers)
Aug 1 – 5, 2024 (Day Order 1 - 3)	1	1.5 Types of Fermentation - Batch, Continuous and Fed Batch	K3-K6	1	2-5	Participatory Learning Method: Presentation	Discussion
	4	Mass Transfer 4.1 Mass Transfer - Diffusion Theory	K1-K4	1	1-3	Participatory Learning Method: Presentation	Quiz

Aug 6 – 10, 2024							
Aug 12 – 14, 2024 (Day Order 4-6)	3	Downstream Processing Extraction of Enzymes	K1-K4	1	1-3	Participatory Learning Method: Presentation	Quiz
	4	4.1 Film Theory	K1-K4	2	1-3	Lecture: Powerpoint presentation	Group discussion
Aug 16 – 23, 2024 (Day Order 1-6)	3	Downstream Processing Removal of Insolubles - Filtration, Centrifugation, Sedimentation, Flocculation	K1-K4	2	1-3	Participatory Learning Method: Presentation	Group discussion
	4	4.2 Types of Mass Transfer I - Liquid-Solid	K2-K6	3	1-5	Lecture: Powerpoint presentation	Quiz
Aug 27 – Sep 3, 2024 (Day Order 1-6)	3	3.2 Cell Disruption – Physical and Chemical Methods	K2-K4	2	1-3	Participatory Learning Method: Presentation	Test (short answers)
	4	4.2 Types of Mass Transfer I - Liquid-Liquid 4.3 Types of Mass Transfer II - Gas-Liquid	K2-K6	3	1-5	Lecture: Powerpoint presentation	Test (short answers)
Sep 4 – 11, 2024 (Day Order 1-6)	3	3.2 Cell Disruption – Physical and Chemical Methods	K2-K4	2	1-3	Participatory Learning Method: Presentation	Test (short answers)
	4	4.3 Types of Mass Transfer II - Gas-Liquid 4.4 Microbial Growth Kinetics - Batch	K2-K6 K4-K6	3	1-5 3-5	Problem Solving Method: Case study	Test (short answers)

Sep 12 - 20, 2024 (Day Order 1-6)	3	3.3 Separation Technique - Membrane Separation, Ultrafiltration	K3-K5	2	2-4	Problem Solving Method: Case study	Group Analysis
	5	Bioproducts from Fermentation Technology 5.1 Production, Harvest, Recovery and Uses - Enzymes, Vitamins	K1-K6	3	1-5	Lecture: Powerpoint presentation	Third component: Scrap book- Production, Harvest, Recovery and Uses - Enzymes, Vitamins
Sep 23 - 26, 2024 (Day Order 1-4)	3	3.3 Separation Technique - Solvent Extraction	K3-K5	1	2-4	Problem Solving Method: Case study	Group Analysis
	5	5.2 Production, Harvest, Recovery and Uses - Aminoacids	K1-K6	2	1-5	Lecture: Powerpoint presentation	Quiz
Sep 27 – Oct 3, 2024				C.A. T	Cest – II		
Oct 4 – 5, 2024 (Day 5 & 6)	3	3.3 Separation Technique - Solvent Extraction	K3-K5	1	2-4	Problem Solving Method: Case study	Group Analysis
	5	5.2 Production, Harvest, Recovery and Uses - Organic Solvents	K1-K6	1	1-5	Lecture: Powerpoint presentation	Open book test

Oct 7 - 15, 2024 (Day Order 1 to 6)	3	3.4 Purification and Drying Techniques - Affinity and Gel Permeation Chromatography - Crystallization	K3-K6	2	2-5	Experiential Learning Method: Industry visit (Field trip)	Test (Short answers)
	5	5.3 Production, Harvest, Recovery and Uses - Baker's Yeast, Milk Products - Probiotics	K2-K6	3	1-5	Experiential Learning Method: Industry visit (Field trip)	Quiz
Oct 16 - 22, 2024 (Day Order 1 to 6)	3	3.4 Purification and Drying Techniques - Drying - Spray Dryer and Freeze Dryer	K3-K6	2	2-5	Experiential Learning Method: Industry visit (Field trip)	Test (Short answers)
	5	5.4 Protein, Beverages - Wine	K2-K6	3	1-5	Experiential Learning Method: Learning by doing	Test (short answers)
Oct 23 - 24, 2024				REV	ISION		
(Day Order 1 to 2)							
	1						

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI COURSE PLAN June - November 2024

Department : Biotechnology

Name of the Faculty : Dr.K. Veena Gayathri

Course Title : Environmental Biotechnology

Course Code : 23BY/PC/EB34

Shift : II

COs	Description	CL
CO1	relate the fundamentals of the environment, ecological factors	K1, K2
CO2	illustrate global environmental issues and treatment methods	К3
CO3	identify the causes of industrial pollution and manage solid wastes	K4
CO4	compare diverse strategies involved in environmental management	K5
CO5	integrate different methods in the removal of the pollutants and address concerns about transformation in the environment	K6

Week	Unit No.	Content	Cognitive Level	Teaching Hours	Cos	Teaching Learning Methodology	Assessment Methods
Jun 24 – 26, 2024	1	Principles of Ecology	K1-K3	2	1-2	Presentation	Assignments
(Day Order 4 - 6)		1.1 The Environment- Physical Environment- Biotic and Abiotic Interactions, Ecosystem- types					
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	1.1 The Environment- Physical Environment- Biotic and Abiotic Interactions, Ecosystem-	K1-K3	1	1-2	Presentation	Questionnaire
		types				Participatory Learning	Tests
		1.2 Habitat and Niche, Resource Partitioning; Character Displacement 1.3 Community Ecology-	, ,	3	1,2, 5	Method: Survey on Environment	
		Nature of Communities; Community Structure and Attributes Population Ecology- Characteristics of a Population	, ,	1	1, 2, 5	Participatory Learning Method: Presentation / Web search	Tests

July 5 – 12, 2024 (Day Order 1 - 6)	2	1.3 Community Ecology- Nature of Communities; Community Structure and Attributes Population Ecology- Characteristics of a Population	K1-K3, K6	1	1-3, 5	Participatory Learning Method: Presentation / Model building	Tests
		1.4 Concept of meta Population- Models of meta-population	K1-K3, K6	2	1-5	Participatory Learning Method: Presentation/ Case Study	Group Discussion
		Environmental					
		Pollution and					
		Management					
		2.1 Water, Soil and Air	K1-K6	2	1-5	Participatory Learning	Group Discussion
		Pollution Its Sources				Method: Presentation/ Case Study	
		Effects & Control, Global					
		Environmental Problems-					
		management					

July 15 – 23, 2024 (Day Order 1 - 6)	2	2.1 Water, Soil and Air Pollution Its Sources Effects & Control, Global Environmental Problems- management	K1-K6	2	1-5	Participatory Learning Method: Presentation/ Case Study	Tests
		2.2Principles of Conservation, conservation strategies: In-situ and ex-situ conservation; Bio- indicators	K3, K5- K6	3	2-3,5	Participatory Learning Method: Presentation/ Case Study	Tests
July 24 – 31, 2024 (Day Order 1 - 6)	2	2.2 Principles of Conservation, conservation strategies: In-situ and ex-situ conservation; Bio- indicators 2.3 Remote Sensing and GIS -Applications in Ecological Mapping and Environmental Hazard Predictions	K3, K5- K6	1	2-3,5	Experiential Learning Method: Presentation/ Online Mapping tools Experiential Learning Method: Practical Demonstration/ Field Trips	Tests

Aug 1 – 5, 2024 (Day Order 1 - 3)	3	2.4 Sewage and wastewater Treatment Systems: Primary, Secondary and Tertiary Treatments; Biological Treatment methods Industrial Waste Management 3.1 Industrial Waste Management- Dairy	K1-K6 K3-K6	1	1-5 2-5	Seminar/ Participatory Learning Method: Web demonstration	Assignment	
Aug 6 – 10, 2024		C.A. Test – I						
Aug 12 – 14, 2024 (Day Order 4-6)	3	Industrial Waste Management 3.1 Industrial Waste Management- Dairy, Paper and Pulp, Textile, and Leather Industry	K3-K6	2	2-5	Presentation	Quiz /Scrap Book	

Aug 16 – 23, 2024 (Day Order 1-6)	3	3.2 Biomedical and Pharmaceutical Wastes	K3-K4, K6	3	3-5	Participatory Learning Method:	Assignment
		3.3 E-waste- Radioactive and Nuclear Power Waste Management	K3-K4, K6	2	3-5	Collections and Reuse strategies Participatory Learning Method: Presentation/ Practical Demonstration	
						Presentation/ Participatory Learning Method: Demonstration of Tools Used for Waste Management	

Aug 27 – Sep 3, 2024 (Day Order 1-6)		3.3 E-waste- Radioactive and Nuclear Power Waste Management	K3-K4, K6	1	2,3,5	Presentation Participatory Learning Method:	Test
	4	3.4 Solid Waste: Sources and Management (Composting, Vermiculture and Methane Production) Recombinant DNA Technology Application in the Environment 4.1 Molecular Biology Tools for Environmental Management, rDNA Technology in Waste Treatment	K3-K4, K6	3	2,3,5	Group Discussions	
Sep 4 – 11, 2024 (Day Order 1-6)	4	4.1 Molecular Biology Tools for Environmental Management, rDNA Technology in Waste Treatment	K3-K6	4	2, 4, 5	Participatory Learning Method: Seminar	Seminar
		4.2 Genetically Modified Organisms in Waste Management	K3, K5- K6	1	2, 4, 5		

Sep 12 - 20, 2024 (Day Order 1-6)	4	4.2 Genetically Modified Organisms in Waste Management 4.3 Metagenomics, Nanoscience in Environmental Management	K6 K3, K5-	3	2,4,5	Seminar Presentation	Seminar
Sep 23 - 26, 2024	5	4.4 Biosensors	K3-K6	3	2-5	Presentation	Test
(Day Order 1-4)		Development to Monitor					
		Pollution					
		Biotechnological					
		Applications in the					
		Environment					
		5.1 Bioremediation of Petroleum Hydrocarbons	K3-K6	1	2-5		
Sep 27 – Oct 3, 2024				C.A.	Test – II		
Oct 4 – 5, 2024	5	5.1 Bioremediation of	K3-K6	1	2-5	Presentation	Test
(Day 5 & 6)		Petroleum Hydrocarbons				Participatory Learning Method:	
						Model making	
Oct 7 - 15, 2024	5	5.1 Bioremediation of	K3-K6	2	2-5	Presentation	Test
(Day Order 1 to 6)		Petroleum Hydrocarbons					
		5.2 Biodegradation of Xenobiotics and Pesticides	K3-K6	3	2-5		

Oct 16 - 22, 2024	5	5.3 Microbes in	K3-K6	3	2-5	Presentation	Test
(Day Order 1 to 6)		Bioleaching Process-					
		Metal Recovery by					
		Leaching Process,					
		Microbial Fuel Cell					
		5.4 Phyto-remediation –	K3-K6	2	2-5		
		Rhizo-filtration, Phyto-		_			
		extraction, Phyto-					
		stimulation					
		Phyto-stabilization and					
		Phyto-transformation					
Oct 23 - 24, 2024		<u> </u>		RE	VISION		
(Day Order 1 to 2)							

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

COURSE PLAN June - November 2024

Department : BIOTECHNOLOGY Name/s of the Faculty : DR. S. JAYASHREE

Course Title : HUMAN DISEASES AND MANAGEMENT

Course Code : 23BY/PE/HD23

Shift : II

Description	COs		CL
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CO1	describe the basic concepts of diseases	K1
CO2	explain the mechanisms of diseases	K2
CO3	predict diagnosis and treatment of diseases	К3
CO4	outline the management of various diseases	K4

Week	Unit No.	Content	Cognitive Level	Teaching Hours	COs	Teaching Learning Methodology	Assessment Methods
Jun 19 – 26, 2024 (Day Order 1 - 6)	1	Bacterial and Viral Diseases 1.1 Bacterial Diseases I - Typhoid	K1-K4	3	1-4	Participatory Learning Methods: Power Point Presentation	MCQ
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1	1.2 Bacterial Diseases II - Tuberculosis	K1-K4	3	1-4	Experiential Learning Methods: Project Designs	MCQ
July 5 – 12, 2024 (Day Order 1 - 6)	1	1.3 Viral Diseases - AIDS	K1-K4	3	1-4	Problem Solving Methods: Case Studies	Group discussion
July 15 – 23, 2024 (Day Order 1 - 6)	2	Parasitic and Fungal Diseases 2.1 Parasitic Diseases I - Malaria	K1-K4	3	1-4	Participatory Learning Methods: Power Point Presentation and videos	Group discussion
July 24 – 31, 2024 (Day Order 1 - 6)	2	2.2 Parasitic Diseases II - Amoebiasis	K1-K4	3	1-4	Participatory Learning Methods: Power Point Presentation	Quiz
Aug 1 – 5, 2024 (Day Order 1 - 3)	2	2.3 Fungal Diseases – Candidiasis	K1-K4	1	1-4	Participatory Learning Methods: Power Point Presentation	Short Test
Aug 6 – 10, 2024			C.A	A. Test - I			
Aug 12 – 14, 2024 (Day Order 4-6)	3	Pathology I 3.1 Parkinson's Disease	K1-K4	2	1-4	Participatory Learning Methods: Power Point Presentation	MCQ
Aug 16 – 23, 2024 (Day Order 1-6)	3	3.2 Atherosclerosis	K1-K4	3	1-4	Participatory Learning Methods: Power Point Presentation	Short test
Aug 27 – Sep 3, 2024 (Day Order 1-6)	3	3.3 Bronchial Asthma	K1-K4	3	1-4	Problem Solving Methods: Case Studies	Short test

Sep 4 – 11, 2024 (Day Order 1-6)	4	Pathology -II 4.1 Peptic Ulcer	K1-K4	3	1-4	Experiential Learning Methods: Project Designs	Group Discussion
Sep 12 - 20, 2024 (Day Order 1-6)	4	4.2 Urinary Tract Infection	K1-K4	3	1-4	Problem Solving Methods: Case Studies	Group Discussion
Sep 23 - 26, 2024 (Day Order 1-4)	4	4.3 Cancer of Breast	K1-K4	2	1-4	Participatory Learning Methods: Power Point Presentation	Third Component Assignment Scrap book
Sep 27 – Oct 3, 2024	C.A. Test - II						
Oct 4 – 5, 2024 (Day 5 & 6)	5	Immunopathology 5.1 Allergy	K1-K4	1	1-4	Problem Solving Methods: Case Studies	Short test
Oct 7 - 15, 2024 (Day Order 1 to 6)	5	5.2 Auto-immune disorders I – Type I Diabetes	K1-K4	3	1-4	Participatory Learning Methods: Power Point Presentation	Group Discussion
Oct 16 - 22, 2024 (Day Order 1 to 6)	5	5.3 Auto-immune disorders II – Rheumatoid Arthritis	K1-K4	3	1-4	Participatory Learning Methods: Power Point Presentation	Group Discussion
Oct 23 - 24, 2024 (Day Order 1 to 2)	REVISION						