STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : Bioinformatics

Name/s of the Faculty : Ms. R. Sagaya Jansi

Course Title : Advances in Bioinformatics

Course Code : 19BI/PC/AB44

Shift : II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2)	**Unit- 1** 1.1 Introduction to Next-generation sequencing. History and Future of DNA Sequencing	Lecture and presentations	**BOOKS FOR STUDY** Head, Steven R., Ordoukhanian, Phillip, Salomon, Daniel R, Next Generation Sequencing Methods and Protocols, Springer, 2018 Eija Korpelainen, Jarno Tuimala, Panu Somervuo, Mikael Huss, Garry Wong, RNA-seq Data Analysis : A Practical Approach, Taylor and Francis publishers2017	Assignment presentations III component
Nov 24-30, 2023 (Day Order 1 to 6)	1.2 Introduction to Linux commands and Different Platforms and Applications	Lecture and presentations	**BOOKS FOR REFERENCE** Takashi Yamamoto. Targeted Genome Editing Using Site-Specific Nucleases: ZFNs, TALENs, and the CRISPR/Cas9 System, 2015	Assignment presentations III component
Dec 1-7, 2023 (Day Order 1 to 6)	1.3 Different file formats – FASTQ, SAM, BAM, GFF, Databases and tools –	Lecture and presentations	**BOOKS FOR REFERENCE** Jennifer Doudna,	Assignment presentations III

	UCSCgenome, Galaxy, SRA, NCBI refseq, ENA, FastQC, Bowtie		Prashant Mali, CRISPR-Cas: A Laboratory Manual, 2016. Richard Cummings, J. Pierce, Handbook of glycomics, Academic Press, 2009	component
Dec 8-9, 2023 (Day Order 1, 3)	**Unit 2** 2.1 Metagenomics – Introduction and biological background, case studies of recent research	Lecture and presentations	– do –	Assignment presentations III component
Dec 11-15, 2023 (Day Order 2 to 6)	2.2 Alpha and Beta diversity of metagenomic studies	Lecture and presentations	-do-	Discussion
Dec 16 – 22, 2023 (Day Order 1 to 6)	2.3 Analysis of metagenome data and logical steps for metagenome analysis	Lecture and presentations	– do –	Discussion
Jan 3 – 6, 2024 (Day Order 1 to 4)	**Unit 3** 3.1 Introduction and Biological background, case studies of recent research	Lecture and presentations	– do –	Discussion
Jan 8 – 12, 2024	**C.A. Test – I**			
Jan 13, 2024 (Day Order 1)	3.1 Introduction and Biological background, case studies of recent research	Lecture and presentations	– do –	Discussion
Jan 18 -20, 2024 (Day Order 4 to 6)	3.2 Quantifying RNA: RNA seq and other techniques. Generating expression table	Lecture and presentations	– do –	Assignment presentations test
Jan 22-29, 2024 (Day Order 1 to 6)	3.2 Quantifying RNA: RNA seq and other techniques. Generating expression table	Lecture and presentations	– do –	Assignment presentations test
Jan 30 – Feb 2, 2024 (Day Order 1 to 4)	3.3 Logical steps for analysing RNA seq data – differential expression and factor	Lecture and presentations	– do –	Assignment presentations

	regression analysis			
Feb 3, 2024 (Day Order 2)	3.3 Logical steps for analysing RNA seq data – differential expression and factor regression analysis	Lecture and presentations	– do –	Assignment presentations
Feb 5- 6, 2024 (Day Order 5 to 6)	**Unit 4** 4.1 Gene regulatory dynamics from analysis of regulatory sequence motifs	Lecture and presentations	– do –	Assignment presentations III component
Feb 7 – 14, 2024 (Day Order 1 to 6)	4.1 Transcription factor-DNA interaction,	Lecture and presentations	– do –	Assignment presentations III component
Feb 15 – 22, 2024 (Day Order 1 to 6)	4.2 Local chromatin dynamics and epigenetic modifications,	Lecture and presentations	– do –	Test and puzzles
Feb 23 – 24, 2024 (Day Order 1 & 5)	4.2 RNA dynamics at the level of transcription and post-transcriptional processing,	Lecture and presentations	– do –	Test and puzzles
Feb 26 – Mar 1, 2024 (Day Order 2 to 6)	4.3 3D dynamics of chromatin and the resulting gene regulatory dynamics on daily and development time scales	Lecture and presentations	– do –	Test and puzzles
Mar 2, 2024 (Day Order 1)	Unit 5 5.1 Introduction to Crispr, cas9, selection of targets from sequences	Lecture and presentations	– do –	Test and puzzles
Mar 4 –8, 2024	**C.A. Test – II**			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6)	5.2 Targeted mutagenesis-recognition sequences, guide RNA design, recognition sequences	Lecture and presentations	– do –	Discussion
Mar 18 - 19, 2024 (Day Order 2 to 3)	5.3 Repair and data analysis of the edited genome, Therapeutic applications	Lecture and presentations	– do –	Discussion
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : Bioinformatics

Name/s of the Faculty : Dr. M. Sharanya

Course Title : Big Data Analysis

Course Code : 19BI/PC/BD44

Shift : II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2)	UNIT – 1 1.1 Introduction to data science	Lecture and presentations	**BOOKS FOR STUDY** Seema Acharya, Subhasini Chellappan, Big Data Analytics, Wiley 2015.	Assignment presentations III component
Nov 24-30, 2023 (Day Order 1 to 6)	1.1 Case Studies: Data Science in Biomedicine and Healthcare 1.2 Sequence Processing, Medical Image Analysis	Lecture and presentations	**BOOKS FOR REFERENCE** Peter Guerra and Kirk Borne, Ten Signs of Data Science Maturity, O'Reily media Pvt ltd, 2016	Assignment presentations III component
Dec 1-7, 2023 (Day Order 1 to 6)	1.2 Natural Language Processing 1.3 Network Modelling and Probabilistic Modelling	Lecture and presentations	-do-	Assignment presentations III component
Dec 8-9, 2023 (Day Order 1, 3)	**Unit 2** 2.1 What is big data? What makes big data valuable	Lecture and presentations	– do –	Assignment presentations III component
Dec 11-15, 2023 (Day Order 2 to 6)	2.1 Example of Big Data 2.2 Where Does Big Data Come From?	Lecture and presentations	-do-	Discussion
Dec 16 – 22, 2023	2.2. Machine-Generated Data and Advantages	Lecture and presentations	– do –	Discussion

(Day Order 1 to 6)				
Jan 3 – 6, 2024 (Day Order 1 to 4)	2.3 Big Data Generated by People organization of Generated Data, integrating the data	Lecture and presentations	– do –	Discussion
Jan 8 – 12, 2024	**C.A. Test – I**			
Jan 13, 2024 (Day Order 1)	3.1 Characteristics of big data Volume,	Lecture and presentations	– do –	Discussion
Jan 18 -20, 2024 (Day Order 4 to 6)	3.1. Variety, Velocity	Lecture and presentations	– do –	Assignment presentations test
Jan 22-29, 2024 (Day Order 1 to 6)	3.2. Characteristics of Big Data – Veracity, Valence and Value	Lecture and presentations	– do –	Assignment presentations test
Jan 30 – Feb 2, 2024 (Day Order 1 to 4)	3.3 Getting value out of big data using a 5-step process to structure your analysis	Lecture and presentations	– do –	Assignment presentations
Feb 3, 2024 (Day Order 2)	3.3 Getting value out of big data using a 5-step process to structure your analysis	Lecture and presentations	– do –	Assignment presentations
Feb 5- 6, 2024 (Day Order 5 to 6)	4.1 Building a Big Data Strategy, How does big data science happen?	Lecture and presentations	– do –	Assignment presentations III component
Feb 7 – 14, 2024 (Day Order 1 to 6)	4.1. Five Components of Data Science	Lecture and presentations	– do –	Assignment presentations III component
Feb 15 – 22, 2024 (Day Order 1 to 6)	4.2 Steps in the Data Science - Acquiring Data	Lecture and presentations	– do –	Test and puzzles
Feb 23 – 24,	4.2 preprocessing and Exploring Data	Lecture and presentations	– do –	Test and puzzles

2024 (Day Order 1 & 5)				
Feb 26 – Mar 1, 2024 (Day Order 2 to 6)	4.3 Analyzing Data, Communicating Results, Turning Insights into Action	Lecture and presentations	– do –	Test and puzzles
Mar 2, 2024 (Day Order 1)	5.2 Introduction to Hadoop systems, The Hadoop Distributed File System	Lecture and presentations	– do –	Test and puzzles
Mar 4 –8, 2024	**C.A. Test – II**			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6)	5.2. A Storage System for Big Data, YARN: A Resource Manager for Hadoop 5.3 MapReduce: Simple Programming for Big Results, When to Reconsider Hadoop?	Lecture and presentations	– do –	Discussion
Mar 18 - 19, 2024 (Day Order 2 to 3)	5.3 Cloud Computing: An Important Big Data Enabler	Lecture and presentations	– do –	Discussion
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : **Bioinformatics**

Name/s of the Faculty : **Ms. R. Sagaya Jansi**

Course Title : **Advances in Bioinformatics - Practical**

Course Code : **19BI/PC/P442**

Shift : **II**

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2)	**Unit 1** 1.1. Virtual machine	Practical	**BOOKS FOR STUDY** Head, Steven R., Ordoukhanian, Phillip, Salomon, Daniel R, Next Generation Sequencing Methods and Protocols, Springer Protocols, Humana Press, 2018.	Practical Test
Nov 24-30, 2023 (Day Order 1 to 6)	1.1. Introduction to UNIX commands	Practical	---do---	Practical
Dec 1-7, 2023 (Day Order 1 to 6)	**Unit 2** 2.1. Analysis of metagenomic raw data using galaxy	Practical	---do---	Practical Test
Dec 8-9, 2023 (Day Order 1, 3)	2.1. Analysis of metagenomic raw data using galaxy (Continuation)	Practical	---do---	Practical Test
Dec 11-15, 2023 (Day Order 2 to 6)	-	-	-	-
Dec 16 – 22, 2023 (Day Order 1 to 6)	**Unit 3** 3.1. Cancer data analysis using Webmev	Practical	---do---	Practical Test
Jan 3 – 6, 2024 (Day Order 1 to 4)	3.1. Cancer data analysis using Webmev (Continuation)	Practical	---do---	Practical Test
Jan 8 – 12, 2024	**C.A. Test – I**			

Jan 13, 2024 (Day Order 1)	**Unit 4** 4.1. RNA seq analysis using Biojupies - DEGs	Practical	---do---	Practical Test
Jan 18 -20, 2024 (Day Order 4 to 6)				
Jan 22-29, 2024 (Day Order 1 to 6)	4.1. RNA seq analysis using Biojupies – Volcano plot	Practical	---do---	Practical Test
Jan 30 – Feb 2, 2024 (Day Order 1 to 4)	4.1. RNA seq analysis using Biojupies – Lincs database	Practical	---do---	Practical Test
Feb 3, 2024 (Day Order 2)	-	-	-	-
Feb 5- 6, 2024 (Day Order 5 to 6)	-	-	-	-
Feb 7 – 14, 2024 (Day Order 1 to 6)	4.1. RNA seq analysis using Epimara	Practical	---do---	Practical Test
Feb 15 – 22, 2024 (Day Order 1 to 6)	4.1. RNA seq analysis using Epimara- TF prediction	Practical	---do---	Practical Test
Feb 23 – 24, 2024 (Day Order 1 & 5)	4.1. RNA seq analysis using Epimara- TF prediction	Practical	---do---	Practical Test
Feb 26 – Mar 1, 2024 (Day Order 2 to 6)	-	-	-	-
Mar 2, 2024 (Day Order 1)	**Unit 5** 5.1 Small guide RNA design – Chop Chop	Practical	---do---	Discussion
Mar 4 –8, 2024	**C.A. Test – II**			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6)	5.1 Small guide RNA design – primerX	Practicals	---do---	Discussion
Mar 18 - 19, 2024 (Day Order 2 to 3)	-	-	-	-
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**			

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI

Course Schedule: November 2023 - April 2024

Department : Bioinformatics

Name/s of the Faculty : Ms. Pujaa B

Course Title : Basics of Clinical Research Management

Course Code : 19BI/PE/CR15

Shift : II

Week & No. of hours	Units & Topics	Teaching Methodology	Text & References	Method of Evaluation
Nov 22 – 23, 2023 (Day Order 1 & 2)	**Unit 1:** 1.1 History of drug development. Pharmaco-epidemology.	Lectureand Power Point presentations	**Text Books:** Lori A. Nesbitt, (2004) *"Clinical Research What It Is andHow It Works"*, Jones Barlett Publishers, UK Steven Piantadosi, (2005), *"Clinical Trials A Methodologic Perspective"*,Second Edition, John Wiley & Sons, UK.	Discussion
Nov 24-30, 2023 (Day Order 1 to 6)	1.2. Issues in Clinical Trials. Nuremberg Code, Declaration of Helsinki. InternationalConference of Harmonization and Good Clinical Practice.	Lecture and case study	**Books for Reference:** Richard K. Rondel, Sheila A. Varley, Colin F. Webb,(2002) *"Clinical Data Management"*, Second Edition, John Wiley& Sons, UK.	Assignment and exercise
Dec 1-7, 2023 (Day Order 1 to 6)	1.3 Clinical trials- History of Clinical trials-stages of Clinical trials	Lectureand Power Point presentations	-do-	Exercise & and test
Dec 8-9, 2023 (Day Order 1, 3)	**Unit 2:** 2.1 Introduction to Drug Discovery and Development, Approaches,	Lectureand Power Point presentations	-do-	Case Study

	Sources of Drugs, Databases for drug search			
Dec 11-15, 2023 (Day Order 2 to 6)	2.2Pharmacokinetics and pharmacodynamics, Toxicological requirements	Lectureand Power Point presentations	-do-	III component Seminar
Dec 16 – 22, 2023 (Day Order 1 to 6)	2.3 Emerging technologies in Drug Discovery.	Lectureand Power Point presentations	-do-	Assignment, III component Written test
Jan 3 – 6, 2024 (Day Order 1 to 4)	2.3 Preclinical Testing, Clinical Trials	Lectureand Power Point presentations	-do-	Assignment, III component Written test
Jan 8 – 12, 2024	**C.A. Test – I**			
Jan 13, 2024 (Day Order 1)	**Unit 3:** 3.1 Evolution and History of Regulations in Clinical Research.	Lectureand Power Point presentations	-do-	III component Seminar
Jan 18 -20, 2024 (Day Order 4 to 6)	3.1 US FDA Regulations, IND, NDA, ANDA, FDA Audits and Inspections	Lectureand Power Point presentations	-do-	III component Seminar
Jan 22-29, 2024 (Day Order 1 to 6)	3.2 European Regulatory Affairs, Organization and Functions	Lectureand Power Point presentations	-do-	Lectureand Power Point presentations
Jan 30 – Feb 2, 2024 (Day Order 1 to 4)	3.3 Indian Regulatory system, Schedule Y- Rules and Regulations.	Lectureand PowerPoint presentations	-do-	III component Seminar
Feb 3, 2024 (Day Order 2)	3.3 Post Drug Approval Activities, PMS	Lectureand Power Point presentations	-do-	III component Seminar
Feb 5- 6, 2024 (Day Order 5 to 6)	**Unit 4:** 4.1 Role of Ethics Committees and Institutional Review Boards.	Lecture and case study	-do-	Written test & Group Discussion
Feb 7 – 14, 2024 (Day Order 1 to 6)	4.1 Special populations; women elderly and children	Lecture and case study	-do-	Written test & Group Discussion
Feb 15 – 22, 2024	4.2 Designing of Protocol,	Lecture and	-do-	Case Study,

(Day Order 1 to 6)	SOP, ICF, Pharmacovigilance	case study		III component
Feb 23 – 24, 2024 (Day Order 1 & 5)	4.3 Project management Documentation, Monitoring, Audits, Inspections, Fraud and Misconduct.	Lecture, Guided Protocol writing	-do-	Exercise and case study presentation
Feb 26 – Mar 1, 2024 (Day Order 2 to 6)	4.3 Roles and Responsibilities of Clinical Research Professionals	Lecture, Guided Protocol writing	-do-	Exercise and case study presentation
Mar 2, 2024 (Day Order 1)	**Unit 5:** 5.1 Importance of CDM in clinical research, Clinical Data Entry, CRF, e-CRF	Lectureand Power Point presentations	-do-	Exercise and case study presentation
Mar 4 –8, 2024	**C.A. Test – II**			
Mar 9 – 16, 2024 (Day 6 & Day Order 1 to 6)	5.2Statistical considerations at the design, analysis and reporting stage.	Discussionof case study	-do-	Discussion
Mar 18 - 19, 2024 (Day Order 2 to 3)	5.3 Data validation, SAE reconciliation, Quality Assurance	Lectureand Power Point presentations	-do-	Discussion
Mar 20-22, 2024 (Day Order 4 to 6)	**REVISION**			