

SEMESTER - I

| MODULE CODE | CATEGORY | SUB-CATEGORY | MODULE | L | T | P | C | Internal Marks | External Marks | Total Marks |
|--------------|----------|--------------|--|-----------|----------|----------|-----------|----------------|----------------|-------------|
| ENGL0101 | G | | ENGLISH | 3 | 0 | 0 | 3 | 25 | 75 | 100 |
| MATH0101 | G | | APPLIED MATHEMATICS – I | 3 | 1 | 0 | 3.5 | 50 | 100 | 150 |
| CHEM0101 | G | | INDUSTRIAL CHEMISTRY | 3 | 0 | 0 | 3 | 25 | 75 | 100 |
| CHEM0102 | G | | INDUSTRIAL CHEMISTRY LAB | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| PHYS0101 | G | | APPLIED PHYSICS – I | 3 | 1 | 0 | 3.5 | 50 | 100 | 150 |
| PHYS0102 | G | | PHYSICS LAB – I | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| ECEN1101 | G | | ELECTRICAL TECHNOLOGY | 2 | 0 | 0 | 2 | 25 | 50 | 75 |
| ECEN1102 | G | | ELECTRICAL TECHNOLOGY LAB | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| CSEN1101 | G | | FUNDAMENTALS OF COMPUTERS AND PROGRAMMING (WITH C) | 4 | 0 | 0 | 4 | 50 | 100 | 150 |
| CSEN1102 | G | | FCPC LAB | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| | G | | FOREIGN LANGUAGE PART-I # | 2 | 0 | 0 | 2 | 25 | 50 | 75 |
| TOTAL | | | | 20 | 2 | 8 | 25 | 350 | 650 | 1000 |

L = Lecture
T = Tutorial
P = Practical
C = Credit Point

FOREIGN LANGUAGE

One foreign language out of the following

| | |
|---------|----------|
| French | LANF0101 |
| German | LANG0102 |
| Spanish | LANS0103 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

English

L T P
3 0 0

| | |
|----------------------------|----------|
| MODULE CODE | ENGL0101 |
| CREDIT POINTS | 3 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 75 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: The Question paper will comprise of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B and Section C Comprise of short answer type and Long answer type questions and will have internal choices.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to vocabulary, synonyms, anatomize and to enhance English language skills as mentioned below:

1. To achieve knowledge and understanding on fundamentals of English Language and various aspects of it.
2. To get familiar with the rules of Grammar and their correct usage.
3. To enhance the creativity of the students related to verbal ability and reasoning or fluency of language.
4. To acquire knowledge and understanding the basic concepts of English language and its application in Science and & Engineering.
5. To acquire knowledge for the correct usage of technical English.

LEARNING OUTCOMES:

1. Able to achieve knowledge and understanding on fundamentals of English Language.
2. Able to get familiar with the rules of Grammar and their correct usage.
3. Enhance the creativity of the students related to verbal ability and reasoning or fluency of English.
4. Ability to acquire knowledge for the correct usage of technical English.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS:

| |
|---|
| <p><u>Unit I: Communicative Grammar</u></p> <p>Communicative Grammar: Spotting the errors pertaining to parts of speech, nouns, pronouns, adjective, adverbs, preposition, conjunction, genders, infinitives, participles, form of Tenses, use of articles ;Concord - grammatical concord, notional Concord and the principle of proximity between subject and verb and other exceptional usages.</p> |
| <p><u>Unit II: Lexis</u></p> <p>Lexis: Words often confused; One-Word Substitutes; Foreign Words (A selected list may be included for all the above components); Formation of Words (suffixes, prefixes and derivatives)..</p> |
| <p><u>Unit III: Introduction to principal components of spoken English</u></p> <p>Introduction to principal components of spoken English – Phonetics, Word-stress patterns, Intonation, Weak forms in English.</p> |
| <p><u>Unit IV: Developing listening and speaking skills through various activities</u></p> <p>Developing listening and speaking skills through various activities, such As: Role play activities Practicing short dialogues Group discussion Debates Speeches Listening to news bulletins Viewing and reviewing T.V. programs etc.</p> |
| <p><u>Unit V: Written Communication</u></p> <p>Written Communication: Developing reading and writing skills through such tasks/activities as developing outlines, key expressions, situations, slogan writing and theme building exercises. Reading verbal and non-verbal texts like cartoons, Graphs and tabulated data etc.</p> |
| <p><u>Unit VI: Technical Writing</u></p> <p>Business Letters, Format of Business letters and Business letter writing-Fully- blocked layout may be used-mail writing; Reports, Types of Reports and Format of Formal Reports; Press Report Writing.</p> |

RECOMMENDED BOOKS:

| | |
|------------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Basic Business Communication: Raymond V Lesikar Mc A Graw Hill publications. 2. Communication Skills: D G Saxena, Kuntal Tamang Top Quark,New Delhi. 3. A textbook of English Phonetics for Indian Students: TBalasubramanian Macmillan India Limited, New Delhi. |
| REFERENCE BOOKS | <ol style="list-style-type: none"> 1. Living English Structures:W S Allen Pearson Publications, New Delhi. 2. High School English Grammar and Composition: P C Wren and H Martin S.Chand Publications, New Delhi. 3. Essentials of Communication: B R Sharma and Sanjeev Gandhi Bharat publications, Yamuna Nagar |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|---------|---------|-------|-------|-----|-----|-----|-----|-----|---------|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | 1,2,3,4 | 1,2,3,4 | 1,2,3 | 1,2,3 | 2,4 | 3,4 | 1,4 | 3,4 | 2,5 | 1,2,3,5 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 150 marks for theory.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 05 |
| 2. | Sessional Test | 2 | 15 |
| 3. | Group Discussion | 4 | 05 |
| 4. | End Semester Exam | 1 | 75 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 |
|-------------|---|---|---|---|
| Class Test | x | x | | |
| Quiz | x | x | x | x |
| Assignment | | | x | x |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Applied Mathematics-I

L T P
3 1 0

| | |
|----------------------------|----------|
| MODULE CODE | MATH0101 |
| CREDIT POINTS | 3.5 |
| FORMATIVE ASSESMENT MARKS | 50 |
| SUMMATIVE ASSESMENT MARKS | 100 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: The Question paper will comprise of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B and Section C Comprise of short answer type and Long answer type questions and will have internal choices.

OBJECTIVES:

1. To achieve knowledge and understanding on fundamentals of matrices, their various properties and capabilities to model and solve wide range of problems in science and engineering.
2. To get familiar with concepts of differential calculus and develop ability to solve simple problems.
3. To understand multiple integrals and their applications in engineering problems.
4. To learn basic concepts of probability and its application in realistic decision making.
5. To acquire knowledge of statistical hypothesis testing and assess their effectiveness in problem solving.

LEARNING OUTCOMES:

1. Able to understand the evolution of matrices and their applications.
2. Exposure to differential calculus and their capabilities to solve problems.
3. Enhance the knowledge of multiple integrals.
4. Able to understand concepts of probability and its application.
5. Ability to acquire knowledge of statistical hypothesis testing and assess their effectiveness.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS:

| |
|--|
| <p><u>UNIT-I: Matrices & their Applications</u> Rank of a matrix, elementary transformations, elementary matrices, inverse using elementary transformations, normal form of a matrix, linear dependence and independence of vectors, consistency of linear system of equations, linear and orthogonal transformations, Eigen values and Eigen vectors, properties of Eigen values, Cayley - Hamilton theorem and its applications. Determinants and their evaluations.</p> |
| <p><u>UNIT-II: Applications of Differentiation</u> Taylor's and McLaurin's series, Asymptotes and Curvature. Partial Differentiation & its Applications : Functions of two or more variables; partial derivatives, Total differential and differentiability, Derivatives of composite and implicit functions, Jacobians, Higher order partial derivatives.</p> |
| <p><u>UNIT-III: Applications of Differentiation contd.</u> Homogeneous functions, Euler's theorem, Taylor's series for functions of two variables (without proof), maxima-minima of function of two variables, Lagrange's method of undetermined multipliers, Differentiation under integral sign..</p> |
| <p><u>UNIT-IV: Multiple Integration</u> Double integral, change of order of integration, Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.</p> |
| <p><u>UNIT-V: Multiple Integration contd.</u> Triple integral, volume of solids, change of variables, Beta and gamma functions and relationship between them.</p> |
| <p><u>UNIT-VI: Probability Distributions & Hypothesis Testing</u> Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions. Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (applications only) and Chi-square test of goodness of fit. Chi-square test of independent events, F- Test.</p> |

RECOMMENDED BOOKS:

| | |
|-----------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> Higher Engineering Mathematics: B.S. Grewal, Khanna Publishers, New Delhi. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, Inc., New York. <i>Advanced Engineering Mathematics</i>, Peter V. O'Neil, Thomson Learning, Inc., Singapore. |
| REFERENCEBOOKS | <ol style="list-style-type: none"> Advanced Engineering Mathematics, R.K. Jain and S.R.K. Iyengar, Alpha science International Ltd. Pang Bourne, England. Advanced Engineering Mathematics, Michael D Greenberg, Prentice-Hall, Englewood Cliffs, NJ. |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|---------------|-------------------|-----------|-------|-------|-----|-------|-----|-----------|-----------|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | 1,2,3 ,4,5 | 1,2 ,3, 4,5 | 1,3 ,5 | 1,2,5 | 1,2,4 | 2,3 | 1,4,5 | 1,3 | 1,2 ,5 | 1,2 ,3 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 150 marks for theory and 50 marks for practical.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 10 |
| 2. | Sessional Test | 2 | 30 |
| 3. | Group Discussion | 4 | 10 |
| 4. | End Semester Exam | 1 | 100 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 |
|-------------|---|---|---|---|---|
| Class Test | x | | x | | x |
| Quiz | | | x | | x |
| Assignment | x | x | | x | |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Industrial Chemistry

L T P
3 0 0

| | |
|----------------------------|----------|
| MODULE CODE | CHEM0101 |
| CREDIT POINTS | 3 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 75 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: The Question paper will comprise of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B and Section C Comprise of short answer type and Long answer type questions and will have internal choices.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to fuel, lubricants and to enhance skills of industrial chemistry as mentioned below:

1. To achieve knowledge and understanding the phase rule for different systems and further for various engineering applications.
2. To get familiar with the importance of water, impurities in water & their effects like hardness, alkalinity & biological effects.
3. To understand & solve the problems like scale and sludge formation, boiler corrosion due to impurities present in water used for industrial purpose.
4. To learn basic concepts about the process of corrosion of different metals & its types with mechanism and cause.
5. To know various factors that can effect corrosion and to be able to produce different methods for prevention of corrosion of different metals used in machines.
6. To have knowledge of different lubricants and to use different lubricants for different machines.
7. To gain knowledge of different fuels and their efficiency.
8. To acquire knowledge about the preparation & properties of different polymers and to be able to recognize the use of different polymers & their composites for engineering applications.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

LEARNING OUTCOMES:

1. Students will be able to develop an insight about the way the chemistry is connected to other occupations and appreciation of the role of chemistry in day to day life in society and the skills of solving related industrial problems.
2. Students will be able to demonstrate their knowledge of removal of hardness of water and different water treatments methods in energy and environment related industries.
3. Graduates will be able to apply their knowledge of preventions of corrosions in different machinery systems.
4. Students will be able to demonstrate the application of different lubricants for various machinery problems and energy usage as well as the influence of human and industrial activities on the environment.
5. Students will show their interest in manufacturing different polymers and polymer composites by using different polymerization techniques and their application in industries.
6. Graduates will be able to develop their challenging careers in the field of chemicals, petroleum, petrochemical, polymer, pharmaceutical, food, biotechnology, microelectronics, energy and nano-materials processing.
7. Graduates will be able to perform laboratory experiments and proper use of standard chemistry glassware and equipment compare and collect quantitative data obtained from experimentation and using various analytical techniques.
8. Graduates will be able to communicate effectively through assignments, presentations and discussions in technical as well as in non technical domain.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS:

UNIT-I: Phase Rule

Terminology, Gibb's phase rule equation, One component system (H₂O system and CO₂-system), Two components system: simple eutectic system (Pb-Ag), system with congruent melting point (Zn-Mg), system with incongruent melting point (Na-K), Applications of these systems and phase rule, Cooling curves.

UNIT-II: V Water & its treatment

Impurities in water & their effects, hardness of water and its determination (EDTA method), alkalinity of water and its determination, treatment of water for domestic use: coagulation, sedimentation, filtration and disinfection, water softening methods: Lime-Soda process, Zeolite process, Ion-exchange process, Related numerical problems.

UNIT-III: Corrosion and its prevention

Introduction, Chemical and Electrochemical corrosion, Types of corrosion: oxidation corrosion, galvanic corrosion, differential aeration corrosion, pitting corrosion, waterline corrosion, stress corrosion (caustic embrittlement), Factors affecting corrosion, preventive measures (Cathodic & anodic protection, electroplating, tinning, galvanization).

UNIT-IV: Lubricants and Fuels

Need for lubricants, Classification, general properties & applications of lubricants, Properties of lubricating oils (Flash & Fire point, Viscosity and Viscosity index, Saponification value, Iodine value, Acid value, Aniline point), Definition and classification of fuel, Calorific value of fuels, Dulong's formula, Determination of calorific value of fuels (Bomb's calorimeter & Boy's Gas calorimeter), Related numerical problems.

UNIT-V: Polymers and Composites

Classification of polymers, types & mechanism of polymerization (Addition and condensation), preparation properties and technical application of thermoplastics (PE, PVC, Teflon), thermosets (UF, PF) and elastomers (synthetic rubbers: SBR, Nitrile rubber), Inorganic polymers (silicones), Polymeric composites (composition, advantages and application areas), Introduction to conducting polymers and conducting polymer composites.

UNIT-VI: Instrumental Methods of Analysis

Principle, instrumentation & general applications of thermal methods of analysis (TGA, DTA, DSC), Basic concepts of spectroscopy, Principal, instrumentation and general applications of spectroscopic techniques (UV-Vis spectroscopy, IR-spectroscopy & Flame photometry), Conductometric titrations, pH metry.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

RECOMMENDED BOOKS:

| | |
|-------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. <i>Engineering Chemistry</i>, P.C. Jain Monica Jain (Dhanpat Rai & Co) 2. <i>Fundamentals of Engineering Chemistry</i>, Shashi Chawla (Dhanpat Rai & Co) 3. <i>Chemistry for Engineers</i>, B.K. Ambasta (Luxmi Publication) 4. <i>Chemistry in Engineering & Tech</i>, Vol. I & II, Kuriacose (TMH) |
| REFERENCES | <ol style="list-style-type: none"> 1. <i>Instrumental methods of Chemical analysis</i>, MERITT & WILLARD (EAST – WEST press) 2. <i>Physical Chemistry</i>, P.W Atkin (ELBS, OXFORD Press) 3. <i>Physical Chemistry</i>, W.J.Moore (Orient Longman) |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|-------------------------------|-------------------|-----------------|-------|-------|-----------------|---------|----------------------|-----------------|-------------------|
| Course Learning Outcomes | 1,2 ,3, 4,5 ,6, 7 | 1,2 ,5, 6,7 | 1,3 ,5, 7 | 1,2,7 | 2,4,6 | 1,2 ,3, 7 | 1,4,6,7 | 1, 3, 4, 5, | 2,5 ,6, 8 | 1,2 ,4, 7,8 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 75 marks for theory and 25 marks for practical.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 05 |
| 2. | Sessional Test | 2 | 15 |
| 3. | Group Discussion | 4 | 05 |
| 4. | End Semester Exam | 1 | 75 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Class Test | | x | x | x | | x | x | |
| Quiz | x | x | x | x | | x | | |
| Assignment | x | | x | | | | | x |

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Industrial Chemistry Lab

L T P
0 0 2

| | |
|----------------------------|----------|
| MODULE CODE | CHEM0102 |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to chemistry as mentioned below:

1. To achieve the practical knowledge of the importance of water and it's, impurities in water & their effects like hardness, alkalinity & biological effects.
2. To be able to understand & solve the problems like scale and sludge formation, boiler corrosion due to impurities present in water used for industrial purpose.
3. To get familiar with experimental methods for treatment of domestic water, water for industrial purpose.
4. To have knowledge of different properties of lubricants and further to use different lubricants for different machines.
5. To obtain data by cooling method for constructing a phase diagram which indicates the solid and liquid phase that is present at each temperature and composition.
6. To be effective in applying the basic concept of different polymerization synthesis techniques for preparation of different polymers and their applications.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

LEARNING OUTCOMES:

1. Able to develop an insight about the way the chemistry is connected to other occupations and appreciation of the role of chemistry in day to day life in society and the skills of solving related industrial problems.
2. Able to perform laboratory experiments and proper use of chemicals in removal of hardness of water and different water treatments methods in energy and environment related industries.
3. Able to check the water samples for various purposes in industries, like chemical industry, Construction Company, pharmaceutical company and demonstrate the role of pure water in day to day life.
4. Able to demonstrate the application of different lubricants for various machinery problems.
5. Enhance the knowledge of different polymers by using some polymerization techniques in industries.
6. Ability to develop their challenging careers in the chemical, petroleum, petrochemical, polymer, pharmaceutical, food and other related industries compare quantitative data collected in the lab and interpret the data obtained from experimentation and using various analytical techniques.

MODULE CONTENTS:

| | |
|-----|---|
| 1. | Determination of Ca^{+2} and Mg^{+2} hardness of water using EDTA solution |
| 2. | Determination of alkalinity of water sample. |
| 3. | Determination of dissolved oxygen (DO) in the given water sample. |
| 4. | To determine TDS of Water samples of different sources. |
| 5. | To find the eutectic point for a two component system by using method of cooling curve. |
| 6. | To Prepare Urea formaldehyde and Phenol-formaldehyde resin. |
| 7. | Determination of viscosity of lubricant by Red Wood Viscosity (No. 1 & N0. 2). |
| 8. | To find out saponification no. of lubricating oil. |
| 9. | Determination of concentration of KMnO_4 solution spectrophotomererically. |
| 10. | Determination of strength of HCl solution by titrating against NaOH solution conductometerically. |
| 11. | To determine amount of sodium & potassium in given water sample by flame photometer. |
| 12. | Determination of dissociation constant of a weak acid by pH-meter. |
| 13. | Estimation of total iron in an iron alloy |
| | Any other experiment carried out in the laboratory. |

RECOMMENDED BOOKS:

| | |
|-------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none">1. <i>Essential of Experimental Engineering Chemistry</i>, Shashi Chawla (DhanpatRai& Co.)2. <i>Expeiments in Applied Chemistry</i>, SunitaRatan (S.K. Kataria& Sons) |
|-------------------|--|

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

| | |
|------------------------|--|
| REFERENCE BOOKS | <ol style="list-style-type: none"> 1. <i>Vogel's Text Book of Quantitative Chemical Analysis</i>, A. I. Vogel, G. H. Jeffery Published by Longman Scientific & Technical, 5th Edition, 1989. 2. <i>Theory & Practice Applied Chemistry</i> – O.P.Virmani, A.K. Narula (New Age). 3. <i>A Text book on Experiments and Calculation– Engineering Chemistry</i>, S.S.Dara, (S.Chand & Company Ltd). |
|------------------------|--|

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---------------|-----------|-------|-------|-----------|-----|-------------|-------|-----|-----------------|
| Course Learning Outcomes | 1,2,3 ,4,6 | 1,2, 4 | 1,3,6 | 1,2,4 | 2,4, 6 | 1,4 | 1,2, 4,6 | 1,2,5 | 1,3 | 1,2 ,3, 6 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks.

Practical

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------|--------------|--------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Applied Physics I

L T P
3 1 0

| | |
|----------------------------|----------|
| MODULE CODE | PHYS0101 |
| CREDIT POINTS | 3.5 |
| FORMATIVE ASSESMENT MARKS | 50 |
| SUMMATIVE ASSESMENT MARKS | 100 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: The Question paper will comprise of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B and Section C Comprise of short answer type and Long answer type questions and will have internal choices.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to modern physics, interference, difference, polarization and to enhance skills of different type of laser and its applications as mentioned below:

1. To make students aware about Modern Physics, their various properties and capabilities to model and solve wide range of problems in science and engineering.
2. To acquire knowledge polarization and their applications in engineering problems.
3. To get familiar with concepts of interference and diffraction and develop ability to solve simple problems.
4. To learn basic concepts of different types of laser and its application in scientific problems.
5. To acquire knowledge of superconductivity implementation and assess their effectiveness in science and Technology.

LEARNING OUTCOMES:

1. Able to apply knowledge in developing advanced materials and devices.
2. Able to apply fundamental laws of superconductivity in engineering.
3. Able to identify and solve applied physics problems.
4. Able to apply knowledge to understand the concepts of fiber optics.
5. Ability to create new problems and solve with the help of applications used.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS:

| |
|---|
| <p><u>Unit I: Interference</u></p> <p>Coherent sources, conditions for sustained interference. Division of Wave-Front, Fresnel's Biprism, Division of Amplitude- Wedge-shaped film, Newton's Rings, Michelson Interferometer, applications, Resolution of closely spaced spectral lines, determination of wavelengths.</p> |
| <p><u>Unit II: Diffraction</u></p> <p>Difference between interference and diffraction, Fraunhofer and Fresnel diffraction, Zone Plate, Fraunhofer diffraction through a single slit, Plane transmission diffraction grating, absent spectra, dispersive power, resolving power and Rayleigh criterion of resolution.</p> |
| <p><u>Unit III: Polarization</u></p> <p>Polarized and unpolarised light, Uni-axial crystals double refraction, Nicol prism, quarter and half wave plates, Detection and Production of different types of polarized light, Polarimetry, Optical and specific rotation, Biquartz and Laurent's haled shade polar meter</p> |
| <p><u>Unit IV: Laser & Fibre Optics</u></p> <p>Absorption of radiation, spontaneous and stimulated emission, Laser action, Einstein Coefficient, characteristics of laser beam-concept of coherence, spatial and temporal coherence. He-Ne and semiconductor lasers (simple ideas), applications of Laser. Propagation of light in optical fibres, numerical aperture, V-number, single and multimode fibres, attenuation dispersion, applications.</p> |
| <p><u>Unit V: Nuclear Physics</u></p> <p>Introduction, Radioactivity, Alpha decay, Gama decay, Q value, Threshold energy, Nuclear reactions, Nuclear fission: Liquid drop model, Nuclear fusion, Particle accelerators: Linear accelerator, Cyclotron.</p> |
| <p><u>Unit VI: Theory of Relativity</u></p> <p>Introduction, Frame of reference, Galilean transformation, Michelson-Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Mass energy relation.</p> |

RECOMMENDED BOOKS:

| | |
|-----------------------|---|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Perspectives of Modern Physics, Arthur Beiser (TMH) 2. Modern Physics for Engineers, S.P. Taneja (R. Chand). 3. Modern Engineering Physics, A.S. Vasudeva (S. Chand). 4. Engineering Physics, SatyaPrakash (PragatiPrakashan). 5. Optics, Ajoy Ghatak (TMH). |
| REFERENCEBOOKS | <ol style="list-style-type: none"> 1. Fundamentals of Physics, Resnick & Halliday (Asian Book). 2. Introduction to Electrodynamics, D.J. Griffith (Prentice Hall). |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|-----------------|-----------|-----------------|---------------|-------|-----|-------|---------------|-----------|-----------|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | 1,2 ,3, 4 | 1,3 ,5 | 1,2 ,4, 5 | 1,2,3,4, 5 | 1,3,4 | 1,4 | 1,2,5 | 1, 3, 5 | 1,4 ,5 | 1,2 ,5 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory and 50 marks for practical.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 10 |
| 2. | Sessional Test | 2 | 30 |
| 3. | Group Discussion | 4 | 10 |
| 4. | End Semester Exam | 1 | 100 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 |
|-------------|---|---|---|---|---|
| Class Test | x | | x | | x |
| Quiz | | | x | | x |
| Assignment | x | x | | x | |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Applied Physics Lab I

L T P
0 0 2

| | |
|----------------------------|----------|
| MODULE CODE | PHYS0102 |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

OBJECTIVES:

1. To achieve knowledge and understanding on Modern Physics, their various properties and capabilities to model and solve wide range of problems in science and engineering.
2. To get familiar with concepts of interference and diffraction and develop ability to solve simple problems.
3. To understand polarization and their applications in engineering problems.
4. To learn basic concepts of different types of laser and its application in scientific problems.
5. To acquire knowledge of superconductivity implementation and assess their effectiveness in science and Technology.

LEARNING OUTCOMES:

1. Able to apply knowledge for finding wavelength of sodium, colours of white light using advanced technology.
2. Able to apply fundamental laws of superconductivity in engineering and technology.
3. Able to identify new problems and solve through different techniques.
4. Able to apply knowledge to understand the concepts of fiber optics.
5. Able to develop new experiment using advances technology.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS:

| |
|--|
| 1. To find the wavelength of sodium light by Newton's rings experiment. |
| 2. To find the wavelength of sodium light by Fresnel's biprism experiment. |
| 3. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating. |
| 4. To find the refractive index and Cauchy's constants of a prism by using spectrometer. |
| 5. To find the wavelength of sodium light by Michelson Interferometer. |
| 6. To find the resolving power of a telescope. |
| 7. To find the pitch of a screw using He-Ne laser. |
| 8. To find the specific rotation of sugar solution by using a polarimeter. |
| 9. To compare the capacitances of two capacitors by De'sauty bridge and hence to find the dielectric constant of a medium. |
| 10. To find the flashing and quenching potentials of Argon and also to find the capacitance of unknown capacitor. |
| 11. To study the photo-conducting cell and hence to verify the inverse square law. |
| 12. To find the temperature coefficient of resistance by using platinum resistance thermometer and Callendar and Griffiths bridge. |

RECOMMENDED BOOKS

| | |
|-------------------|--|
| TEXT BOOKS | 1. Advanced Practical Physics - B.L. Workshop and H.T. Flint (KPH) |
| REFERENCES | 1. Practical Physics - S.L. Gupta & V. Kumar (Pragati Prakashan). 2. Advanced Practical Physics Vol. I & II- Chauhan & Singh (Pragati Prakashan). |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|-------|-------|---------|-------|-----|-------|-----|-------|---|---|
| Course Learning Outcomes | 1,2,5 | 1,2,4 | 1,2,3,5 | 1,2,4 | 2,5 | 1,3,5 | 3,5 | 1,3,5 | 3 | 2 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks.

Practical

| Assessment # | Type of Assessment | Per Semester | Maximum Marks |
|---------------------|---------------------------|---------------------|----------------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Electrical Technology

L T P
2 0 0

| | |
|----------------------------|----------|
| MODULE CODE | ECEN1101 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 50 |
| END SEMESTER EXAM DURATION | 2 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: The Question paper will comprise of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B and Section C Comprise of short answer type and Long answer type questions and will have internal choices.

OBJECTIVES:

The aim of teaching this subject is to impart knowledge primarily related to application of electricity so that learner will be able to make basic electrical circuits in real life. Some of the objectives of the course are:

1. To acquire basic knowledge of Electric Networks.
2. To inculcate the knowledge of AC and DC fundamentals.
3. To enable to solve electric circuit using various theorems and methods.
4. To get familiar with the concept of three phase circuit and its various connections.
5. To understand the concept of resonance in electrical network.
6. To gain knowledge of construction and working of Transformer.
7. To get exposure about working of AC and DC machines.

LEARNING OUTCOMES:

1. Able to understand basic aspects of electrical technology used in any kind of industry.
2. Able to understand various electrical applications in day to day life.
3. Get familiar with working of various components of a circuit.
4. Ability to analyze the behavior of electrical parameters in different forms.
5. Able to measure various electrical parameters.
6. Able to know the difference between single phase and three phase electrical supply.
7. Acquiring problem solving skills.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS:

| |
|--|
| <p><u>Unit I: D.C. Network Laws</u> Ohm's Law, Kirchoff's Laws, Nodal and Loop methods of analysis Star to Delta & Delta to Star transformation.</p> |
| <p><u>Unit II: Network Theorems</u> Thevenin's theorem, Norton's theorem, superposition theorem, maximum power transfer theorem, Millman's theorem.</p> |
| <p><u>Unit III: Single Phase A.C. Circuits</u> Sinusoidal signal, instantaneous and peak values, RMS and average values, crest and peak factor, Concept of phase, representation-polar & rectangular.</p> |
| <p><u>Unit IV: Series and Parallel A.C. circuits</u> Series and Parallel A.C. circuits. Concept of active and reactive power, power factor, series and parallel resonance, Q factor, cut-off frequencies and bandwidth.</p> |
| <p><u>Unit V: Three Phase A.C. Circuits</u> Three phase A.C. circuit, star and delta connection, phase and line voltage and currents, balanced star and circuits, power equation, measurement of power by two wattmeter method, introduction to unbalanced circuits.</p> |
| <p><u>Unit VI: Transformers & Machines</u> Construction, EMF equation, ideal transformer, Phasor diagram on no load and full load, equivalent circuit, losses, regulation and efficiency, open and short circuit test. Introduction of AC and DC machines.</p> |

RECOMMENDED BOOKS:

| | |
|------------------------|---|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Electrical Technology (Vol-I), by B.L. Thareja & A. K. Thareja, S. Chand publications. 2. Electrical Technology (Vol-II), by B.L. Thareja & A. K. Thareja, S. Chand publications. 3. Basic Electrical Engineering, II edition, by V. N. Mittal & Arvind Mittal, TMH Publications. |
| REFERENCE BOOKS | <ol style="list-style-type: none"> 1. Electrical Engineering Fundamentals : Deltoro, PHI 2. Network Analysis ; Valkenburg, PHI. 3. Electrical and Electronic Technology (8th Edition): Hughes, Pearson. 4. A textbook of Electrical Technology, J. B. Gupta, Katson publication. 5. Electrical Technology by Mukesh Saini. |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 75 marks.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 05 |
| 2. | Sessional Test | 2 | 15 |
| 3. | Group Discussion | 4 | 05 |
| 4. | End Semester Exam | 1 | 50 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------|---|---|---|---|---|---|---|
| Class Test | | | | x | x | x | x |
| Quiz | x | x | x | | | | |
| Assignment | | x | x | | | x | x |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|-----|---|---|---|---|-----|---|-----|---|---|
| Course Learning Outcomes | 1,7 | 2 | 5 | 3 | | 1,6 | | 7,4 | | |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Electrical Technology Lab

L T P
0 0 2

| | |
|----------------------------|-------|
| MODULE CODE | |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

OBJECTIVES:

1. To get familiar with various measuring instruments.
2. To understand practical aspects of Network theorems.
3. To get familiar with major parts of electrical machines.
4. To aware students about precautionary measures of using Electrical supply.
5. To analyze different components of any electrical network.
6. To get familiar with the constructional part of transformer.

LEARNING OUTCOMES:

1. Creates implementation skills.
2. Able to measure various electrical parameters.
3. Able to understand various electrical applications in day to day life.
4. Get familiar with working environment of three phase electrical supply.
5. Ability to analyze the electrical connections.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

LIST OF EXPERIMENTS:

| | |
|--|--|
| 1. | To verify ohm's law. |
| 2. | To verify KCL and KVL. |
| 3. | To verify Thevenin's theorem. |
| 4. | To verify Norton theorem. |
| 5. | To verify superposition theorem. |
| 6. | To verify Maximum power transfer theorem. |
| 7. | To measure power and power factor by 3 voltmeter method. |
| 8. | To measure power and power factor by 3 ammeter method. |
| 9. | To study the construction of Transformer. |
| 10. | To study about function of multimeter. |
| Experiments based on advanced topics: | |
| 11. | To perform O.C. and S.C. tests of a transformer. |
| 12. | To study frequency response of a series R-L-C circuit and determine resonant frequency and Q-factor for various values of R, L, and C. |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------|--------------|--------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|---|-----|---|---|---|-----|---|-----|---|---|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | 3 | 2,4 | | 1 | 5 | 1,4 | | 1,2 | | 3 |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Fundamentals of Computers (with 'C')

L T P
4 0 0

| | |
|----------------------------|----------|
| MODULE CODE | CSEN0101 |
| CREDIT POINTS | 4 |
| FORMATIVE ASSESMENT MARKS | 50 |
| SUMMATIVE ASSESMENT MARKS | 100 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: The Question paper will comprise of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B and Section C Comprise of short answer type and Long answer type questions and will have internal choices.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to components of computers, computer languages and to enhance skills of programming in 'C' language as mentioned below:

1. To make students aware of the evolution of computers in different generations including its classification in different categories based on its capabilities.
2. To acquire knowledge on major components of computers hardware, software, data and processes.
3. To get familiar with concepts of microprocessor interfacing and its applications.
4. To achieve an understanding on basic concepts of operating system and networking.
5. To demonstrate the working of system software.
6. To understand syntax and semantics of 'C' programming language.
7. To enable learner to build logic for a given problem and finally develop programs.

LEARNING OUTCOMES:

1. Able to understand the evolution of computer and basic terminology.
2. Exposure to various hardware and software and their compatibilities.
3. Enhance the knowledge regarding components and connectors such as ports etc to enable communication between computers.
4. Able to understand the basic functionality of OS and the process of secured data management.
5. Ability to differentiate the class of system software, its functionality versus application software.
6. Ability to create programs involving file handling and to understand the scenario of sequential as well as random data retrieval approach.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS:

Unit I: Computers system and its fundamentals

Evolution of computers, hardware organization of a computer; Introduction to microprocessors, generations of microprocessors, Input/Output devices, Input/Output ports and connectors; Programming languages- machine language, assembly language, low level languages, high level languages, types of high level languages.

Unit II: System software

Translators- compiler, interpreter, assembler; Macros, Loader, Linker, Relationship between Compiler, Interpreter, Loader and Linker; Operating System-fundamentals of operating system, functions of operating system, classification of operating systems, basic introduction to DOS, UNIX/LINUX OS, Windows XP.

Unit III: An overview of 'C'

History of C, importance of C, basic structure of C programs, executing a 'C' program, character set, 'C' tokens, keywords and identifiers, constants, variables and data types, declaration of variables, declaration of storage class, operators and expressions, managing I/O operations, decision making with IF statement, the if..else statement, nesting of if...else statement, switch statement, conditional statement, GOTO statement, the while statement, the do statement, the for statement and jumps in loops.

Unit IV: Array, structure and union in 'C'

Arrays: one-dimensional arrays, two-dimensional arrays, multi-dimensional arrays, dynamic arrays, character arrays and strings, user defined functions, structure-definition and initialization, declaring variables, accessing structure members; copying and comparing structure variables; operations on individual members; array of structure; structure within structure; unions, size of structure.

Unit V: Functions in 'C'

Basics of functions, built-in and user defined functions, using string, Math and other built-in functions, advantages of using functions, working of a function, declaring, defining and calling user defined functions-The return statement, call by value and call by reference, function as an argument, recursion, advantages and disadvantages of recursion.

Unit VI: Pointers in 'C'

Pointers- accessing the address of a variable, declaration and initialization of pointer variables, accessing a variable through its pointer; pointer Expressions; pointer and arrays, pointer and character strings; arrays of pointer; pointers as function arguments; functions returning pointers; pointers to functions.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

RECOMMENDED BOOKS:

| | |
|------------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Fundamental of Computers and Programming with C, by A.K.Sharma, Dhanpat Rai Publications, Delhi. 2. Computer Networks (4th Edition), by Andrew S. Tanenbaum. 3. Balagurusamy-Programming in ANSI C. |
| REFERENCE BOOKS | <ol style="list-style-type: none"> 1. ANSI C, by Dennis Ritchi. 2. Balagurusamy-Programming in ANSI 'C'. |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory and 50 marks for practical.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 10 |
| 2. | Sessional Test | 2 | 30 |
| 3. | Group Discussion | 4 | 10 |
| 4. | End Semester Exam | 1 | 100 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------|---|---|---|---|---|---|
| Class Test | x | | x | | X | |
| Quiz | | | x | | X | X |
| Assignment | x | x | | x | | |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---|---|---|---|---|---|---|---|---|---|
| Course Learning Outcomes | 2 | 3 | 5 | 2 | 5 | 3 | | | | |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Fundamentals of Computers (with 'C') Lab

L T P
0 0 2

| | |
|----------------------------|----------|
| MODULE CODE | CSEN0102 |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESSMENT MARKS | 25 |
| SUMMATIVE ASSESSMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to components of computers, computer languages and to enhance skills of programming in 'C' language as mentioned below:

1. To acquire knowledge on a programming language.
2. To learn problem solving techniques.
3. To understand syntax and semantics of 'C' programming language.
4. To get familiar with program writing in C.
5. To enable learner to build logic for a given problem and finally develop programs.

LEARNING OUTCOMES:

1. Read, understand and trace the execution of programs in C language.
2. Ability to write code in C for a given algorithm.
3. Implement programs with pointers and arrays.
4. Perform pointer arithmetic, and use of pre-processor.
5. Write programs that perform operations using derived data types.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

LIST OF EXPERIMENTS

| | |
|--|--|
| 1. | Write a program to calculate Simple Interest. |
| 2. | Write a program to print largest of three numbers (if-then-else). |
| 3. | Write a program to print whether given number is prime or not. |
| 4. | Write basic programs illustrating Switch Case statement. |
| 5. | Write a program to print largest of ten numbers (for statement). |
| 6. | Write a program to implement matrix multiplication. |
| 7. | Write a program to print Fibonacci Series. |
| 8. | Write a program to print factorial of a number. |
| 9. | Write a program to implement different string functions. |
| 10. | Write a program to check whether a string is palindrome or not. |
| 11. | Write a program to swap two numbers using call by reference and call by value. |
| 12. | Write a program to create records of student (Name, Roll No., DOB and Marks) using struct and union. |
| Experiments based on advanced topics: | |
| 13. | Write a program to determine the length of a character string using pointers. |
| 14. | Write a C program to count the lines, words and characters in a given text. |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------|--------------|--------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---|---|---|---|-----|---|---|---|---|---|
| Course Learning Outcomes | 3 | 2 | 4 | 1 | 1,2 | | | | | |

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

French Language – Part 1

L T P
2 0 0

| | |
|----------------------------|----------|
| MODULE CODE | LANF0101 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 50 |
| END SEMESTER EXAM DURATION | 2 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in French language and to enhance skills as mentioned below:

1. To prepare students to develop basic understanding on French language.
2. To acquire knowledge on French grammar.
3. To understand syntax and semantics of language.
4. To achieve an understanding on basic communication in French language.
5. To understand a dialogue between two native speakers and also take part in short, simple conversations using the skills acquired.

LEARNING OUTCOMES:

1. Able to understand the basic grammar of French language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the basics of French language.
4. Able to understand the French history.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS

UNIT I:- BASIC COMMUNICATION – This module will develop oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -

- Establish contact with someone
- Introduce self and others
- Greet, congratulate, and express condolences
- Spell
- Count
- Exchange simple information on self, preferences, feelings, plans, dreams
- Ask for information
- Tell the time
- Advice, order, suggest
- Buy, sell
- Make a reservation
- Order food or any article
- Invite, accept or refuse invitation
- Fix an appointment
- Locate a place
- Give directions
- Give chronological order of events
- Prepare an itinerary
- Ask for / Give explanations
- Describe a person, an object, an event, a place
- Describe the weather
- Compare

UNIT II: BASIC PHONETICS – This module will develop the ability in the students: -

- To pronounce words, say sentences, questions and give orders using the right accent and intonation.
- To express surprise, doubt, fear, displeasure and all positive or negative feelings using the right intonation
- To use ‘liaison’ and ‘enchainment’
- To distinguish voiced and unvoiced consonants
- To distinguish between vowel sounds

UNIT III: BASIC GRAMMAR & FORMATION OF SENTENCES – This module will develop the ability in the students to construct sentences and frame questions using: -

- Nouns – gender and number
- Articles – definite and indefinite, partitif, articles contractés
- Pronouns – personal, relative (qui, que, où), y, en
- Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

tenses (indicative mood) – present, present continuous, simple future, immediate future, recent past, simple past, past continuous

- Verbs – the imperative mood
- Adjectives – numeric, qualitative, possessive, demonstrative, interrogative – gender and number
- Adverbs – simple adverbs of time, place, quantity
- Prepositions – simple prepositions (place, time)
- Interrogation – interrogative words, interrogative phrases, inversion

RECOMMENDED BOOKS:

| | |
|------------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Nouveau Sans Frontières 1 by Philippe Dominique & Jacky Girardet 2. “CONNEXIONS-1” by Regine Merieux & Yves Loiseau Published by Didier. |
| REFERENCE BOOKS | <ol style="list-style-type: none"> 3. Five in one Multilingual Glossary, published by Saraswati House Pvt. Ltd. New Delhi 2011. |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---|---|---|---|---|---|---|---|---|-----|
| Course Learning Outcomes | | | | | | | | | | 1,2 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 75 marks for theory.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------------|--------------|--------------|
| 1. | Class Test | 1 | 10 |
| 2. | Sessional Test | 2 | 15 |
| 3. | End Semester Written Exam | 1 | 50 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 |
|-------------|---|---|---|---|
| Class Test | x | x | x | |
| Quiz | x | x | x | |
| Assignment | | | x | x |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

German Language – Part 1

L T P
2 0 0

| | |
|----------------------------|----------|
| MODULE CODE | LANG0102 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 50 |
| END SEMESTER EXAM DURATION | 2 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in German language and to enhance skills as mentioned below:

1. To prepare students to develop basic understanding on German language.
2. To acquire knowledge on German grammar.
3. To understand syntax and semantics of language.
4. To achieve an understanding on basic communication in German language.
5. To understand a dialogue between two native speakers and also take part in short, simple conversations using the skills acquired.

LEARNING OUTCOMES:

1. Able to understand the basic grammar of German language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the basics of German language.
4. Able to understand the German history.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS

UNIT I:- BASIC COMMUNICATION – This module will develop oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -

- Establish contact with someone
- Introduce self and others
- Greet, congratulate, and express condolences
- Spell
- Count
- Exchange simple information on self, preferences, feelings, plans, dreams
- Ask for information
- Tell the time
- Advice, order, suggest
- Buy, sell
- Make a reservation
- Order food or any article
- Invite, accept or refuse invitation
- Fix an appointment
- Locate a place
- Give directions
- Give chronological order of events
- Prepare an itinerary
- Ask for / Give explanations
- Describe a person, an object, an event, a place
- Describe the weather
- Compare

UNIT II: BASIC PHONETICS – This module will develop the ability in the students: -

- To pronounce words, say sentences, questions and give orders using the right accent and intonation.
- To express surprise, doubt, fear, displeasure and all positive or negative feelings using the right intonation
- To use ‘liaison’ and ‘enchainment’
- To distinguish voiced and unvoiced consonants
- To distinguish between vowel sounds

UNIT III: BASIC GRAMMAR & FORMATION OF SENTENCES – This module will develop the ability in the students to construct sentences and frame questions using: -

- Nouns – gender and number
- Articles – definite and indefinite, articles
- Pronouns – personal, relative
- Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

- tenses (indicative mood) – present, present continuous, simple future, immediate future, recent past, simple past, past continuous
- Verbs – the imperative mood
 - Adjectives – numeric, qualitative, possessive, demonstrative, interrogative – gender and number
 - Adverbs – simple adverbs of time, place, quantity
 - Prepositions – simple prepositions (place, time)
 - Interrogation – interrogative words, interrogative phrases, inversion

RECOMMENDED BOOKS:

| | |
|------------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Tangram, Kursbuch und Arbeitsbuch, 1A, 1B & 2A, Max Hueber Verlag 2. Tangram, Kursbuch und Arbeitsbuch, 2B, 3A & 3B, Max Hueber Verlag |
| REFERENCE BOOKS | <ol style="list-style-type: none"> 1. em Abschlusskurs, Kursbuch und Arbeitsbuch, Max Hueber Verlag |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---|---|---|---|---|---|---|---|---|-----|
| Course Learning Outcomes | | | | | | | | | | 1,2 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 75 marks for theory.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------------|--------------|--------------|
| 1. | Class Test | 1 | 10 |
| 2. | Sessional Test | 2 | 15 |
| 3. | End Semester Written Exam | 1 | 50 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 |
|-------------|---|---|---|---|
| Class Test | x | x | x | |
| Quiz | x | x | x | |
| Assignment | | | x | x |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER-I

Spanish Language – Part 1

L T P
2 0 0

| | |
|----------------------------|----------|
| MODULE CODE | LANS0103 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 50 |
| END SEMESTER EXAM DURATION | 2 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in Spanish language and to enhance skills as mentioned below:

1. To prepare students to develop basic understanding on Spanish language.
2. To acquire knowledge on Spanish grammar.
3. To understand syntax and semantics of language.
4. To achieve an understanding on basic communication in Spanish language.
5. To understand a dialogue between two native speakers and also take part in short, simple conversations using the skills acquired.

LEARNING OUTCOMES:

1. Able to understand the basic grammar of Spanish language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the basics of Spanish language.
4. Able to understand the Spanish history.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS

UNIT I:- BASIC COMMUNICATION – This module will develop oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -

- Establish contact with someone
- Introduce self and others
- Greet, congratulate, and express condolences
- Spell
- Count
- Exchange simple information on self, preferences, feelings, plans, dreams
- Ask for information
- Tell the time
- Advice, order, suggest
- Buy, sell
- Make a reservation
- Order food or any article
- Invite, accept or refuse invitation
- Fix an appointment
- Locate a place
- Give directions
- Give chronological order of events
- Prepare an itinerary
- Ask for / Give explanations
- Describe a person, an object, an event, a place
- Describe the weather
- Compare

UNIT II: BASIC PHONETICS – This module will develop the ability in the students: -

- To pronounce words, say sentences, questions and give orders using the right accent and intonation.
- To express surprise, doubt, fear, displeasure and all positive or negative feelings using the right intonation
- To use ‘liaison’ and ‘enchainment’
- To distinguish voiced and unvoiced consonants
- To distinguish between vowel sounds

UNIT III: BASIC GRAMMAR & FORMATION OF SENTENCES – This module will develop the ability in the students to construct sentences and frame questions using: -

- Nouns – gender and number
- Articles – definite and indefinite, articles
- Pronouns – personal, relative
- Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

tenses (indicative mood) – present, present continuous, simple future, immediate future, recent past, simple past, past continuous

- Verbs – the imperative mood
- Adjectives – numeric, qualitative, possessive, demonstrative, interrogative – gender and number
- Adverbs – simple adverbs of time, place, quantity
- Prepositions – simple prepositions (place, time)
- Interrogation – interrogative words, interrogative phrases, inversion

RECOMMENDED BOOKS:

| | |
|------------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Aula Internacional 1 and 2, Novellas and short stories 2. Aula Internacional 3, España and Latinoamérica: Historia y Cultura, Novellas |
| REFERENCE BOOKS | <ol style="list-style-type: none"> 1. Español sin fronteras, I, SGEL, 1997 2. Nuevo Ven I, Edelsa 2004 |

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|---|---|---|-----|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | | | | | | | | | | 1,2 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 75 marks for theory.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------------|--------------|--------------|
| 1. | Class Test | 1 | 10 |
| 2. | Sessional Test | 2 | 15 |
| 3. | End Semester Written Exam | 1 | 50 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 |
|--------------------|----------|----------|----------|----------|
| Class Test | x | x | x | |
| Quiz | x | x | x | |
| Assignment | | | x | x |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

SEMESTER - II

| MODULE CODE | CATEGORY | SUB-CATEGORY | MODULE | L | T | P | C | Internal Marks | External Marks | Total Marks |
|--------------|----------|--------------|--------------------------------------|-----------|----------|-----------|-----------|----------------|----------------|-------------|
| PHYS0103 | G | | APPLIED PHYSICS-II | 3 | 1 | 0 | 3.5 | 50 | 100 | 150 |
| PHYS0104 | G | | APPLIED PHYSICS LAB – II | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| ECEN0104 | G | | BASICS OF ELECTRONICS | 2 | 0 | 0 | 2 | 25 | 50 | 75 |
| ECEN0105 | G | | BASICS OF ELECTRONICS LAB | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| MECH0102 | G | | BASICS OF MECHANICAL ENGINEERING | 2 | 0 | 0 | 2 | 25 | 50 | 75 |
| MECH0103 | G | | BASICS OF MECHANICAL ENGINEERING LAB | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| MECH1102 | G | | WORKSHOP TECHNOLOGY LAB | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| CIVL0101 | G | | BASICS OF CIVIL ENGINEERING | 2 | 0 | 0 | 2 | 25 | 50 | 75 |
| CIVL0102 | G | | BASICS OF CIVIL ENGINEERING LAB | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| MATH0116 | G | | APPLIED MATHEMATICS-II | 4 | 1 | 0 | 4.5 | 50 | 100 | 150 |
| MATH0117 | G | | NUMERICAL METHODS | 3 | 0 | 0 | 3 | 25 | 75 | 100 |
| VALU1019 | G | | VALUE EDUCATION | 2 | 0 | 0 | 2 | 25 | 50 | 75 |
| CSEN1107 | G | | PC LAB | 0 | 0 | 2 | 1 | 25 | 25 | 50 |
| | G | | FOREIGN LANGUAGE PART- II # | 2 | 0 | 0 | 2 | 25 | 50 | 75 |
| TOTAL | | | | 20 | 2 | 12 | 27 | 400 | 675 | 1075 |

FOREIGN LANGUAGE

| MODULE CODE | MODULE NAME |
|-------------|-------------|
| LANF0104 | FRENCH |
| LANG0105 | GERMAN |
| LANS0106 | SPANISH |

- L = Lecture**
T = Tutorial
P = Practical
C = Credit Point

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Applied Physics II

L T P
3 1 0

| | |
|----------------------------|----------|
| MODULE CODE | PHYS0103 |
| CREDIT POINTS | 3.5 |
| FORMATIVE ASSESMENT MARKS | 50 |
| SUMMATIVE ASSESMENT MARKS | 100 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: In total EIGHT questions will be set. Question ONE will be compulsory and will cover all units. Remaining seven questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to solid state physics, crystal geometries, quantum physics, nano-science, energy bands and electromagnetic theory to enhance skills in the field of electricity and magnetism and its applications as mentioned below:

1. To achieve knowledge and understanding on soli-state physics, various properties of crystals to model and solve wide range problems in science and engineering.
2. To get familiar with concepts of micro and nano scales of materials and develop ability to solve simple problems.
3. To understand the concepts of electricity and magnetism, distribution of solids according to band theory, free electrons, and applications of maxwell's equation in engineering problems.
4. To learn basic concepts of different types of magnetic properties of solids in scientific problems.
5. To acquire knowledge of crystal structure and assess their effectiveness in science and Technology.

LEARNING OUTCOMES:

1. Able to apply knowledge in developing advanced materials and devices.
2. Able to apply fundamental laws of electricity and magnetism in engineering.
3. Able to identify and solve crystal structure and semiconductor physics problems.
4. Able to solve applications based on Maxwell's equation
5. Able to apply knowledge to understand the concepts of quantum physics.
6. Able to identify and solve concepts related to nano particles.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

COURSE CONTENT:

UNIT I: Crystal Structure

Space lattice, unit cell and translation vector, Miller indices, simple crystal structure. Laue's treatment to Bragg's law, powder method, point defects in solids- Schottky and Frenkel defects, Bonding in solids ionic and covalent bonds.

UNIT II: Quantum Physics

Difficulties with classical physics, introduction to quantum mechanics simple concepts, Black body radiations Discovery of Planck's constant, phase velocity and group velocity. Schrodinger wave equations-time dependent and time independent, Expectation value, Ehrenfest Theorem, particle in a one-dimensional box. Quantum Statistics, Bose-Einstein and Fermi-Dirac Statistics, Elementary ideas of quark, gluons and hadrons.

UNIT III: Nano-Science

Features of nano-systems, concept of quantum size effect, quantum dots and their applications.

Free Electron Theory: Elements of classical free electron theory and its limitations. Drude's theory of conduction, quantum theory of free electrons, Fermi level, density of states, Fermi-Dirac distribution function, Thermionic emission, Richardson's equation.

UNIT IV: Band Theory of Solids

Origin of energy bands, Kronig-Penny model (qualitative) E-K diagrams, Brillouin Zones, Concept of effective mass and holes. Classification of solids into metals, semiconductors and insulators. Fermi energy and its variation with temperature. Hall Effect and its applications.

UNIT V: Green Energy

Introduction to Green energy, types of green energy, energy conversion mechanisms for solar energy, wind energy, ocean energy and geothermal energy.

UNIT VI: Electro Magnetic Theory

Gradient, Divergence, Curl, Gauss' law, Ampere's Law, Continuity equation, Maxwell's equation (differential and integral forms), Significance of Maxwell's equations, Poynting Theorem, Electromagnetic wave propagation in dielectrics and conductors.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

RECOMMENDED BOOKS:

| | |
|-----------------------|---|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Concepts of Modern Physics, Arthur Beiser (TMGH) 2. Solid State Physics, S.O. Pillai (New Age Int. Ltd. Pub.) 3. Modern Physics for Engineers, S.P. Taneja (R. Chand) 4. Modern Engineering Physics, A.S. Vasudeva (S. Chand) |
| REFERENCEBOOKS | <ol style="list-style-type: none"> 1. Introduction to Solid State Physics, Kittel (John Wiley) 2. Quantum Mechanics, A. Ghatak 3. A Textbook of Engineering Physics, Avadhanulu and Kshisagar (S. Chand) |

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|-----|---|---|---|-------|-----|-----|-----|-----|-----|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | 1,3 | 1 | 1 | 1 | 1,2,6 | 1,4 | 1,2 | 1,5 | 2,3 | 1,2 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 150 marks for theory and 50 marks for practical.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 10 |
| 2. | Sessional Test | 2 | 30 |
| 3. | Group Discussion | 4 | 10 |
| 4. | End Semester Exam | 1 | 100 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------|---|---|---|---|---|---|
| Class Test | x | | x | | x | |
| Quiz | | | x | | x | x |
| Assignment | x | x | | x | | |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Applied Physics Lab II

L **T** **P**
0 0 2

| | |
|----------------------------|----------|
| MODULE CODE | PHYS0104 |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

OBJECTIVES

1. To achieve the practical knowledge of low and high resistance and resistance of galvanometer by different methods.
2. To be able to find characteristic of a solar cell, V-I of a p-n diode and to find the fill factor and e/m for electrons by helical method.
3. To get familiar with ionization potential of Argon/Mercury using a thyratron tube and find the radius of coil by Stewart and Gee's apparatus.
4. To have knowledge of hysteresis loss by tracing a B-H curve.
5. To obtain the Planck's constant, co-efficient of self-inductance by using a Rayleigh bridge, Hall Co-efficient of semi-conductor.
6. To obtain band gap of intrinsic semi-conductor using four probe method.

LEARNING OUTCOMES:

1. Able to apply knowledge for finding the characteristics of solar cells and their applications.
2. Able to apply fundamental laws of superconductivity in engineering and technology.
3. Able to identify new problems and solve through different techniques.
4. Able to apply knowledge to understand the concepts of p-n junction diode.
5. Able to develop new experiment using advances technology.

COURSE CONTENT

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

| | |
|---|---|
| 1. | To find the low resistance by Carey-Foster's bridge. |
| 2. | To find the resistance of a galvanometer by Thomson's constant deflection method using a post office box. |
| 3. | To find the value of high resistance by Substitution method. |
| 4. | To find the value of high resistance by Leakage method. |
| 5. | To study the characteristics of a solar cell and to find the fill factor. |
| 6. | To find the value of e/m for electrons by Helical method. |
| 7. | To find the ionisation potential of Argon/Mercury using a thyratron tube. |
| 8. | To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee's apparatus. |
| 9. | To study the characteristics of (Cu-Fe, Cu-Constantan) thermo couple. |
| 10. | To find the value of Planck's constant by using a photo electric cell. |
| 11. | To find the value of Co-efficient of self-inductance by using a Rayleigh bridge. |
| 12. | To find the value of Hall Co-efficient of semi-conductor. |
| 13. | To study the V-I characteristics of a p-n diode. |
| 14. | To find the band gap of intrinsic semi-conductor using four probe method. |
| 15. | To calculate the hysteresis loss by tracing a B-H curve. |
| Note: At least 12 experiments out of the list must be done in the semester. | |

RECOMMENDED BOOKS

| | |
|------------------------|--|
| TEXT BOOKS | 3. Advanced Practical Physics, B.L. Workshop and H.T. Flint (KPH) |
| REFERENCE BOOKS | 4. Practical Physics, S.L. Gupta & V. Kumar (Pragati Prakshan). 5. Advanced Practical Physics Vol. I & II – Chauhan & Singh (Pragati Prakshan). |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|-----|-----|-------|-------|-----|-----|-------|-------|-----|---|
| Course Learning Outcomes | 1,5 | 2,4 | 2,3,5 | 1,2,4 | 1,5 | 3,4 | 2,3,5 | 1,2,4 | 4,5 | 1 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks.

Practical

| Assessment # | Type of Assessment | Per Semester | Maximum Mark |
|---------------------|---------------------------|---------------------|---------------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Basics of Electronics

L T P
2 0 0

| | |
|----------------------------|--------------|
| MODULE CODE | ECEN0104 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 50 |
| END SEMESTER EXAM DURATION | 1 hr 30 mins |
| LAST REVISION DATE | |

INSTRUCTIONS: The Question paper will comprise of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B and Section C Comprise of short answer type and Long answer type questions and will have internal choices.

OBJECTIVES:

The aim of teaching this subject is to impart knowledge primarily related to electronic circuitry so that learner may found it's applications in real life. Some of the objectives of the course are:

1. To acquire knowledge about semiconductor physics for intrinsic and extrinsic materials.
2. To get familiar with different type of electronic displays.
3. To acquire the knowledge of basic digital circuitry.
4. To analyze the performance of negative as well as positive feedback circuits.
5. To describe the scientific principles that apply to the basic flow of electricity and explain the function of various materials used as conducting, semiconducting, and insulating devices in the construction of standard electronic circuits.

LEARNING OUTCOMES:

1. Able to appreciate the significance of electronics in different applications.
2. Able to apply method and appropriate technology to the study of physical science.
3. Able to compile the different building blocks in digital electronics using logic gates and implement simple logic function using basic universal gates.
4. Acquiring problem solving skills.
5. Get familiar with working of various components of a circuit.
6. Get familiar with measurement devices for example CRO, multi meter.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS:

| |
|--|
| <p><u>Unit I: Semiconductor Physics</u> Basic concepts, Intrinsic and extrinsic semiconductors, diffusion and drift currents, p-n junction under open- circuit, reverse bias and forward-bias conditions, p-n junction in the breakdown region, Ideal diode.</p> |
| <p><u>Unit II: Amplifiers</u> Introduction of different types of amplifiers and their characteristics, Principle of amplification, concept of feedback in amplifiers, frequency response of RC coupled amplifiers.</p> |
| <p><u>Unit III: Oscillators</u> Criteria for oscillations, study of different types of oscillators.</p> |
| <p><u>Unit IV: Digital Electronics</u> Binary, Octal and Hexadecimal number system and conversions, Boolean Algebra, Truth tables of logic gates (AND, OR, NOT) NAND, NOR as universal gates.</p> |
| <p><u>Unit V: Electronics Instruments</u> Role, importance and applications of general purpose test instruments viz Multimeter Digital and Analog, Cathode Ray Oscilloscope (CRO), and Function/Signal Generator</p> |
| <p><u>Unit VI: Display</u> Seven segment display, Fourteen segment display, and Dot matrix display. LED Display: Introduction, Construction, and Advantage of LEDs in electronics display. LCD Display: Introduction, Types of LCD display- Dynamic scattering and field effect type; Types of liquid crystal cells: Transmitting type and reflective type, advantage and disadvantage of LCD display.</p> |

RECOMMENDED BOOKS:

| | |
|-----------------------|---|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Electronic Devices & Circuits - Boylstad & Nashelsky. 2. J.S Katre “Basic Electronics” Tech Max Publications 3. J.B Gupta, “Basic Electronics” S K kataria and sons |
| REFERENCEBOOKS | <ol style="list-style-type: none"> 1. Electrical and Electronic Technology (8th Edition): Hughes, Pearson. 2. Cooper and Helfrick, "Modern Electronic Instrumentation and Measuring Techniques", 4th print Prentice Hall of India, New Delhi (1996). 3. Cooper and Helfrick, "Modern Electronic Instrumentation and Measuring Techniques", 4th print Prentice Hall of India, New Delhi (1996). |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 75 marks.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 05 |
| 2. | Sessional Test | 2 | 15 |
| 3. | Group Discussion | 4 | 05 |
| 4. | End Semester Exam | 1 | 50 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------|---|---|---|---|---|---|
| Class Test | x | | | x | | |
| Quiz | x | | x | | | x |
| Assignment | | x | | | x | x |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---|---|---|-----|---|---|-----|---|---|---|
| Course Learning Outcomes | 2 | 1 | 3 | 1,2 | 4 | | 5,6 | 5 | | |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Basics of Electronics Lab

L T P
0 0 2

| | |
|----------------------------|----------|
| MODULE CODE | ECEN0105 |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

OBJECTIVES:

1. To understand the practical aspects of basic electronics theory.
2. To Design and construct simple electronic circuits to accomplish a specific function
3. To understand the working of CRO and other measuring instruments.
4. To understand input and output characteristics of Bi-polar junction transistor.
5. To get familiar with ideal and practical characteristics of IC 741.
6. To provide experimental validation of the elementary analogue circuitry using analogue and digital testers.
7. To learn operation of electronic displays.
8. To understand their capabilities and limitations and make decisions regarding their best utilization in a specific situation.

LEARNING OUTCOMES:

- 1 Identify the basic tools and test equipment used to construct, troubleshoot, and maintain standard electronic circuits and systems.
- 2 Able to verify the working of diodes, transistors and their applications.
- 3 Able to design various basic circuits of digital electronics using simple gates and capable to work on IC 741.
- 4 Get familiar with the operation and applications of cathode ray oscilloscope.
- 5 To generate signals using function generator.
- 6 Build a common emitter/base/collector amplifier and measure its voltage gain.
- 7 Explore the operation and advantages of operational amplifiers.
- 8 Exploring the circuitry which converts an analog signal to digital signal.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

LIST OF EXPERIMENTS:

| | |
|--|---|
| 1. | To get familiar with the working knowledge of the following instruments : a) Cathode ray oscilloscope (CRO) b) Multi meter (Analog and Digital) c) Function generator. |
| 2. | a) Plot the forward and reverse V-I characteristics of P-N junction diode. b) Study of Zener diode in breakdown region. |
| 3. | To plot and study the input and output characteristics of BJT in common-emitter configuration |
| 4. | Verification of truth tables of logic gates (OR, AND, NOT, NAND, NOR). |
| 5. | To get familiar with the working and use of seven-segment display. |
| 6. | Verification of truth tables of flip-flops (S-R,. J-K). |
| 7. | To measure phase difference between two waveforms using CRO. |
| 8. | To find frequency response of a given amplifier and calculate its bandwidth. |
| 9. | To get familiar with pin-configuration of typical op-amp (741)and its use as : a) Inverting amplifier b) Non-inverting amplifier c) Summing amplifier d) Difference amplifier |
| 10. | Use of op-amp as a) Integrator b) Differentiator |
| Experiments based on advanced topics: | |
| 11. | To assemble and test 5V/9 V DC regulated power supply and find its line-regulation and load-regulation |
| 12. | To assemble Wein Bridge oscillator circuit and calculation of oscillation frequency and its verification from the observed output. |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

| Assessment # | Type of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------|--------------|--------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---|---|-----|---|---|-----|-------|-----|---|---|
| Course Learning Outcomes | 4 | 1 | 2,3 | 1 | 3 | 3,5 | 6,8,7 | 4,5 | | |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Basics of Mechanical Engineering

L **T** **P**
2 0 0

| | |
|----------------------------|-------------|
| MODULE CODE | MECH0102 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 50 |
| END SEMESTER EXAM DURATION | 1 hr 30 min |
| LAST REVISION DATE | |

INSTRUCTIONS: The Question paper will comprise of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B and Section C comprise of short answer type and Long answer type questions and will have internal choices.

OBJECTIVES:

1. To have an understanding of fundamental concepts of thermodynamics system and its properties.
2. To develop an ability to identify, formulate, and solve engineering problems.
3. To achieve an ability to use the techniques, skill, and modern engineering tools necessary for engineering practice.
4. An ability to work professionally in both thermal and mechanical systems areas.
5. Apply their mechanical engineering education to address the full range of technical and societal problems with creativity, imagination, confidence and responsibility.
6. To understand multiple integrals and their applications in engineering problems.

LEARNING OUTCOMES:

1. Able to apply knowledge of mathematics, science, and engineering.
2. An ability to design and conduct experiments, as well as to analyze and interpret data.
3. Enhance the knowledge about how to identify, formulate, and solve engineering problems.
4. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
5. Able to design and conduct experiments; analyze results.
6. Recognize and understand contemporary issues and the role of professionals in global society.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

COURSE CONTENT:

| |
|--|
| <p><u>Unit I: Introduction to Machine tools</u></p> <p>Introduction to Machine Tool to Commonly used Machine Tools in a Workshop: - Lathe, Shaper, Planer, Milling, Drilling, Slotter. Introduction to Metal Cutting.</p> |
| <p><u>Unit II: Basic concept of thermodynamics</u></p> <p>Basic concept of thermodynamics, Introduction, States, Work, Heat, Temperature, Zeroth, 1st, 2nd and 3rd law of thermodynamics, Concept of internal energy, enthalpy and entropy. Problems Properties of Steam & Steam Generator Formation of steam at constant pressure, Thermodynamic properties of Steam, Use of steam tables, Measurement of dryness fraction by throttling calorimeter.</p> |
| <p><u>Unit III : Refrigeration & Air-conditioning</u></p> <p>Introduction to refrigeration and air -conditioning, Rating of refrigeration machines, Coefficient of performance, Simple refrigeration vapour compression cycle, Psychrometric charts and its use, Human comforts.</p> |
| <p><u>Unit IV: Hydraulic Turbines & Pumps</u></p> <p>Introduction, Classification, Construction details and working of Pelton, Francis and Kaplan turbines, Specific speed and selection of turbines, Classification of water pumps and their working.</p> |
| <p><u>Unit V: Power Transmission Methods and Devices</u></p> <p>Introduction to Power transmission, Belt, Rope, Chain and Gear drive. Types and functioning of clutches. Introduction to Manufacturing Systems, Fundamentals of Numerical Control (NC), Advantage of NC systems, Classifications of NC, Comparison of NC and CNC.</p> |
| <p><u>Unit VI : Stresses and Strains</u></p> <p>Introduction, Concept & types of Stresses and strains, Poisson's ratio, stresses and strains in simple and compound bars under axial, flexure & torsional loading, Stress- strain diagrams, Hooks law, Elastic constants & their relationships.</p> |

RECOMMENDED BOOKS:

| | |
|------------------|--|
| TEXT BOOK | <ol style="list-style-type: none"> 1. Elements of Mechanical Engineering – R.K.Rajput Lakmi Pub., Delhi 2. Elements of Mechanical Engineering – D.S. Kumar, S.K. Kataria and Sons 3. Engineering Thermodynamics- P.K.Nag TMH, New Delhi 4. Refrigeration & Airconditioning – Arora & Domkundwar, Dhanpatrai & co.pvt ltd |
| REFERENCE | <ol style="list-style-type: none"> 1. Hydraulic Machines – Jagdish Lal, Pub.- Metropolitan, Allahbad. 2. Strength of Materials - G.H. Ryder, Pub.- ELBS. 3. Hydraulic and Fluid Mechanics – Modi and Seth, Pub. – Standard Book House, New Delhi 4. Engineering Thermodynamics – C.P. Arora, Pub. - TMH, New Delhi. |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 75 marks for theory.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 05 |
| 2. | Sessional Test | 2 | 15 |
| 3. | Group Discussion | 4 | 05 |
| 4. | End Semester Exam | 1 | 50 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 | 6 |
|-------------|---|---|---|---|---|---|
| Class Test | x | | x | | x | |
| Quiz | | | x | | x | x |
| Assignment | x | x | | x | | |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---|---|---|-----|---|---|---|---|---|---|
| Course Learning Outcomes | 2 | 5 | | 2,4 | 4 | 3 | 6 | 2 | | 3 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Basics of Mechanical Engineering Lab

L T P
0 0 2

| | |
|----------------------------|----------|
| MODULE CODE | MECH0103 |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESSMENT MARKS | 25 |
| SUMMATIVE ASSESSMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs. |
| LAST REVISION DATE | |

OBJECTIVES:

1. To learn effective engineering communication.
2. Ability to work in teams on multidisciplinary projects in industry and research organizations.
3. Develop awareness of the ethical, professional and environmental implications of work in a global and societal context.
4. To learn modern engineering tools, techniques, skills and contemporary engineering practice, necessary for engineering work.
5. Have an understanding to solve mechanical engineering problems based on data interpretation, design, experiment and analysis of results.

LEARNING OUTCOMES:

1. Able to apply knowledge of mathematics (including differential equations and statistics), physical and life sciences, and engineering to carry out analysis and design to solve problems at the interface of engineering and biology.
2. Exposure to design and conduct experiments, as well as to measure, analyze and interpret data from living systems.
3. Ability to design a system, component, or process to meet desired needs, including systems that involve the interaction between living and non-living materials.
4. Ability to identify, formulate, and adapt engineering solutions to unmet biological needs.
5. Ability to create the techniques, skills, and modern engineering tools necessary for engineering practice, including the ability to model and analyze biological systems as engineering systems.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

LIST OF EXPERIMENTS

| | |
|-----|---|
| 1. | To study the Cochran and Babcock & Wilcox boilers. |
| 2. | To study the working and function of mountings and accessories in boilers. |
| 3. | To study Two-Stroke & Four-Stroke Diesel Engines. |
| 4. | To Study Two-Stroke & Four-Stroke Petrol Engines. |
| 5. | To study the vapour compression Refrigeration System and determination of its C.O.P. |
| 6. | To study the functioning of Window Room Air Conditioner. |
| 7. | To study the constructional features and working of Pelton Wheel Turbine, Francis Turbine and Kaplan Turbine. |
| 9. | To calculate the Mechanical Advantage, Velocity Ratio and Efficiency of Single Start, Double |
| 10. | Start and Triple Start Worm Wheel. |
| 11. | To calculate Mechanical Advantage, Velocity Ratio and Efficiency of Single Purchase and Double purchase winch crab and plot graphs. |

RECOMMENDED BOOKS:

| | |
|------------------|---|
| TEXT BOOK | <ol style="list-style-type: none">1. Elements of Mechanical Engineering – R.K.Rajput Lakmi Pub., Delhi.2. Elements of Mechanical Engineering – D.S.Kumar, S.K. Kataria and Sons. |
| REFERENCE | <ol style="list-style-type: none">1. Strength of Materials - G.H. Ryder, Pub.- ELBS.2. Hydraulic and Fluid Mechanics – Modi and Seth, Pub. – Standard Book House, New Delhi. |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------|--------------|--------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|-----|---|-----|---|-----|---|---|---|---|---|
| Course Learning Outcomes | 3,4 | 2 | 3,5 | 1 | 1,2 | | 4 | | 3 | |

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Workshop Technology Lab

L T P
0 0 2

| | |
|----------------------------|----------|
| MODULE CODE | MECH1102 |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs. |
| LAST REVISION DATE | |

OBJECTIVES:

1. To practice workshop safety rules effectively.
2. To acquire knowledge and use simple hand tools.
3. To acquire knowledge and use simple measuring and gauging instruments.
4. To operate simple drilling machines for producing small holes.
5. To understand about various machine tools for producing simple metal components and articles.

LEARNING OUTCOMES:

1. Able to understand applications of hand tools and power tools.
2. Able to get familiar with operations of machine tools.
3. Ability to select the appropriate tools required for specific operation.
4. Exposure to safety measures required to be taken while using the tools.
5. Ability to acquire knowledge and practice on foundry, forging and welding.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

COURSE CONTENT:

| | |
|----|--|
| 1 | To study different types of measuring tools used in metrology and determine least counts of vernier calipers, micrometers and vernier height gauges. |
| 2 | To study different types of machine tools (lathe, shape or planer of slotter, milling, drilling machines). |
| 3 | To prepare a job on a lathe involving facing, outside turning, taper turning, step turning, radius making and parting-off. |
| 4 | To study different types of fitting tools and marking tools used in fitting practice. |
| 5 | To prepare lay out on a metal sheet by making and prepare rectangular tray pipe shaped components e.g. funnel. |
| 6 | To prepare joints for welding suitable for bull welding and lap welding. |
| 7 | To perform pipe welding. |
| 8 | To study various types of carpentry tools and prepare simple types of at least two wooden joints. |
| 9 | To prepare simple engineering components/shapes by forging. |
| 10 | To prepare mold and core assembly to put metal in the mold and fettle the casting. |

RECOMMENDED BOOKS:

| | |
|------------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> Workshop Technology Vol. 1 and 2 BY RAGHUVANSHI, Title: B.S. Dhanpat Rai & Sons. Workshop practices, Author HS BAWA, TITLE: Tata McGraw-Hill. |
| REFERENCE BOOKS | <ol style="list-style-type: none"> Workshop practices and materials, author BJ BLACK, Title: CRC press. Mechanical practice workshop, author KC john, Title: PHI learning. |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

| Assessment # | Type of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------|--------------|--------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---|---|---|-----|---|---|---|---|---|-----|
| Course Learning Outcomes | 2 | 3 | | 2,5 | 4 | 3 | | 2 | | 1,3 |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Basics of Civil Engineering

L T P
2 0 0

| | |
|----------------------------|----------|
| MODULE CODE | CIVL0101 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 50 |
| END SEMESTER EXAM DURATION | 1.30 Hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: The Question paper will consist of seven questions distributed over three sections A, B and C. Section A comprises of very short answer type questions and is compulsory. Section B & C comprise of short answers type and long answer type questions. These sections will have internal choice.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to basic knowledge of different sections of civil engineering as mentioned below:

1. To achieve knowledge and understanding about engineering aspects related to buildings.
2. To get familiar with different building materials and their properties.
3. To understand importance of surveying and the transportation systems.
4. To learn basic concepts related to water supply and sewage disposal.
5. To understand the fundamental concepts of geotechnical engineering and properties of soil.

LEARNING OUTCOMES:

1. Able to know about basic civil engineering terms and their applications.
2. Able to learn about the basic building material used in construction.
3. Able to understand about importance of surveying in civil engineering.
4. Able to know about soil behaviour and soil properties in different conditions.
5. Able to learn about water supply system and different layout of water distribution systems.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENT:

| |
|---|
| <p><u>UNIT -I: Building Materials</u> Introduction of Civil Engineering materials: Bricks– composition, classifications, properties and uses. Stone – classification of rocks, quarrying, dressing properties and uses. Timber – properties, uses. Cement – grades, types, properties, uses. Steel – mild steel, medium steel, hard steel, their properties, uses. Concrete – grade designation, properties and uses.</p> |
| <p><u>UNIT-II: Building Components</u> Building – selection of site, classification, components. Foundations –functions, classification bearing capacity. Flooring – requirements, selection, types. Roof – types and requirements.</p> |
| <p><u>UNIT-III: Surveying</u> Introduction, Principles of surveying, use and adjustment of various instruments employed in chain survey, compass surveying and plane table surveying. Definition and working principles of a levelling instruments, Use and adjustment of dumpy and tilting levels, Establishment of Bench Marks by levelling.</p> |
| <p><u>UNIT-IV: Transportation</u> Highway –classification, cross section and components of roads. Railway – cross section and components of permanent way and their functions. Waterway – docks and harbour, classifications, components. Bridge – introduction and components of bridge.</p> |
| <p><u>UNIT-V: Water Supply And Sewage Disposal</u> Water supply – objective, quantity of water, sources, standards of drinking water, distribution system. Sewage – classification, technical terms, septic tank, components and functions.</p> |
| <p><u>UNIT-VI: Geotechnical Engineering</u> Soil mechanics– Introduction, formation, composition, classification and properties of soil.</p> |

RECOMMENDED BOOKS:

| | |
|------------------------|---|
| TEXT BOOKS | <ol style="list-style-type: none">1. Basics of Civil Engineering, Raju .K.V.B, Ravichandran .P.T, Ayyappa Publications.2. Engineering Material's, Rangwala .S.C Charotar Publishing House. |
| REFERENCE BOOKS | <ol style="list-style-type: none">1. Basics of Civil Engineering, <u>Shrikrishna, Kiran M . Tajne</u>, Shrikrishna A Dhale. S.Chand Publication2. Basic Civil Engineering, Satheesh Gopi. Publisher: Pearson India |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 150 marks for theory and 50 marks for practical.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 5 |
| 2. | Sessional Test | 2 | 15 |
| 3. | Group Discussion | 4 | 5 |
| 4. | End Semester Exam | 1 | 50 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 |
|-------------|---|---|---|---|---|
| Class Test | x | | x | x | x |
| Quiz | x | x | | x | |
| Assignment | x | | x | | x |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|-------|-----------|---------|-----|-----|---|-----|-------|-----|---|
| Course Learning Outcomes | 3,4,5 | 1,2,3,4,5 | 1,2,4,5 | 1,3 | 1,5 | 5 | 1,2 | 1,3,5 | 3,5 | 2 |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Basics of Civil Engineering Lab

L T P
0 0 2

| | |
|----------------------------|----------|
| MODULE CODE | CIVL0102 |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESSMENT MARKS | 25 |
| SUMMATIVE ASSESSMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects of Civil Engineering field to the students of all branches of Engineering.

1. To study the practical experiments in chaining, compass.
2. To study the basics properties of cement.
3. To study the practical application of theodolite.
4. To study the properties of soil.
5. To give experience in handling surveying equipments.

LEARNING OUTCOMES:

1. Able to determine linear measurement like horizontal distance.
2. Ability to determine properties of cement experimentally.
3. Ability to determine different properties of soil experimentally.
4. Ability to determine C B R value of soil.
5. Ability to handle different surveying instruments.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

LIST OF EXPERIMENTS

| | |
|-----|--|
| 1. | Linear measurement using tape, chain. |
| 2. | Chain survey – Determination of area by perpendicular offset. |
| 3. | Theodolite- Measurement of horizontal and vertical angles by Vernier Theodolite. |
| 4. | To determine the normal consistency of cement paste. |
| 5. | To determine soundness of given cement by Le-Chatelier method |
| 6. | To determine initial and final setting time of cement |
| 7. | To determine the fineness of cement. |
| 8. | To determine water content of soil mass. |
| 9. | To determine Atterberg Limit of soil. |
| 10. | C B R Value test. |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

| Assessment # | Type of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------|--------------|--------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | I | j |
|--------------------------|---|------|--------|---|-------|---|---|---|---|---|
| Course Learning Outcomes | | 1,2, | 1,2,3, | | 1,2,3 | | | | | |
| | | 3 | 4 | | ,4 | | | | | |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Applied Mathematics-II

L T P
4 1 0

| | |
|----------------------------|----------|
| MODULE CODE | MATH0116 |
| CREDIT POINTS | 4.5 |
| FORMATIVE ASSESMENT MARKS | 50 |
| SUMMATIVE ASSESMENT MARKS | 100 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: In total EIGHT questions will be set. Question ONE will be compulsory and will cover all units. Remaining seven questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

1. To achieve knowledge and understanding of differential equations, their various properties and capabilities to model and solve wide range of problems in science and engineering.
2. To get familiar with concepts of Laplace transforms and develop ability to solve simple and complex problems.
3. To understand Fourier series and their applications in engineering problems.
4. To learn basic concepts of Fourier Transforms and its application in scientific problems.
5. To acquire knowledge of complex functions and assess their effectiveness in science and Technology.

LEARNING OUTCOMES:

1. Able to understand differential equations and their capability to solve problems.
2. Exposure to Laplace transforms and their compatibilities.
3. Enhance the knowledge regarding Fourier series and their applications
4. Able to understand Fourier Transforms and its application.
5. Ability to acquire knowledge of complex functions and assess their effectiveness in science and Technology.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENT:

UNIT-I: Ordinary Differential Equations & its Applications

Exact differential equations. Equations reducible to exact differential equations. Applications of Differential equations of first order & first degree to simple electric circuits, Newton's law of cooling, heat flow and orthogonal trajectories.

UNIT-II: Linear Differential Equations.

Linear differential equations of second and higher order. Complete solution, complementary function and particular integral, method of variation of parameters to find particular Integral, Cauchy's and Legendre's linear equations, simultaneous linear equations with constant coefficient. Applications of linear differential equations to simple pendulum, oscillatory electric circuits.

UNIT-III: Partial Differential Equations and Its Applications

Formation of partial differential equations, Lagrange's linear partial differential equation, First orders non-linear partial differential equation, Char pit's method. Method of separation of variables and its applications to wave equation and one dimensional heat equation, two dimensional heat flow, steady state solutions only.

UNIT-IV: Laplace Transforms and its Applications

Laplace transforms of elementary functions, properties of Laplace transforms, existence conditions, transforms of derivatives, transforms of integrals, multiplication by t^n , division by t . Evaluation of integrals by Laplace transforms. Laplace transform of Unit step function, unit impulse function and periodic function. Inverse transforms, convolution theorem, application to linear differential equations and simultaneous linear differential equations with constant coefficients.

Unit –V: Fourier Series and Fourier Transforms

Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series.

Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem.

UNIT-VI: Functions of Complex Variable

Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions. Limit and Continuity of a function, Differentiability and Analyticity, Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, application to flow problems. Integration of complex functions. Cauchy-Integral theorem and formula.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

RECOMMENDED BOOKS

| | |
|-------------------|---|
| TEXT BOOKS | <ol style="list-style-type: none"> Higher Engineering Mathematics: B.S. Grewal, Khanna Publishers, New Delhi. Advanced Engineering Mathematics, Erwin Kreyszig, John Wiley & Sons, Inc., New York. Advanced Engineering Mathematics, Peter V. O’Neil, Thomson Learning, Inc., Singapore. |
| REFERENCES | <ol style="list-style-type: none"> Advanced Engineering Mathematics, R.K. Jain and S. R .K. Iyengar, Alpha science International Ltd. Pang Bourne, England. Advanced Engg. Mathematics, Michael D. Greenberg, Prentice-Hall, Englewood Cliffs, NJ. |

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|-------|------|-----|---------|-----|-----|-------|-----|-----|-----|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | 1,2,5 | 2, 5 | 3,4 | 1,2,3,4 | 2,3 | 3,4 | 2,3,5 | 1,3 | 4,5 | 1,2 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 150 marks for theory and 50 marks for practical.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 10 |
| 2. | Sessional Test | 2 | 30 |
| 3. | Group Discussion | 4 | 10 |
| 4. | End Semester Exam | 1 | 100 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 |
|--------------------|----------|----------|----------|----------|----------|
| Class Test | x | | x | | x |
| Quiz | | | x | | x |
| Assignment | x | x | | x | |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Numerical Methods

L **T** **P**
3 0 0

| | |
|----------------------------|----------|
| MODULE CODE | MATH0117 |
| CREDIT POINTS | 3 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 75 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: In total EIGHT questions will be set. Question ONE will be compulsory and will cover all units. Remaining seven questions are to be set taking at least one question from each unit. The students are to attempt five questions in total, first being compulsory.

OBJECTIVES:

The aim of this subject is to develop understanding of different methods related to error, area numerically, using different techniques to enhance skills of numerical methods as mentioned below:

1. To achieve knowledge and understanding of different types of error, interpolation, extrapolation and capabilities to solve by different methods with wide range of problems in science and engineering.
2. To get familiar with concepts of nonlinear equations and develop ability to solve simpleComplex problems.
3. To understand direct and indirect methods solve simultaneous linear equations and theirapplications in engineering problems.
4. To learn basic concepts of area solve by integration and its application in realistic decision making.
5. To acquire knowledge of ordinary and partial differential equations solve by different methods and assess their effectiveness in problem solving.

LEARNING OUTCOMES:

1. Able to understand the evolution of techniques and basic terminology.
2. Exposure to various methods and techniques and their compatibilities.
3. Enhance the knowledge regarding different types of error, linear, non-linear and ordinary and partial differential equations.
4. Able to understand the basic techniques and start to implement in real life.
5. Ability to find the largest Eigen values and corresponding Eigen vector.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENT:

Unit I: Errors in Numerical Calculation

Introduction, Numbers and their accuracy, Absolute, relative and Percentage errors and their analysis, General error formula.

Interpolation and Curve Fitting: Newton's forward and backward; Gauss forward and backward; central difference interpolation formulae; Lagrange's and Newton divided difference interpolation formula, Interpolating with a cubic spline, Bezier curves and B-spline curves, Curve fitting by Least squares approximations.

Unit II: Nonlinear equations

Bisection method, Regula False method, Secant method, Iteration Method, Newton's Raphson method, Giraffe's methods, Muller's method.

Unit III: Simultaneous linear equations

Gauss Elimination method, Gauss-Jordan method, LU- decomposition Method, Jacobi's method, Gauss- Seidal method, Relaxation method.

Unit IV: Numerical differentiation and Integration

Derivatives from differences tables, higher order derivatives, Newton-cotes integration formula, Trapezoidal rule, Simpson's rules, Boole's rule and Weddle's rule, Romberg's Integration.

Unit V: Numerical solution of ordinary differential equations

Taylor series methods, Euler and modified Euler method, Runge-Kutta methods, Milne's method, Adams-Moulton method.

Unit VI: Numerical solution of partial differential equations

Finite difference approximation of partial derivatives, solution of Laplace equation (standard 5-point formula only), one dimensional heat equation (Schmidt method, Crank-Nicolson method, Dufort and Frankel method).

Eigen Value Problems: Power method, Jacobi, Given's and Householder's methods for symmetric matrices.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

RECOMMENDED BOOKS:

| | |
|------------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Applied Numerical analysis: Curtis F Gerald and Patrick, G Wheatley-Pearson Education. 2. Numerical Methods: Fairs & Burden, Brooks Cole, 2001. 3. Numerical Methods in Engineering and Science, B S Grewal, Khanna Publishers. |
| REFERENCE BOOKS | <ol style="list-style-type: none"> 1. Numerical Methods for Scientific and Engineering computations, M.K. Jain, S.R.K. Iyenger and R.K. Jain-Wiley Eastern Ltd. 2. Numerical Methods for engineers, Steven C. Chapra, Raymond P. Can ale, McGraw Hill. |

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|-----|-----|-----|-------|-----|-------|-------|-----|-----|-----|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | 1,2 | 1,3 | 1,5 | 1,3,5 | 2,3 | 2,3,4 | 1,2,4 | 1,4 | 1,3 | 2,5 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

| Assessment # | Type of Assessment | Per Semester | Maximum Mark |
|--------------|--------------------|--------------|--------------|
| 1. | Class Test | 4 | 10 |
| 2. | Sessional Test | 2 | 10 |
| 3. | Group Discussion | 4 | 05 |
| 4. | End Semester Exam | 1 | 75 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 | 5 |
|--------------------|----------|----------|----------|----------|----------|
| Class Test | x | | x | | x |
| Quiz | | | x | | x |
| Assignment | x | x | | x | |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

Value Education

L **T** **P**
2 0 0

| | |
|----------------------------|----------|
| MODULE CODE | VALU1019 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 75 |
| END SEMESTER EXAM DURATION | 2 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The Purpose of Value Education is specifying the present deterioration in the value system in the fast changing world trends and to develop understanding of moral values in different aspects of life for inculcating the skills as mentioned below:

1. To prepare students to develop basic understanding of Value Education.
2. To acquire knowledge on Value Education.
3. To understand the ethics, character building, leadership & goal setting.
4. To understand the success & personal growth.
5. To support the women empowerment & environmental awareness.

LEARNING OUTCOMES:

1. Able to understand the Importance of Values in Life – what is a Value system?
2. Exposure to various principles, concepts, types, advantages and disadvantages of value education.
3. Ability to understand the life style management & self esteem.
4. To behave morally in society.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS:

| |
|--|
| <p><u><i>UNIT 1: VALUE EDUCATION</i></u></p> <ul style="list-style-type: none"> • Definition, Concept and Classification of values • The need for value education • Pedagogy of Values • Challenges of Value Adoption • Life Style Management |
| <p><u><i>UNIT 2: VALUE & PERSONAL DEVELOPMENT</i></u></p> <ul style="list-style-type: none"> • The principles of integrity • Character Development • Values in everyday life • Values, Virtues, Powers & Qualities • Successful Personality |
| <p><u><i>UNIT 3: VALUES IN SOCIETY</i></u></p> <ul style="list-style-type: none"> • Character Building • Positive thinking & Emotional Maturity • Women Empowerment • Overcoming Addiction • Environmental Awareness |
| <p><u><i>UNIT 4: PERSONAL PROGRESS & FIELD STUDY</i></u></p> <ul style="list-style-type: none"> • Personal progress manual • Field Project |

RECOMMENDED BOOKS:

| | |
|------------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Seven Habits of Highly Effective People, Covey Stephen, Free Press, United States, 1989 2. You Can Win, Khera Shiv, Macmillan India Limited, New Delhi, 1998 |
| REFERENCE BOOKS | Mani Jacob, ed., (2002). Resource for Value Education, New Delhi: Institute of Value Education. |

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|---|---|---|-----|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | | | | | | | | | | 1,2 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------------|--------------|--------------|
| 1. | Class Test | 1 | 10 |
| 2. | Sessional Test | 2 | 15 |
| 3. | End Semester Written Exam | 1 | 50 |
| 4. | End Semester Oral Exam | 1 | 25 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 |
|-------------|---|---|---|---|
| Class Test | x | x | x | |
| Quiz | x | x | x | |
| Assignment | | | x | x |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

PC Lab

L T P
0 0 2

| | |
|----------------------------|----------|
| MODULE CODE | CSEN1107 |
| CREDIT POINTS | 1 |
| FORMATIVE ASSESSMENT MARKS | 25 |
| SUMMATIVE ASSESSMENT MARKS | 25 |
| END SEMESTER EXAM DURATION | 3 hrs |
| LAST REVISION DATE | |

OBJECTIVES:

The main objective of the lab is to provide the students the knowledge of computer hardware, the processors, memories, motherboards, different add-on cards, and other peripherals like printers, plotters and the scanners. The students are trained for the assembly and disassembly of PCs. Another important objective is to impart knowledge about the troubleshooting and fault finding the computers and the peripherals.

LEARNING OUTCOMES:

Following this course, students will be able to:

1. Learn about different hardware components of a computer and their troubleshooting.
2. Understand different peripherals, their performance and cost characteristics
3. Understand installation of various operating systems, their capabilities
4. Learn commonly used PC software like MS Word, Excel and PowerPoint.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

LIST OF EXPERIMENTS

PC Software: Application of basics of MS Word 2013, MS Excel 2013, MS Power Point 2013, MS Access 2013.

| | |
|----|---|
| 1. | To prepare the Your Bio Data using MS Word. |
| 2. | To prepare the list of marks obtained by students in different subjects and show with the help of chart/graph the average, min and max marks in each subject. |
| 3. | Prepare a presentation explaining the facilities/infrastructure available in your department. |
| 4. | Create a database of books in the library on a mini scale w.r.t. Computers and manipulate the database using different forms and reports. |

PC Hardware:

| | |
|-----|--|
| 1. | To check and measure various supply voltages of PC. |
| 2. | To make the comparative study of various motherboards. |
| 3. | To make the comparative study of various processors. |
| 4. | To study various cables used in computer communication. |
| 5. | To study various connections and ports used in computer communication. |
| 6. | To study various cards used in a Computer System. |
| 7. | To remove, study and replace CD-Rom, Harddisk. |
| 8. | To observe various cables and connectors used in networking. |
| 9. | To assemble a PC. |
| 10. | Troubleshooting exercises related to various components of computer like monitor, drives, memory and printers etc. |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 50 marks for practical.

Practical:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------|--------------|--------------|
| 1 | Internal Assessment | 2 | 25 |
| 2 | External Assessment | 1 | 25 |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
|--------------------------|---|---|---|---|-----|---|---|---|---|---|
| Course Learning Outcomes | 3 | 2 | 4 | 1 | 1,2 | | | | | |

EVALUATION

At the end of semester, Subject teacher will submit an evaluation report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the subject with respect to its strengths as well as those areas which could be improved. The review report contains the following:

- Approved refinement decisions due for implementation,
- Actions taken based on previous subject review,
- Problems encountered in the subject delivery,
- Suggested remedies / corrective measures, and
- Report discussed and analysed, actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

L T P
2 0 0

French Language – Part 2

Pre-requisite - French Language – Part 1

| | |
|----------------------------|------------------------------|
| MODULE CODE | LANF0104 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 75 (Written – 50, Oral – 25) |
| END SEMESTER EXAM DURATION | 2 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in French language and to enhance skills as mentioned below:

1. To prepare students to develop advance understanding on French language.
2. To acquire the command over the French grammar.
3. To read and write short, simple texts.
4. To enable learner to build logic in French language.
5. To make students aware of the French culture, customs & traditions.

LEARNING OUTCOMES:

1. Able to understand the advance grammar of French language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the advance of French language.
4. Able to understand the French history.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS

| |
|---|
| <p><u>UNIT I: MODERATE COMMUNICATION</u> – This module will sharpen the communicative skills already acquired in the PART 1 - BASIC COMMUNICATION and further builds on them. It develops oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -</p> <ul style="list-style-type: none"> • Describe in detail people, relationships, events, places, cultures of countries • Compare people, relationships, events, places, cultures and the changes that they have undergone • Apply for a job • Exchange personal and professional information • Express opinion on people, places, events encountered in one’s personal life and on press articles, television programmes, multimedia, films, and books • Argue, justify and substantiate a point of view • Describe hypothetical or imaginary situations • Express plans, dreams, aspirations of the future • Paragraph writing • Professional communication |
| <p><u>UNIT II: MODERATE PHONETICS</u> – This module will re-enforces all the notions introduced in the PART 1- BASIC PHONETICS.</p> |
| <p><u>UNIT III: MODERATE GRAMMAR</u> – This module will sharpen the concepts introduced in the PART 1 - BASIC GRAMMAR & FORMATION OF SENTENCES and further develops the following linguistic skills: -</p> <ul style="list-style-type: none"> • Pronouns – relative (don’t), possessive, indefinite, demonstrative and the use of double pronouns • Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following tenses (indicative mood) – past perfect, future perfect • Verbs – the subjunctive mood (past and present) • Verbs – conditional (past and present) and gerund forms, • Adverbs of time, place, quantity and indefinite adverbs • Direct/indirect speech • Comparative and superlative structures • Active/passive structures • Multiple clause sentences – independent clauses joined by co-ordinating conjunctions, dependant clause (subordinate clause) • Phrases to express cause, consequence, and objective |

RECOMMENDED BOOKS:

| | |
|------------------------|--|
| TEXT BOOKS | <ol style="list-style-type: none"> 1. Nouveau Sans Frontières 1 by Philippe Dominique & Jacky Girardet 2. “CONNEXIONS-1” by Regine Merieux & Yves Loiseau Published by Didier. |
| REFERENCE BOOKS | <p>Five in one Multilingual Glossary, published by Saraswati House Pvt. Ltd. New Delhi 2011.</p> |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|---|---|---|-----|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | | | | | | | | | | 1,2 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------------|--------------|--------------|
| 1. | Class Test | 1 | 10 |
| 2. | Sessional Test | 2 | 15 |
| 3. | End Semester Written Exam | 1 | 50 |
| 4. | End Semester Oral Exam | 1 | 25 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 |
|-------------|---|---|---|---|
| Class Test | x | x | x | |
| Quiz | x | x | x | |
| Assignment | | | x | x |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

L T P
2 0 0

German Language – Part 2

Pre-requisite - German Language – Part 1

| | |
|----------------------------|------------------------------|
| MODULE CODE | LANG0105 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 75 (Written – 50, Oral – 25) |
| END SEMESTER EXAM DURATION | 2 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in German language and to enhance skills as mentioned below:

1. To prepare students to develop advance understanding on German language.
2. To acquire the command over the German grammar.
3. To read and write short, simple texts.
4. To enable learner to build logic in German language.
5. To make students aware of the German culture, customs & traditions.

LEARNING OUTCOMES:

1. Able to understand the advance grammar of German language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the advance of German language.
4. Able to understand the German history.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MODULE CONTENTS

UNIT I: MODERATE COMMUNICATION – This module will sharpen the communicative skills already acquired in the **PART 1 - BASIC COMMUNICATION** and further builds on them. It develops oral and written skills of understanding, expressing and exchanging information / interacting on the topics given below: -

- Describe in detail people, relationships, events, places, cultures of countries
- Compare people, relationships, events, places, cultures and the changes that they have undergone
- Apply for a job
- Exchange personal and professional information
- Express opinion on people, places, events encountered in one's personal life and on press articles, television programmes, multimedia, films, and books
- Argue, justify and substantiate a point of view
- Describe hypothetical or imaginary situations
- Express plans, dreams, aspirations of the future
- Paragraph writing
- Professional communication

UNIT II: MODERATE PHONETICS – This module will re-enforces all the notions introduced in the **PART 1- BASIC PHONETICS**.

UNIT III: MODERATE GRAMMAR – This module will sharpen the concepts introduced in the **PART 1 - BASIC GRAMMAR & FORMATION OF SENTENCES** and further develops the following linguistic skills: -

- Pronouns – relative (don't), possessive, indefinite, demonstrative and the use of double pronouns
- Verbs – conjugation of regular and irregular verbs (affirmative and negative) in the following tenses (indicative mood) – past perfect, future perfect
- Verbs – the subjunctive mood (past and present)
- Verbs – conditional (past and present) and gerund forms,
- Adverbs of time, place, quantity and indefinite adverbs
- Direct/indirect speech
- Comparative and superlative structures
- Active/passive structures
- Multiple clause sentences – independent clauses joined by co-ordinating conjunctions, dependant clause (subordinate clause)
- Phrases to express cause, consequence, and objective

RECOMMENDED BOOKS:

| | |
|------------------------|---|
| TEXT BOOKS | <ol style="list-style-type: none">1. Tangram, Kursbuch und Arbeitsbuch, 1A, 1B & 2A, Max Hueber Verlag2. Tangram, Kursbuch und Arbeitsbuch, 2B, 3A & 3B, Max Hueber Verlag |
| REFERENCE BOOKS | em Abschlusskurs, Kursbuch und Arbeitsbuch, Max Hueber Verlag |

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

MAPPING OF COURSE LEARNING OUTCOMES

| | | | | | | | | | | |
|--------------------------|---|---|---|---|---|---|---|---|---|-----|
| Program Outcomes | a | b | c | d | e | f | g | h | i | j |
| Course Learning Outcomes | | | | | | | | | | 1,2 |

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------------|--------------|--------------|
| 1. | Class Test | 1 | 10 |
| 2. | Sessional Test | 2 | 15 |
| 3. | End Semester Written Exam | 1 | 50 |
| 4. | End Semester Oral Exam | 1 | 25 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 |
|-------------|---|---|---|---|
| Class Test | x | x | x | |
| Quiz | x | x | x | |
| Assignment | | | x | x |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

SEMESTER - II

L T P
2 0 0

Spanish Language – Part 2

Pre-requisite - Spanish Language – Part 1

| | |
|----------------------------|------------------------------|
| MODULE CODE | LANS0106 |
| CREDIT POINTS | 2 |
| FORMATIVE ASSESMENT MARKS | 25 |
| SUMMATIVE ASSESMENT MARKS | 75 (Written – 50, Oral – 25) |
| END SEMESTER EXAM DURATION | 2 hrs |
| LAST REVISION DATE | |

INSTRUCTIONS: All questions are compulsory. Each question may have multiple options and will cover all units.

OBJECTIVES:

The aim of this subject is to develop understanding on different aspects related to oral and written skills of expressing and exchanging information / interacting in Spanish language and to enhance skills as mentioned below:

1. To prepare students to develop advance understanding on Spanish language.
2. To acquire the command over the Spanish grammar.
3. To read and write short, simple texts.
4. To enable learner to build logic in Spanish language.
5. To make students aware of the Spanish culture, customs & traditions.

LEARNING OUTCOMES:

1. Able to understand the advance grammar of Spanish language and differentiation of genders and objects.
2. Exposure to various syntax & communication methods with others.
3. Ability to read, write, speak & listen the advance of Spanish language.
4. Able to understand the Spanish history.

PDM UNIVERSITY
DEPARTMENT OF BIOMEDICAL ENGINEERING

METHODS OF TEACHING AND STUDENT LEARNING

The subject is delivered through lectures, on-line support, text book / course material reading and practical exercises. Some videos will be shown to demonstrate certain concepts and research areas will be discussed. Resource material is provided with the help of PDM Educational Directory Services (PEDS).

ASSESSMENT METHODOLOGIES:

This subject will be evaluated for a total of 100 marks for theory.

Theory:

| Assessment # | Type Of Assessment | Per Semester | Maximum Mark |
|--------------|---------------------------|--------------|--------------|
| 1. | Class Test | 1 | 10 |
| 2. | Sessional Test | 2 | 15 |
| 3. | End Semester Written Exam | 1 | 50 |
| 4. | End Semester Oral Exam | 1 | 25 |

MAPPING OF ASSESSMENT METHODS AGAINST THE LEARNING OUTCOMES

Theory:

| Assessments | 1 | 2 | 3 | 4 |
|-------------|---|---|---|---|
| Class Test | x | x | x | |
| Quiz | x | x | x | |
| Assignment | | | x | x |

EVALUATION

At the end of semester, course faculty will submit an evaluation / review report. The purpose of this report is to identify aspects that will be highlighted by students and faculty's feedback for the course with respect to its strengths as well as those areas which could be improved. The review report contains the following areas:

- Problems encountered in the content delivery;
- Suggested remedies / corrective measures;
- Approved refinement decisions due for implementation;
- Actions taken based on previous course review; and
- Report discussed and analysed; actions taken as a result of this process and are communicated to the main stakeholders.