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| **6. Teaching-Learning Evaluation Plan** | |
| Subject: Therapeutic Instrumentation | Course Code: 20BM0302 |
| Faculty Name: Dr. Vandana | Program: B. Tech. Biomedical Engineering (6th Sem) |

| **SESSION COVERAGE PLAN** | | | | | | |
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| **Unit** | **Sessions** | **Topics** | **Textbook/Reference Books** | **Process/Methodology** | **Outcome/Learning of units** | **Assessment Method** |
| 1 | Lecture 1 & 2 | Introduction to Cardiac Pacemakers, External Pacemakers | T1, T2 | Blackboard, Presentation | Students will understand the importance of cardiac pacemakers and learn about external pacemakers | Class discussion, Quiz |
| Lecture 3 & 4 | Implantable Pacemakers, Recent Developments in Pacemaker System Analyzer | T1 | Presentation, Discussion | Students will gain knowledge about implantable pacemakers and recent developments in pacemaker technology | Group project, Presentation |
| Lecture 5 & 6 | Introduction to Cardiac Defibrillators, DC Defibrillators | T1 | Presentation, Discussion | Students will understand the importance of cardiac defibrillators and learn about DC defibrillators | Case studies, Practical demonstration |
| Lecture 7 & 8 | Implantable Defibrillators, Pacer-cardio Vector | T1 | Presentation, Discussion | Students will gain knowledge about implantable defibrillators and understand the pacer-cardio vector | Written test, Lab experiment |
| Lecture 9 | Defibrillator Analysis | T1 | Presentation, Discussion | Students will analyze the performance and operation of defibrillators | Case-based assessment, Practical examination |
| 2 | Lecture 1 & 2 | Introduction to Instruments for Surgery, Principle of Surgical Diathermy | T2 | Blackboard, Presentation | Students will understand the different surgical instruments and principles of diathermy | Class discussion, Practical demonstration |
| Lecture 3 & 4 | Surgical Diathermy Machine, Safety Aspects in Electro-Surgical Diathermy Units | T2 | Presentation, Discussion | Students will gain knowledge about surgical diathermy machines and understand safety measures | Quiz, Lab practical |
| Lecture 5 & 6 | Introduction to Physiotherapy and Electrotherapy Equipment, High-Frequency Heat Therapy | R1 | Blackboard, Presentation, Discussion | Students will be introduced to physiotherapy and electrotherapy equipment and understand heat therapy | Group discussion, Case study |
| Lecture 7 & 8 | Short Wave Diathermy, Microwave Diathermy | T2 | Presentation, Discussion | Students will understand the differences between short wave and microwave diathermy | Lab experimentation, Presentation |
| Lecture 9 | Ultrasonic Therapy Unit, Pain Relief through Electrical Stimulation | R1 | Presentation, Discussion | Students will understand the use of ultrasonic therapy and electrical stimulation for pain relief | Practical demonstration, Written assignment |
| 3 | Lecture 1 & 2 | Function of the Kidneys, Artificial Kidney | R3, R1 | Blackboard, Presentation | Students will understand the role of kidneys and the concept of artificial kidney | Quiz, Class discussion |
| Lecture 3 & 4 | Introduction to Dialysis and Dialyzers, Membranes of Hemodialyzers | R1 | Presentation, Discussion | Students will learn about the dialysis process and the types of dialyzers | Lab practical, Written test |
| Lecture 5 & 6 | Hemodialysis Machines, Portable Kidney Machines | R1, R3 | Presentation, Discussion | Students will gain knowledge about hemodialysis machines and portable kidney machines | Group project, Presentation |
|  | Lecture 7 & 8 | Introduction to Lithotripters, The Stone Disease Problem | R1 | Presentation, Discussion | Students will understand the role of lithotripters in stone treatment and the impact of stone disease | Case studies, Practical demonstration |
| Lecture 9 | Modern Lithotripter Systems, Extracorporeal Shockwave Therapy | R1 | Presentation, Discussion | Students will gain knowledge about modern lithotripter systems and shockwave therapy | Written test, Group discussion |
| 4 | Lecture 1 - 4 | Introduction to Anesthesia Machine, Anesthesia Machine, Electronics in Anesthesia Machine, Introduction to Radiotherapy Equipment | T2 | Blackboard, Presentation, Discussion | Students will understand the importance of anesthesia and the components of anesthesia and radiotherapy machines | Practical examination, Lab practical |
|  | Lecture 5 - 8 | Development of Betatron, Chemotherapy, Heart Lung Machine, Radiotherapy Equipment (Continued) | R3 | Presentation, Discussion | Students will learn about the advancements and impact of medical equipment in therapy and treatment | Case-based assessment, Presentation |
| 5 | Lecture 1 - 4 | Mechanics of Respiration - Artificial Respiration, Introduction to Ventilators, Types of Ventilators, Classification of Ventilators | T1 | Blackboard, Presentation | Students will understand the mechanics of respiration and learn about different types and classifications of ventilators | Quiz, Lab practical |
| Lecture 5 - 8 | Pressure-Volume-Flow Diagrams, Modern Ventilators, High-Frequency Ventilators, Introduction to Humidifiers, Nebulizers, and Aspirators | T1, R1 | Presentation, Discussion | Students will understand the importance of PVF diagrams and learn about modern ventilators and respiratory care equipment | Practical demonstration, Written test |
| Lecture 9 | Humidifiers, Nebulizers, and Aspirators (Continued) | R1 | Presentation, Discussion | Students will gain knowledge about the functioning and application of respiratory care equipment | Practical demonstration, Written test |

**TEXT BOOKS:**

1. R. S. Khandpur, Handbook of biomedical Instrumentation, Tata McGraw Hill Publication company Ltd, New Delhi, 1997.

2. Joseph J. Carr, John Michael Brown, Introduction to Biomedical Equipment Technology 4th edition, Pearson Education, 2001.

**REFERENCE BOOKS:**

1. John G. Webster, Biomedical Instrumentation, Wiley Publications, 2007.

2. S. Ananthi, A Text Book of Medical Instrumentations, New Age International (P) Limited, Publishers, 2005.

3. Albert M. Cook, John G. Webster, Albert M. Cook, John G. Webster, [Prentice-Hall](https://www.google.co.in/search?hl=en&gbpv=1&bsq=therapeutic+equipment&dq=therapeutic+equipment&printsec=frontcover&q=inpublisher:%22Prentice-Hall%22&tbm=bks&sa=X&ved=2ahUKEwidh-b7iID9AhXDSGwGHdlxCc8QmxMoAHoECB8QAg&sxsrf=AJOqlzXoe-KDMZnQFq3-cfM18q_Rafsdyg:1675658128075), 1982.