

## Computer Vision and Machine Learning BM -75703

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75703	Computer Vision and Machine Learning	4	-	4				70	30	00	00	100

CO1: To introduce student to concept of image formation and fundamentals of image processing.

CO2: To introduce mechanisms used in biological visual systems that inspire design of artificial unit.

CO3: Introduction to techniques of image segmentation.

CO4: Various techniques for image representation.

CO5: To introduce principles of motion analysis and object recognition.

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	-	2
CO2	3	2	1	1	3
CO3	3	2	3	-	2
CO4	3	2	2	-	1
CO5	3	2	3	1	3
Average	3	1.8	2	0.4	2.2

## Bio-MEMS BM- 75004

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75004	Bio Mems	4	-	4				70	30	00	00	100

CO1: To understand fundamental of microsystems engineering.

CO2: Attain knowledge about micro fabrication and micromachining.

CO3: Have experience in design consideration for Bio-MEMS device.

CO4: Understand its applications in field of biomedical devices

CO5: Awareness of different packaging and microsystem designing

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2
CO1	-	1	1	-	2	-	-
CO2	-	1	2	-	2	1	2
CO3	1	1	3	1	2	3	-
CO4	1	1	3	1	-	3	-
CO5	1	1	2	-	1	1	2
Average	0.6	1	2.2	0.4	1.4	1.6	0.8

### Adaptive Signal Processing BM -75201

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75201	Adaptive Signal Processing	4	-	4				70	30	00	00	100

CO1: To understand random variables and apply its knowledge in calculating various parameters related to it

CO2: To understand and be able to compare various prediction filters

CO3: to compare Wiener filter with other predictive filters

CO4: to evaluate the choice of adaptive filters and apply on various signals..

CO5: compare frequency domain filters with time domain filters. decide which one to opt for a particular situation

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	-	1
CO2	3	2	1	1	2
CO3	3	2	3	-	1
CO4	3	2	2	-	1
CO5	3	2	3	1	2
Average	3	1.8	2	0.4	1.4

### Advanced Biomechanics BM -75702

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75702	Advanced Biomechanics	4	-	4				70	30	00	00	100

### Course Outcomes:-

CO1: To understand the need of studying biomechanics with respect to rigid body mechanics

CO2: To understand the key concept of tissue characterization.

CO3: to understand the mechanics of muscle fibre.

CO4: To analyze how adding time in study brings deformation in state of objects

CO5: Tobe able to apply concept of mechanics in cardiovascular system.

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	3	1	1	-	1
CO2	3	1	1	1	1
CO3	3	1	3	-	1
CO4	3	1	2	-	1
CO5	3	1	3	1	1
Average	3	1	2	0.4	1

## Advanced signal Processing BM -75701

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75201	Advanced Signal Processing	4	-	4				70	30	00	00	100

CO1: To acquire the fundamental concepts of Signal processing.

CO2: To understand various design techniques for linear phase analysis.

CO3: To introduce multi rate signal processing.

CO4: To study various signal model.

CO5: To apply concept of power spectrum analysis to various engineering problems.

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	-	1
CO2	2	1	1	1	1
CO3	2	2	3	-	2
CO4	3	2	2	-	1
CO5	3	2	3	1	1
Average	2.4	1.6	2	0.4	1.2

### Bio-Statistics: BM 75501:

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75501	Biostatistics	4	-	4				70	30	00	00	100

### Course Outcomes:-

CO1: Introduction to measurement & descriptive statistics in medical practices.

CO2: Get familiar with statistics software.

CO3: Knowledge of regression & correlation.

CO4: Understand basics of sampling.

CO5: Study of Hypothesis testing.

CO	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	-	2
CO2	2	1	1	1	2
CO3	2	2	2	-	2
CO4	2	2	2	-	2
CO5	2	2	2	1	2
Average	2	1.6	1.6	0.4	2

### Mechatronics BM 75704:

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75704	Mechatronics	4	-	4				70	30	00	00	100

#### Course Outcomes:-

- CO1: To develop understanding of basics of mechatronics.
- CO2: to develop understanding of hydraulic systems for automation
- CO3: to understand application of bearings and belts
- CO4: to apply simulation techniques to get prototyping models
- CO5: to study the application of Robots and therapies.

#### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	-	1
CO2	2	1	1	1	1
CO3	2	2	3	-	2
CO4	3	2	2	-	1
CO5	3	2	3	1	1
Average	2.4	1.6	2	0.4	1.2

### Finite Element Method BM 75851

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75851	Finite Element Methods	-	-	4				-	-	40	60	100

#### Course Outcomes:-

- CO1: to understand the structure of Hypermesh Software
- CO2: to apply the concepts of modelling to make basic mesh structures
- CO3: to apply small mesh structures to make complex structures
- CO4: to design the model of a bone.
- CO5: to design and analyse the model of spinal column

#### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	-	1
CO2	2	1	1	1	1
CO3	2	2	3	-	2
CO4	3	2	2	-	1
CO5	3	2	3	1	1
Average	2.4	1.6	2	0.4	1.2

## Neural Network and Fuzzy Logic: BM 75203

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75203	Neural Network and Fuzzy Logic	4	-	4				70	30	00	00	100

### Course Outcomes:-

CO1: to understand supervised and unsupervised learning in neural networks.

CO2: to apply supervised learning in feedback networks.

CO3: to design complex networks using basic networks.

CO4: Understand the role of neural networks and fuzzy logic in engineering, artificial intelligence, and cognitive modelling.

CO5: apply fuzzy sets and logic in uncertain events

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	-	1
CO2	2	1	1	1	1
CO3	2	2	3	-	2
CO4	3	2	2	-	1
CO5	3	2	3	1	1
Average	2.4	1.6	2	0.4	1.2

## BM-75003: Medical Imaging Systems

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75003	Medical Imaging System	4	-	4				70	30	00	00	100

### Course Outcomes:-

CO1: To learn basics of radiographic imaging and components of radiographic machine.

CO2: Understand basics of computed tomography imaging technique and its image reconstruction.

CO3: To understand basic physics of magnetic resonance imaging and its instrumentation.

CO4: To learn basic physics of ultrasound, the instrumentation involved and modes of operation.

CO5: To learn various imaging modalities with its instrumentation.

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	2	3	2	1	2
CO2	3	3	2	1	2
CO3	3	3	3	1	2
CO4	3	3	2	1	2
CO5	2	3	3	1	2
Average	2.6	3	2	1	2

## Rehabilitation and Prosthetics BM 75202

Subject Code	Subject Name	l	t	p	Theory credits	Practical credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th	CW	SW	Pr	
BM-75202	Rehabilitation and Prosthetics	4	-	4				70	30	00	00	100

### Course Outcomes:-

CO1: To understand the continuum of care for clinical rehabilitation.

CO2: To understand key aspects of sensorimotor systems as related to human performance.

CO3: To understand the importance of accessibility including information technology, healthcare, and telecommunication.

CO4: To understand some basic principles and applications of biomechanics to rehab devices and interfaces.

CO5: To design and analyse the innovative approaches in neurorehab.

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	2	2	1	1	-
CO2	2	1	1	2	1
CO3	1	1	3	-	1
CO4	3	-	3	-	1
CO5	3	2	2	1	2
Average	2.2	1.2	2	0.8	1

## Modelling & Simulation BM -75852

Subject-Code	Subject Name	L	T	P	Theory Credits	Practical Credits	Total credits	Maximum Marks				
								Theory		Practical		Total
								Th.	CW	SW	Pr.	
BM-75852	Modeling and Simulation	-	-	4	-	4	4	-	-	40	60	100

CO1: To review background information required for studying virtual instrumentation.

CO2: To study the basic building blocks of simulation.

CO3: To study a few applications of physiological modeling.

CO4: To study the various graphical programming environments in virtual instrumentation

CO5: Ability to design and conduct experiments, as well as to analyses and interpret results.

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	2	1	1	-	1
CO2	2	1	1	-	1
CO3	2	2	3	1	3
CO4	3	2	2	-	1
CO5	3	3	3	2	3
Average	2.4	1.8	2	1.5	1.8

## Bio Sensors & Instrumentation BM-75002

Subject-Code	Subject Name	L	T	P	Theory Credits	Practical Credits	Total Credits	Maximum Marks				
								Theory		Practical		Total
								Th.	CW	SW	Pr.	
BM-75002	Bio Sensors & Instrumentation	4	-	-	4	-	4	70	30		-	100

CO1: To make the student acquire an adequate knowledge of the physiological systems of the human body and relate them to the parameters that have clinical importance.

CO2: Identify to describe how bio specific interaction is used for various applications.

CO3: To describe the most common sensor principles used today, such as electric, optical, and mechanic.

CO4: To compare different techniques with emphasis on sensitivity and selectivity.

CO5: To provide awareness of electrical safety of medical equipment's.

### Course Articulation Matrix

CO	PO1	PO2	PO3	PO4	PO5
CO1	1	1	-	1	2
CO2	1	1	2	1	2
CO3	1	1	3	1	3
CO4	1	1	3	-	3
CO5	2	1	2	2	3
Average	1.2	1	2.5	1.25	2.6

## Electronic System Design BM-75451

Subject-Code	Subject Name	L	T	P	Theory Credits	Practical Credits	Total Credits	Maximum Marks				
								Theory		Practical		Total
								Th.	CW	SW	Pr.	
BM-75451	Electronic System Design Laboratory	4	-	-	4	-	4	70	30		-	100

CO1: To understand circuit analysis and synthesis.

CO2: To operate various hardware and software for data acquisition.

CO3: To design and build op amp based circuits for measuring op-amp characteristics.

CO4: Classify different OP-Amp configurations based on their design and working.

CO5: Design and development of biomedical based project

CO	PO1	PO2	PO3	PO4	PO5
CO1	-	1	2	2	2
CO2	2	1	2	-	2
CO3	1	2	3	1	3
CO4	1	2	2	2	3
CO5	3	3	3	2	3
Average	1.75	1.8	2.4	1.75	2.6

# BM 75001: Physiology for Engineers

## Course Outcomes:-

Subject-Code	Subject Name	L	T	P	Theory Credits	Practical Credits	Total Credits	Maximum Marks				
								Theory		Practical		Total
								Th.	CW	SW	Pr.	
BM 75001	Physiology for Engineers	4	-	-	4	-	4	70	30	-	100	

CO1: Classify different types of cell based on their structure and functionality.

CO2: Explain physiology of cardiovascular and respiratory systems and their implications..

CO3: Describe the physiology and anatomy of digestive and excretory systems.

CO4: Describe the interdependence and interactions of nervous and musculoskeletal systems.

CO5: Clinical and technological implications.

CO	PO1	PO2	PO3	PO4	PO5
CO1	-	1	2	2	3
CO2	-	1	2	2	3
CO3	-	1	2	2	3
CO4	-	1	2	2	3
CO5	3	3	3	2	3
Average	3	1.4	2.2	2	3