CURRICULUM & SYLLABUS

COURSEWORK

FOR

Doctor of Philosophy (Ph.D.)

IN

BIOMEDICAL ENGINEERING

FACULTY OF ENGINEERING AND TECHNOLOGY
SRM UNIVERSITY DELHI-NCR, SONEPAT
Plot No.39, Rajiv Gandhi Education City, P.S. Rai,
Sonepat, Haryana-131029

COURSE STRUCTURE

Code	Course	L	T	P	C
RES701	Research Methodology	4	0	0	4
CPE-RPE101	Research and Publication Ethics	2	0	0	2
	Departmental Elective-I	3	0	0	3
	Departmental Elective-II	3	0	0	3
Total Credit		**12**			

LIST OF DEPARTMENTAL ELECTIVES

Code	Course	L	T	P	C
Departmental Elective-I					
	Bioinstrumentation and Electronics	3	0	0	3
	Methods in Biomedical Data Science	3	0	0	3
	Biostatistics and Data Analysis	3	0	0	3
Departmental Elective-II					
	Physiological Signal Processing and Control Theory	3	0	0	3
	Advanced Medical Imaging	3	0	0	3
	Structural Bioinformatics and Drug Design	3	0	0	3

Research Methodology – Syllabus

Unit-I Research Methods

Meaning of Research-Objectives of Research-Motivation in Research – Types of Research – Significance of Research –Research and Scientific Method– Criteria of good Research – Problem Encountered by Researchers in India – What is Research Problem? Selecting the Problem – Defining the Problem – Technique involved in Defining the Problem- Research Design – Different research design – Basic principles of Experimental Designs – Significance of Report Writing – Different Steps in writing Report – Layout of the Research Report – Types of Reports – Oral Presentation Mechanics of Writing a Research Report – Precautions for Writing Research Reports-Research metrics and Indexing.

Unit – II Analytical Instrumentation

Electromyography, Nerve conduction studies, Somatosensory evoked potentials, Strength duration curve, Goniometry, Balance master, Computerised treadmill, Bicycle ergometry, Hand grip dynamometer, Biofeedback, Pulmonary function tests, Ultrasonography, Pelvic inclinometer, Blood lactate analysis, Pulse oximetry, Physical fitness tests, Sphygmomanometer, Body fat analyser, Isokinetic machine,Peak flow meter.

Unit –III Clinical Trials

Introduction, composition, procedures &records, Informed consent, responsibility & rules applicable to

investigators and sponsors, reporting of adverse events and other related ethical issues. Clinical Trial Guidelines. Biosafety and Bioequivalence studies.

Unit – IV Biostatistics

Principles and practice of statistical methods in biological research – Data collection, presentation of Data – Measures of central tendency –Mean, Median, Mode, Correlation co-efficient, Standard deviation, student 't' test, chi-square test. Analysis of variance (ANOVA) and its uses. Basics of computers – types, servers, operating systems – Windows, UNIX and Linux. Finding scientific articles Pubmed. Outline of SPSS and Mathematica. Parametric and Non parametric test, Qualitative analysis, Questionnaire designing and validation, Interview, FGD.

Research and Publication Ethics syllabus

Module 1: Introduction to Philosophy: Definition, nature and scope, concept, branches, Ethics: Moral Philosophy, nature of moral judgments and reactions.

Module 2: Ethics with respect to Science and Research, Intellectual honesty and Research integrity Scientific misconducts: Falsification, Fabrication and Plagiarism(FFP), Redundant Publications: Duplicate Publications and overlapping Publication, salami slicing, Selective Reporting misrepresentation of data.

Module 3: Publication Ethics: Definition, introduction and importance, Best Practices/standards setting initiatives and guidelines : Committee on **Publication Ethics** (COPE), World Association of Medical Editors (WAME) etc., Conflicts of interest, Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa types, Violation of Publication ethics, authorship and contributorship, Identification of Publication misconduct, complaints and appeals, Predatory Publishers and Journals.

Module 4: Open access Publications and initiatives, SHERPA/ROMEO online resource and check publisher copy right & Self archiving policies, Software tool to identify predatory publications developed by SPPU Journal finder/ Journal suggestion tools Viz. JANE, Elsevier journal finder, Springer, Journal suggester

Module 5: Group Discussion: Subject specific ethical issues , FFP and authorship, Conflict of interest, Complaints and appeals: example fraud from India and abroad, Software tools: Use of Plagiarism software Turnitin, Urkund and other open source software tools

Module 6: Data Bases: Indexing DataBase, Citation Data Bases: Webof Science, Scopus etc, Impact factor of Journal as per Journal Citation Report, SNIP,SJR,IPP, Cite Score, Metrics: h-index, g index, i10 index, almetrics