



**Department of Mechanical Engineering**  
**Faculty of Engineering and Technology**

12<sup>th</sup> August, 2015

**Minutes of the Meeting of BOS held on 12<sup>th</sup> August, 2015**

A meeting of the members of Board of Studies of the Department of Mechanical Engineering, Faculty of Engineering and Technology, Jamia Millia Islamia, New Delhi was held on Wednesday 12<sup>th</sup> August, 2015 at 3:30 P.M. in the office of the Head. Following members were present.

1.	Prof. Mohd Islam	Chairman and Head of the Department
2.	Prof. Abid Haleem	Member
3.	Prof. M. Emran Khan	Member
4.	Prof. M. M. Hasan	Member
5.	Prof. Z. A. Khan	Member
6.	Prof. Mohd Suhaib	Member
7.	Dr. Arshad Noor Siddiquee	Member
8.	Dr. S.M. Muzakkir	Member
9.	Dr. Aas Mohd	Member
10.	Dr. Islam Nawaz	Member
11.	Dr. Sabah Khan	Member
12.	Dr. Mohd Asjad	Member
13.	Dr. A. F. Sherwani	Member
14.	Mr. Mohd. Javaid	Member
15.	Mr. Mohd. Shoeb	Member


Following members were granted leave of absence

1.	Prof. S. M. Yahya	Co-opted Member
2.	Prof. Saranjit Singh	Nominated Member
3.	Prof. Khalid Moin	Nominated Member
4.	Prof. S. G. Deshmukh	Co-opted Member
5.	Prof. J. A. Usmani	Member (Leave)
6.	Prof. Mukhtar Ahmad	Member (Leave)
7.	Prof. Z. Mallick	Member
8.	Mrs. Halima Begum	Member (Leave)
9.	Mr. Lokesh Kumar	Member (Study Leave)

The meeting started at 3:30 p.m. The chairman welcomed all the members present in the meeting.

Following items were discussed and approved in the meeting.

- Minutes of the BOS meeting held on 28<sup>th</sup> April, 2015, were confirmed.
- The members discussed the Internal Assessment and Evaluation of Project/Dissertation of B.Tech./M.Tech./B.E Students and decided that 50% of sessional marks (60 marks) shall be given by a committee consisting of four faculty members belonging to the same stream (Design/Thermal/Production & Industrial) including the supervisor during the presentations, one each after the two sessional tests. If the supervisor is officially not available then the committee will award the marks.
- B.Tech. (Mech. Engg.) syllabus revision was discussed and 10% (Average) change in the syllabus was approved.
- The meeting ended at 4: 30 pm with a vote of thanks to the chair.

  
(Professor Mohd. Islam)  
Chairman, BOS

Copy to:

- All the members of the BoS of Mechanical Engineering Department.
- The Dean, Faculty of Engineering and Technology, JMI.
- The Registrar, JMI for information and necessary action.
- P. S. to Vice Chancellor for the kind information of Vice Chancellor, JM.I
- BOS file.

Head  
Deptt. of Mechanical Engg.  
Jamia Millia Islamia  
New Delhi-110025

**Note:** Any clarifications and comments on the minutes may kindly be brought to the notice of the chairman, BOS. If no comments are received within a week of the issue, the minutes will be deemed as confirmed.



**Department of Mechanical Engineering**  
**Faculty of Engineering and Technology**

18<sup>th</sup> April, 2017

**Minutes of the Extra-ordinary (Urgent) Meeting of BOS held on 18<sup>th</sup> April, 2017**

A Extra-ordinary (Urgent) meeting of the members of Board of Studies of the Department of Mechanical Engineering, Faculty of Engineering and Technology, Jamia Millia Islamia, New Delhi was held on Tuesday, 18<sup>th</sup> April, 2017 at 3:00 p.m. in the office of the Head. Following members were present.

		Chairman and Head of the Department
1.	Prof. J. A. Usmani	Member
2.	Prof. Abid Haleem	Member
3.	Prof. Mohd. Islam	Member
4.	Prof. M. Emran Khan	Member
5.	Prof. M. M. Hasan	Member
6.	Prof. Z. A. Khan	Member
7.	Prof. Z. Mallick	Member
8.	Prof. M. N. Karimi	Member
9.	Prof. Abdur Rahim	Member
10.	Prof. Aas Mohd	Member
11.	Prof. Arshad Noor Siddiquee	Member
12.	Prof. S.M. Muzakkir	Member
13.	Mrs. Halima Begum.	Member
14.	Dr. Islam Nawaz	Member
15.	Dr. A. F. Sherwani	Member
16.	Dr. Mohd. Asjad	Member
17.	Mr. Mohd. Javaid	Member
18.	Mr. Mohd. Shoeb	Member

Following members were granted leave of absence

1.	Prof. S. M. Yahya	Co-opted Member
2.	Prof. S. G. Deshmukh	Co-opted Member
3.	Prof. Khalid Moin	Nominated Member
4.	Prof. Saranjit Singh	Nominated Member


Following members were on leave

1.	Prof. Mohd Suhaib	Member
2.	Dr. Sabah Khan	Member
3.	Dr. Ali Hasan	Member
4.	Mr. Lokesh Kumar	Member

The meeting started at 3:00 p.m. The chairman welcomed all the members present in the meeting.

The following item was discussed and approved in the meeting.

1. The B.Tech. and M.Tech. program structure was discussed and approved. The same is attached as Annexure-I.
2. The meeting ended at 4: 30 pm with a vote of thanks to the chair.

  
(Prof. J. A. Usmani)  
Chairman, BOS  
Head  
Mech. Engg. Deptt.  
Jamia Millia Islamia  
New Delhi-110025

Copy to:

- 1 Dean, Faculty of Engineering and Technology, JMI.
- 2 All faculty members of the Department of Mechanical Engineering.
- 3 Prof. S.M. Yahya (Co-opted Member)
- 4 Prof. S.G. Deshmukh (Co-opted Member)
- 5 Prof. Khalid Moin (Nominated Member)
- 6 Prof. Saranjeet Singh (Nominated Member)
- 7 The Registrar, JMI for information.
- 8 P.S. to the Vice Chancellor, JMI for information.
- 9 Asstt. Registrar (Admn.), JMI
- 10 BOS Folder, Mechanical Engineering Department

**Note:** Any clarifications and comments on the minutes may kindly be brought to the notice of the chairman, BOS. If no comments are received within a week of the issue, the minutes will be deemed as confirmed.



Department of Mechanical Engineering  
Faculty of Engineering and Technology

12<sup>th</sup> May, 2016

Minutes of the Meeting of BOS held on 12<sup>th</sup> May, 2016

A meeting of the members of Board of Studies of the Department of Mechanical Engineering, Faculty of Engineering and Technology, Jamia Millia Islamia, New Delhi was held on 12<sup>th</sup> May, 2016 at 3:00 P.M in the office of the Head. Following members were present.

1.	Prof. J.A.Usmani	Chairman and Head of the Department
2.	Prof. S. M. Yahya	Co-opted Member
3.	Prof. Khalid Moin	Nominated Member
4.	Prof. Mohd. Islam	Member
5.	Prof. M. Emran Khan	Member
6.	Prof. M. M. Hasan	Member
7.	Prof. Z. A. Khan	Member
8.	Prof. Z. Mallick	Member
9.	Prof. Mohd Suhaib	Member
10.	Prof. M. N. Karimi	Member
11.	Prof. Abdur Rahim	Member
12.	Prof. Aas Mohd.	Member
13.	Prof. Arshad Noor Siddiquee	Member
14.	Dr. S.M. Muzakkir	Member
15.	Dr. Islam Nawaz	Member
16.	Dr. Sabah Khan	Member
17.	Dr. Ali Hasan	Member
18.	Dr. Mohd Asjad	Member
19.	Dr. A. F. Sherwani	Member
20.	Mr. Mohd. Javaid	Member
21.	Mr. Mohd. Shoeb	Member

Following members were granted leave of absence

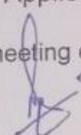
1.	Prof. S. G. Deshmukh	Co-opted Member
2.	Prof. Saranjeet Singh	Nominated Member
3.	Prof. Abid Haleem	Member
4.	Mrs. Halima Begum.	Member
5.	Mr. Lokesh Kumar	Member

The meeting started at 3:00 p.m. The chairman welcomed all the members present in the meeting.

Following items were discussed and approved in the meeting.

1. Minutes of the BOS meeting held on 21<sup>st</sup> April, 2016, were confirmed.

2. Teaching load of faculty members of the department for Odd and Even Semesters for the session 2016-17 for B.Tech. and M.Tech.(Mech.) courses was approved after incorporating suggestions/changes discussed in the meeting. The members authorized the Head of the Department to make changes as per the requirements (Annexure-I).
3. Under any other items, following were discussed and approved:
  - i. The revised and updated CBCS course structure was discussed and approved. (Annexure-II)
  - ii. The letter of the Dean, Faculty of Engineering and Technology, seeking discussion on the lateral entry Diploma Engineering holders was discussed. The members discussed the matter at length and disapproved the lateral entry of Diploma Engineering holders into the B.Tech. regular Program.
  - iii. The members authorized the Head of the Department to appoint paper setters, moderators and paper evaluators for the Ph.D. entrance examination for the session 2016-17.
  - iv. The name of B.Tech. ( I ) semester course Basic Mechanical Engineering has been changed to Elements of Mechanical Engineering and the syllabus of the same has been redesigned which will be communicated to the Head Applied Science Department for further necessary action.
4. The meeting ended at 4: 15 pm with a vote of thanks to the chair.

  
(Professor J.A.Usmani)  
Chairman, BOS

HEAD  
MECH. ENGG. DEPTT.  
JAMIA MILLIA ISLAMIA  
NEW DELHI-110025

Copy to:

1. All the members of the BoS of Mechanical Engineering Department.
2. The Dean, Faculty of Engineering and Technology, JMI.
3. The Registrar, JMI for information and necessary action.
4. P. S. to Vice Chancellor for the kind information of Vice Chancellor, JM.I
5. BOS file.

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## ERGONOMICS

<b>Paper Code</b>	<b>BM-804</b>
<b>Course Credits</b>	<b>4</b>
<b>No. of Lectures/week</b>	<b>3</b>
<b>No. of Tutorials/week</b>	<b>1</b>

### Course Description

#### Unit-1

Introduction to ergonomics, scope of ergonomics, cost of ignoring ergonomics, result of application of ergonomics, Ergonomics and its areas of application in the work-system, Description of Human-Machine system. Standard format for describing human-machine system.

#### Unit-II

Muscular Work: Physiological Principles, Sources of Energy, Nervous control of movements and structure of nervous system: Types of nervous system, Neurons, Action potential, Sodium potassium pump, innervations of muscles, Reflex-arc. Dynamics and static muscular work. Field method for assessing physical overload.

#### Unit-III

Design aspect in ergonomics: Manufacturing work-station design; Determining work-station design parameters, Systematic approach for determining work-station design, determining work-station dimension. Tool evaluation and design: Principles of tool design (General principles, Anatomical concern, and Single handle); Attributes of common industrial hand tools, Attributes of common industrial power tools, Tool evaluation check list. Displays and controls.

#### Unit-IV

Cumulative Trauma Disorder: Work-related Musculoskeletal Disorder: Definition of work-related Musculoskeletal Disorder, Types of WMSDs, Factors affecting WMSDs. Occupational Human Vibration: Characteristics of vibration, Whole-body and hand-arm vibration, Effect of vibration on comfort, health and performance.

#### Unit-V

Sound and related studies: Definition, evaluation of noise, combining decibels. Levels and Spectra: Sound power level, sound intensity level, numerical problems on sound its measurement

### Pre-Requisite Courses (/ Papers):

Industrial Engineering

### Text books:

- Introduction to Ergonomics-R.S. Bridger, McGraw-Hill International Edition.

### Reference books:

- Industrial Noise Control-Lewis H-Bell and Douglas H-Bell, Marcel Dekker, INC.

<b>Course Objective</b>	<ul style="list-style-type: none"> <li>• Fitting Tasks to Human, Kroemer, K.H.E. and Grandjean, E. (1997). Philadelphia: Taylor and Francis</li> <li>• The Ergonomic Edge-MacLeod, D. (1995). New-York: Van NostrandReinhold.</li> <li>• Provide students with the basis of occupational ergonomics.</li> <li>• Ergonomic considerations in design, ergonomic consideration in re-design and research basis of ergonomics.</li> </ul>
<b>Course Outcomes</b>	<p>CO1: Understand the fundamental of ergonomics (Human Factors) principles of design and evaluation.</p> <p>CO2: Be able to describe an expanded view of ergonomics, which encompasses more than ergonomically related injuries but all parts of assuring that the work-place fits the worker.</p> <p>CO3: Be able to put ergonomic assessments and solutions to practical use in the work place.</p> <p>CO4: Will be capable of initiating evaluations of ergonomic issues and working with an ergonomist.</p> <p>CO5: Understanding the concept of Sound and related studies, Numerical problems on sound its measurement</p>
<b>Computer Usage / Software required:</b>	Adobe Acrobat Reader, Power Point or PP viewer, Video Player.

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### SOLAR ENERGY SOURCE LAB

<b>Paper Code</b>	<b>BM-704</b>
<b>Course Credits</b>	<b>2</b>

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**DEPARTMENT OF  
MECHANICAL ENGINEERING  
FACULTY OF ENGINEERING AND TECHNOLOGY  
JAMIA MILLIA ISLAMIA  
NEW DELHI-110025**

**SOLAR ENERGY LAB.**

**LIST OF EQUIPMENT**

Sr. No.	EQUIPMENT
1.	Solar Thermal Training System
2.	Solar Photovoltaic-Thermal Hybrid Training System
3.	Grid Tied Training System
4.	Solar PV Training System
5.	Solar Training System Cell Level





## List of experiments

### Solar concentrator

Determine the Performance ( $U_L$ ,  $F_R$ ,  $\eta$ ) of the Parabolic Trough collector with fixed parameters with (i) water and (ii) oil as working fluid

Determine the Performance ( $U_L$ ,  $F_R$ ,  $\eta$ ) of the Parabolic Trough collector with varying solar insolation with (i) water and (ii) Oil as working fluid.

Determine the Performance ( $U_L$ ,  $F_R$ ,  $\eta$ ) of the Parabolic Trough collector with varying flow rate of fluid with (i) water and (ii) oil as working fluid.

Determine the Performance ( $U_L$ ,  $F_R$ ,  $\eta$ ) of the Parabolic Trough collector with changing insulation thickness with (i) water and (ii) oil as working fluid.

Determine the Performance ( $U_L$ ,  $F_R$ ,  $\eta$ ) of the Parabolic Trough collector with different inlet water temperature with (i) water and (ii) oil as working fluid.

Determine the Performance ( $U_L$ ,  $F_R$ ,  $\eta$ ) of the Parabolic Trough collector with different wind speed with (i) water and (ii) oil as working fluid.

Determine the Performance ( $U_L$ ,  $F_R$ ,  $\eta$ ) of the Parabolic Trough collector with different ambient temperature with (i) water and (ii) oil as working fluid.

Find an optimum flow rate of fluid for getting minimum heat losses (or maximum heat gain) for different insulation thickness with (i) water and (ii) oil as working fluid



## List of experiments

### Solar training system(Cell level)

To demonstrate the I-V and P-V characteristics of different types of solar cells with varying spectrum, radiation and temperature level.

Demonstrate relation between power output of solar cell and load resistance

Evaluation of series and parallel resistance of each type of solar cell.

Demonstrate the effect of putting two different types of solar cells in series and parallel (mismatching effect).

To demonstrate the impact of partial shading on solar cell performance.

To draw I-V characteristics of rheostat with I-V characteristics of solar cells

## List of experiments

### Solar Thermal Training System

Evaluation of  $U_L$ ,  $F_R$  and  $\eta$  in Thermosyphonic mode of flow with fixed input parameters

Evaluation of  $U_L$ ,  $F_R$ ,  $\eta$  in Thermosyphonic mode of flow at different radiation level

Evaluation of  $U_L$ ,  $F_R$ ,  $\eta$  in Thermosyphonic mode of flow at different inlet water temperature.

Evaluation of  $U_L$ ,  $F_R$ , and  $\eta$  in Thermosyphonic mode of flow with different wind speed

Evaluation of  $U_L$ ,  $F_R$ ,  $\eta$  in forced mode of flow with fixed input parameters

Evaluation of  $U_L$ ,  $F_R$ ,  $\eta$  and drawing of different curves in forced mode of flow with different flow rate.


Evaluation of  $U_L$ ,  $F_R$ ,  $\eta$  in forced mode of flow at different radiation level

Evaluation of  $U_L$ ,  $F_R$ ,  $\eta$  in forced mode of flow at different inlet water temperature

Evaluation of  $U_L$ ,  $F_R$ ,  $\eta$  in forced mode of flow at different wind speed

Evaluation of  $U_L$ ,  $F_R$ ,  $\eta$  in forced mode of flow at different incident angle (change in tilt angle) and all other parameter as in 1<sup>st</sup> forced mode experiment

Evaluation of  $U_L$ ,  $F_R$ , and  $\eta$  in Thermosyphonic mode of flow at different tilt angle



## List of experiments

### Solar photovoltaic training and research kit

To demonstrate the I-V and P-V characteristics of PV module with varying radiation and temperature level.

To demonstrate the I-V and P-V characteristics of series and parallel combination of PV modules.

To show the effect of variation in tilt angle on PV module power.

To demonstrate the effect of shading on module output power.

To demonstrate the working of diode as Bypass diode and blocking diode.

Workout power flow calculations of stand- alone PV system of DC load with battery.

Workout power flow calculations of stand- alone PV system of AC load with battery.

Workout power flow calculations of stand- alone PV system of DC and AC load with battery.

To draw the charging and discharging characteristics of battery.

## INDUSTRIAL TRAINING

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**Paper Code**                    **BM-654**  
**Audit Course with no**  
**credit**

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- Industrial Practical Training
- Training Certificate Submission
- Training Report Submission
- Training Presentation

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## Mechanics of Multiphase Materials

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Paper Code MTD 903

Course Credits 4

No. of Lectures / week 3

No. of Tutorials/week 1

### Course Description

#### Unit – I: Introduction

Basics of Composites, Mechanical Behaviour of Composite Materials, Material heterogeneity. Different types of Matrix and reinforcements, Survey of laminated, fibrous, particulate, cellular and porous, platelet structures. Fabrication Techniques, Rapid prototyping, Polymer composites, Thermoplastics, Thermosets, Metal matrix and ceramic composites. Biodegradable Composites, Hybrids, Concept of equivalent homogeneity.

Strengthening mechanisms, Aspect Ratio, Prediction of stiffness and strength, Rule of Mixture, discontinuous and continuous fibre composites and their comparison, Critical Fibre Length, Short and Continuous Fibres, Fibre Orientation, properties and bounds. Bounds on physical properties: Voigt and Reuss bounds; Hashin - Shtrikman bounds.

#### Unit – II: Macro mechanics

Concepts of Solid Mechanics, Stress-Strain Relations For Anisotropic Materials, Stiffnesses, Compliances and Engineering Constants for Orthotropic Materials, Stiffness, Hygro-thermo-elastic Constitutive Relation, Restrictions on Engineering Constants, 2-Dimensional Lamina Analysis: Stress-Strain Relations for Plane Stress in an Orthotropic Material, Stress-Strain Relations for a Lamina of Arbitrary Orientation, Invariant Properties of an Orthotropic Lamina, Strengths of an Orthotropic Lamina, Strength Concepts, Experimental Determination of Strength And Stiffness, Lamina Engineering Constants, Biaxial Strength Criteria for an Orthotropic Lamina.

#### Unit – III: Micromechanics

Mechanics of Materials Approach to Stiffness, Concepts of Equivalent Homogeneity, Volumetric Averaging and Standard Mechanics, Elasticity Approach to Stiffness, Comparison of Approaches to Stiffness, Mechanics of Materials Approach to Strength.

Macro mechanical Behaviour of a Laminate: Classical Lamination Theory, Laminate Constitutive Relations, Laminate Theory, Special Cases of Laminate Stiffness, Theoretical Versus Measured Laminate Stiffness, Strength of Laminates, Inter-laminar Stresses  
Bending, Buckling, and Vibration of Laminated Plates

#### Unit - IV

STRENGTH OF UNIDIRECTIONAL LAMINA: Micro mechanics of

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failure, Failure mechanisms, Failure and Damage, Defects in Composites, Damage Mechanisms in Fibrous Composites, Micro-level Damage Mechanisms, Matrix Level Damage Mechanisms, Coupled Fibre-Matrix Level Mechanisms, Macro level Failure Mechanism, Coupled Micro-Macro level Failure Mechanisms, Fatigue.  
Composite Testing and Standards, Mechanical property characterization. Shear and Flexural Testing.  
Design Considerations in Laminated Composites

**Unit - V**

**Functionally graded materials:** manufacturing, processing and applications, Effective Material properties of FGMs, Failure of Functionally Graded Materials: Mechanics Models of FGMs, Fracture of FGMs, and Finite Element Modelling.

- **Cellular solids.** Structure property relations of cellular solids. Lightweight cellular solids. Foams, structural honeycombs, sandwich structures. Polymer lattice structures. Synthetic foams. Poisson's ratio of composites and foams. Applications.
- Dental Composites, Bone cements, Nano-Composites, Piezoelectric composites.

**Pre-Requisite Courses  
(/ Papers):**  
**Text books:**

- Material Science, Strength of Materials, Experimental Stress Analysis, Mathematics.
- Mechanics Of Composite Materials, 2nd Edition, Robert M. Jones, McGraw Hill Company, New York.

**Reference books:**

- Engineering Mechanics of Composite Materials by Isaac and M Daniel, Oxford University Press, 1994.
  - Analysis and performance of fibre Composites/ B. D. Agarwal and L. J. Broutman / Wiley Interscience, New York, 1980.
  - Mechanics of Composite Materials/ Second Edition (Mechanical Engineering)/ Autar K. Kaw, Publisher: CRC
  - Analysis of Laminated Composite Structures/ L. R. Calcote/ Van NostrandRainfold, New York, 1969.
  - Advanced Mechanics of Composite Materials/ Vasiliev&Morozov/Elsevier/Second Edition
  - David A Colling & Thomas Vasilos, Industrial Materials: Polymers, Ceramics and Composites, vol. 2, Prentice Hall, N. Jersey, 1995
  - Failure of Functionally Graded Materials G.H. PAULINO, Z.-H. JIN, and R.H. DODDS, Jr. University of Illinois, Urbana, USA.
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**Course Objective**

- Explain the behaviour of constituents in the composite materials
- Enlighten the students in different types of reinforcement
- Develop the student's skills in understanding the different manufacturing methods available for composite material.
- Illuminate the knowledge and analysis skills in applying basic laws in mechanics to the composite materials.

**Course Outcomes**

- CO1: Define a composite, enumerate advantages and drawbacks of composites over monolithic materials, and discuss factors which influence mechanical properties of a composite
- CO2: Classify composites, introduce common types of fibres and matrices, and manufacturing, mechanical properties and applications of composites
- CO3: Apply constitutive equations of composite materials and understand mechanical behaviour at micro and macro levels.
- CO4: Determine stresses and strains relation in composites materials and carry out failure analysis
- CO5: Apply knowledge of composites in understanding the functionally Graded Materials and Cellular Solids.

**Computer Usage /  
Software required:  
ANSYS, MATLAB.**

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# Course Structure of M. Tech. (Mechanical) Machine Design/Thermal Engg./Production & Industrial Engg.

MECHANICAL ENGINEERING DEPARTMENT, Faculty of Engineering & Technology, *Jamia Millia Islamia*

## M. Tech. (Mechanical) I SEMESTER (Machine Design)

S. No.	COURSE NO. & NAME	COURSE TYPE	Credits	L	T	P	HRS
1	ASC-901 Advanced Mathematics	PC (CBCS)	4	3	1	0	4
2	MEC-901 Optimization Methods	PC	4	3	1	0	4
3	MEC-902 Technical Communications	PC	4	3	1	0	4
4	MED-901 Theoretical and Experimental Stress Analysis	PC	4	3	1	0	4
5	MED-902 Advanced Mechanical Engineering Design	PC	4	3	1	0	4
6	*MED-903 Mechanics of Multi-phase Materials	PE	4	3	1	0	4
i	MED-904 Experimental Stress Analysis and Advanced Mechanical Engg. Design Laboratory	PC Lab	2	0	0	4	4
ii	MEC-903 Computer Applications & Programming Laboratory	PC Lab	2	0	0	4	4
<b>Total</b>			<b>28</b>	<b>18</b>	<b>6</b>	<b>8</b>	<b>32</b>

## M. Tech. (Mechanical) II SEMESTER (Machine Design)

S. No.	COURSE NO. & NAME	COURSE TYPE	Credits	L	T	P	HRS
1	MEC-906 Finite Element Methods	PC (CBCS)	4	3	1	0	4
2	MEC-907 Statistics For Decision Making	PC	4	3	1	0	4
3	MED-905 Advance Mechanism	PC	4	3	1	0	4
4	MED-906 Vibration Engineering	PC	4	3	1	0	4
5	* MED-907 Tribological System Design	PE	4	3	1	0	4
i	MED-908 Vibration Engineering and Mechanisms Laboratory	PC Lab	2	0	0	4	4
<b>Total</b>			<b>22</b>	<b>15</b>	<b>5</b>	<b>4</b>	<b>24</b>

\*The course may be opted from the list of Elective courses given at the end.