































































Theory of probability – principles and properties of normal distribution – binomial distribution – interpretation of data using the normal probability curve – causes of distribution – deviations from the normal forms.

Correlation – meaning – coefficient of correlation – linear correlation – product moment correlation – rank correlation, biserial correlation, tetracoric correlation partial and multiple correlations – regression equation.

Variance – concept – foundations – assumptions – one way classification. ANOVA MANOVA, ANCOVA, MANCOVA.

Item analysis – item pool – its selection – item difficulty item variance – item conduction – time validity – difficulty index.

Non – parametric statistics – its nature and condition and application – non parametric analysis of variance and measures of association – tests of difference with correlated and uncorrelated data – tests of similarity.

Selection appropriate statistics methods in the research, receivers operating characteristics

**Reference:**

- Computer analysis and qualitative research : Nigel G. Fielding & Raymond M. Lee, 1<sup>st</sup> edition,1998
- Essential Research Methods : Rubbin, Allen, 2<sup>nd</sup> edition 2010
- Research design explained : Mitchell, Mark L , 7<sup>th</sup> edition, 2010
- Research Methodology : Kothari, C.R, 2<sup>nd</sup> edition,2011
- Research Methodology : Kumar,5<sup>th</sup> edition, 2006
- Research Methodology and Biostatistics : Bais,Vinod Kumar, 2<sup>nd</sup> edition, 2013
- Research Method a modular approach: Jackson,sherri L ,2<sup>nd</sup> edition,2011
- Foundation of clinical research and application to practice (portney)
- Non parametric statistics for the behaviour sciences : Mc graw hill sieger, Sydney
- Research: the validation of clinical practice: FAdavis
- Clinical Research Survival Guide : Niebauer, Josef ed, 2002
- Biostatistics c Daniel: ww,5<sup>th</sup> edition 1987
- Biostatistics: The bare essentials : Norman, Geoffrey R, 2<sup>nd</sup> edition,2000
- Introduction to biostatistics: Glover ,Thomas,2002
- Manual of biostatistics :Baride,JP ,2003
- Methods in biostatistics : Mahajan , B.K, 6<sup>th</sup> edition, 2004
- Simple biostatistics: Indrayan. A, 2<sup>nd</sup> edition

<b>TITLE----- Biomechatronics</b>
<b>COURSE CODE--- MPO104</b>
<b>TEACHING HOURS----- 60 ( Theory)</b>
<b>CREDITS --- As per affiliated university norms</b>

### **1. CAD-CAM**

Introduction to CAD, CAD application in Prosthetics and Orthotics, Graphical representation, Graphical representation of solid model, Geometric modeling, Solid modeling concept, Process of solid modeling, Geometric transformation, Vector and matrix algebra, Geometric transformation, Two dimensional transformation, Three dimensional transformation, Two and three dimensional transformation and projection, Projection, Prospective projection, Plane curve and cones, Cubes, Bezier curve, Solid modeling, Solid modeling concept, Half spaces, Boundary representation (B-rep), Constructive solid geometry (CSG), Other solid modeling schemes, Visibility concepts- Clipping, Visibility concepts- 3D Clipping, Visible lines and surface, MATLAB Tutorial

#### **1.1. CAM**

Introduction of CAM, Classification of CNC and NC system, Types of CNC machines , Purpose of CNC and NC system, Process of CNC, Advantage of CAM system, Application of CAD- CAM in P&O field, Advantage of CAD- CAM in P&O field, Latest development in application of CAD-CAM in P&O field

### **2. Electronics**

#### **A. Introduction:**

D.C. Circuits, Ohm's Law, Kirchoff's Laws, D.C. Circuits, Nodal and Loop methods of analysis, A.C. CIRCUITS, Sinusoidal signal, Instantaneous and peak values, RMS and average values, Behaviors of components in A.C. circuits, Series and parallel a.c. circuits, Series and parallel A.C. circuits, Series and parallel resonance ,Q factor, Cut-off frequencies and bandwidth, Magnetic circuit concepts: Self inductance ,Magnetic coupling analysis of single tuned & double tuned, Circuit involving mutual inductance.

**B.** Introduction to transformer: Circuit analysis, Sinusoidal steady state circuit analysis, Voltage, current, sinusoidal & phaser presentation single phase AC circuit ,Behavior of resistance, Inductance & capacitance & their combination, Impedance concept of power, Power factor, Series & parallel resonance ,Band width & quality factor, Measurement of R, L, and C,

**C.** Network theorems: Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem, Star to Delta & Delta to Star transformation.

Transformers: Principle, construction & working of transformer, Efficiency and regulation,

D. Application of electronic in Prosthetics and Orthotics field.

### **3. Robotics**

A. Introduction: types, classification and usage, Science and Technology of robot, Utility of robotics in field of Prosthetics and Orthotics,

**B. Elements of robots – links, joints, actuators, and sensors,** Purpose of sensors, internal and external sensors, common sensors, encoders, tachometers, strain gauge based force-torque sensors, proximity and distance measuring sensors

**C. Kinematics of serial robots:** Introduction, Direct and inverse kinematics problems, Examples of kinematics of common serial manipulators, workspace of a serial robot, Inverse kinematics of constrained and redundant robots

### **Reference:**

- Carbon materials for advanced technologies: Burchell, T.D; 1999
- Composites engineering handbook: Mallick, P.Ked; 1997
- Corrosion resistance of elastomers: Schlossberg, D; 1990
- Design with reinforced plastics: Mayer, Rayner M; 1993
- Engineering materials: Budinski, K.G; 1999; 6th edition
- Engineering materials technology: Jacobs, James A; 1997; 3rd edition
- Engineering mechanics dynamics: Soutas-Little, R.W; 1999
- Engineering with fiber-polymer engineering: Powell, Peter C; 1994
- Fundamentals of material science and engineering : Callister, William D; 2001
- History of engineering and technology: Garrison. Ervan; 1999; 2nd edition
- Introduction to polymers: Young, R.J; 1991; 2nd edition
- Management in engineering : Freeman-Bell, Gail; 1996; 2nd edition
- Material Science and engineering: Callister, William D; 2006; 6th edition
- Physics of plastics: Birley, A.W; 1992
- Plastics technology handbook: Chanda, Manas; 1993; 2nd edition
- Selecting thermoplastics for engineering applications: Macdermott, C.P; 1997; 2nd edition
- Text book of fluid mechanics: c Rajput, R.K; 2006; 3rd edition
- Text book of polymers: Bhatnagar, M.S; 2004; 1st, 2<sup>nd</sup>, 3<sup>rd</sup> edition
- Information technology for management: Turban E; 2002; 3rd edition
- Fundamentals of computers and I.T : A Jaiswal; 2006
- CAD-CAM principles, practice and manufacturing management : Chris MC Malvan; 1998
- Polymer Engineering Principles: Throne, James L, Pregarhoj, Richard C
- Plastic Engineering handbook of one society of the plastic industry: Berins Michael L; 5th edition
- International Plastics Handbook: Sacchtling, H

- Injection Moulding: Theory and Practice: Rubin, Irrin I
- Introduction to Mechantronics and measurement system: David G Alciatore, Micheal B Histard
- Introduction to Robotics:Mechanics and Control,3/E: John J. Craig; Prentice Hall
- Principles of Robot Motion, by Choset et all
- Robotics Toolbox for MATLAB
- Robot Building for Beginners
- Industrial Robotics- technology, programming and applications, : M.P. Groover, Mc Graw Hill, 2001
- Robotics Control, Sensing, Vision and Intelligence, Fu. K.S.Gonzalz.R.c and Lee C.S.G, Mc Graw- Hill Book Co, 1987
- Robotics for engineers, Yoram Koren, Mc Graw- Hill Book Co.,1992
- Robotics and Image Processing, Janakirama P.A, Tata Mc Graw- Hill, 1995



<b>TITLE----- Applied Biomechanics &amp; Kinesiology</b>
<b>COURSE CODE--- MPO105</b>
<b>TEACHING HOURS----- 60 ( Theory)</b>
<b>CREDITS --- As per affiliated university norms</b>

### Unit-1

#### **a. General Biomechanics:**

Force & its component, Lever & mechanical Advantage, Torque or Moment of force & Ground reaction force & Introduction of Kinetics & Kinematics

#### **b. Tissue Biomechanics:**

Histology & nourishment of connective tissues, joint mechanics & consideration of positioning of joints & application of tissue biomechanics in P&O.

### Unit-2

#### **a. Biomechanics of Ankle & foot complex**

Mechanics & pathomechanics of muscle activity at the ankle & foot & analysis of the forces on the ankle & foot during activity.

#### **b. Biomechanics of knee**

Mechanics & pathomechanics of muscle activity at the knee & analysis of the forces on the knee during activity.

### Unit-3

#### **a. Biomechanics of Hip**

Mechanics & pathomechanics of muscle activity at the hip & analysis of the forces on the Hip during activity.

#### **b. Biomechanics of Spine:**

Mechanics & pathomechanics of the cervical musculature, analysis of the forces on the cervical spine during activity, structure & function of the bones & joints of the thoracic spine, mechanics & pathomechanics of the thoracic musculature, analysis of the forces on the thoracic spine during activity & structure & function of the bones & joints of the lumbar spine.

Mechanics & pathomechanics of the lumbar musculature, analysis of the forces on the lumbar spine during activity, structure & function of the bones & joints of the pelvis, mechanics & pathomechanics of the muscle activity in the pelvis & analysis of the forces on the pelvis during activity.

### Unit-4

#### **a. Biomechanics of Shoulder:**

Mechanics & pathomechanics of the muscle activity in the Shoulder complex & analysis of the forces on the Shoulder complex during activity.

**b. Biomechanics of Elbow:**

Mechanics & pathomechanics of muscle activity at the elbow & analysis of the forces on the elbow during activity.

**Unit-5**

**a. Biomechanics of Wrist & Hand**

Mechanics & pathomechanics of the muscle activity in the wrist & hand, analysis of the forces on the wrist during activity, mechanics & pathomechanics of the Special connective tissue in the hand, mechanics & pathomechanics of the intrinsic muscles of the hand & mechanics & pathomechanics of the pinch & grasp.

c. **Posture:** Mechanics & pathomechanics related to posture.

**Reference:**

- Basic biomechanics of musculoskeletal system: Nordin, Margaela; 2001
- Biomechanical basis of human movement: Hamill, Joseph, 2<sup>nd</sup> ed; 2003
- Biomechanics of musculoskeletal system: Nigg, Benno M.ed, 3<sup>rd</sup> ed
- Clinical Biomechanics: Dvir, Zeevi, 2000
- Human body: Vigue, Mastin; 2004
- Human Body Dynamics: Tozeren, Aydin; 2000
- Introduction to biomechanics: Humphrey, Jay D.; 2003
- Primes of biomechanics: Lucas, George L.
- Understanding balance: Roberts, Tristan D.M.; 1995
- Brunnstoms clinical kinesiology: Smith, Lausa K., 5<sup>th</sup> ed.; 1996
- Clinical kinesiology and anatomy: Lippest, Lynn S., 4<sup>th</sup> ed.
- Introduction to kinesiology: Hoffman Shirt J, 2<sup>nd</sup> ed.; 2005
- Kinesiology: Oatis, Casol A; 2004
- Kinesiology: Muscolino, Joseph E; 2006
- Kinesiology: Soderberg, Gary L., 2<sup>nd</sup> ed.; 1997
- Kinesiology flash cards: Lippest, Lynn.S, 2<sup>nd</sup> ed; 2006
- Principles of anatomy and physiology: Tortora, Gaseal J., 10<sup>th</sup> ed.; 2003
- Joint structure and function :Norkin S., 5<sup>th</sup> ed.
- Kinesiology: Brunnstrom s., F. A. Davis, Philadelphia; 1996
- Biomechanical basis of orthotic and prosthetic management: Butterworth Heinmann
- Scientific basis of human movement : Gowitzke, Williams, Wilkins, Blatimore; 1988
- Textbook of disorder and injuries of musculoskeletal system : Salter, R.B.
- Human neuroanatomy: Carpurter M.B., Williams, Wilkins, Blatimore 1983

<b>TITLE----- Clinical Practice in Lower Extremity Orthotics</b>
<b>COURSE CODE--- MPO151</b>
<b>TEACHING HOURS---- 380 ( Practical)</b>
<b>CREDITS --- As per affiliated university norms</b>

**Objectives**

1. The candidate should be able to assess, diagnose, plan and execute the orthotic treatment for children and adults with various neuromusculoskeletal disorder.
2. . To maintain clinical record.
3. Assessment of minimum 20 patients with various disorders.
4. Use of instrumentation in minimum 10 patients with disorders.
5. Plan and execute in minimum 5 patients with disorders.
6. Maintain clinical records.

<b>TITLE----- Clinical Practice in Lower Extremity Prosthetics</b>
<b>COURSE CODE--- MPO152</b>
<b>TEACHING HOURS---- 380 ( Practical)</b>
<b>CREDITS --- As per affiliated university norms</b>

**Objectives**

1. The candidate should be able to assess, diagnose, plan and execute the prosthetic treatment for children and adults with various amputation (congenital and acquired).
2. To maintain clinical record.
3. Assessment of minimum 20 patients with various amputation (congenital and acquired) .
4. Use of instrumentation in minimum 10 patients with amputation (congenital and acquired).
5. Plan and execute in minimum 5 patients with amputation (congenital and acquired).
6. Maintain clinical records.

<b>TITLE----- Advanced Upper Extremity Prosthetics</b>
<b>COURSE CODE--- MPO 201</b>
<b>TEACHING HOURS----- 60</b>
<b>CREDITS --- As per affiliated university norms</b>

**1. General consideration:**

- Anatomy & Biomechanics of Upper extremity.
- Evidence based practice in Upper extremity Prosthetics.
- Assessment for patients with upper extremity amputations.
- Upper extremity Prosthesis & its components.

**2. Advancement in the upper extremity prosthetic components:-**

- Myoelectric prosthetics
- Neuroelectric Prosthetics
- Myoacoustic Prosthetics
- And other latest developments

**3. Prosthetic Management of Partial Hand Amputation;**

Medical Consideration, Advancement in socket technology, Biomechanics of Prosthesis, Current trends in prosthetic management Partial Hand amputation.

**4. Prosthetic Management of Wrist disarticulation;**

Medical Consideration, Advancement in socket technology, Biomechanics of Prosthesis, Current trends in prosthetic management Wrist disarticulation.

**5. Prosthetic Management of Transradial Amputation:**

Medical Consideration, Advancement in socket technology, Biomechanics of Prosthesis, Current trends in prosthetic management transradial amputation.

**6. Prosthetic Management of Elbow Disarticulation:**

6.1. Medical Consideration, Advancement in socket technology, Biomechanics of Prosthesis, Current trends in prosthetic management elbow disarticulation.

**7. Prosthetic Management of Transhumeral amputation:**

7.1. Medical Consideration, Advancement in socket technology, Biomechanics of Prosthesis, Current trends in prosthetic management Transhumeral amputation.

**8. Prosthetic Management of Shoulder Disarticulation:**

Medical Consideration, Advancement in socket technology, Biomechanics of Prosthesis, Current trends in prosthetic management Shoulder Disarticulation.

9. Prosthetic and orthotic management of Upper limb deficiency.

10. Emerging trends in Upper limb prosthetics: research and development.

11. Fitting and training the bilateral Upper limb amputee.

12. Prosthetic management of multiple limb deficient child

13. Upper -Limb Prosthetic Adaptations for Sports and Recreation.

**Reference:**

- omprehensive management of upper limb amputee[ Atkirs ,D.J ] 1989.
- Functional restoration of adults & children with upper extremity amputation :Meies, Robert H. ed, 2004,demas, NY.
- Upper extremity : Traumatic injuries & conditions – Child,S .( 1997 ).
- A text book of computer science for prosthetics & orthotic : S.K Panda , A.N Nanda ,R.R Swain, 1<sup>st</sup> edition; 2010.
- Amputation surgical practice & patient : Murdoch , G edition ;1996.
- Amputation & prosthetics : macy ,bella ,2<sup>nd</sup> edition ; 2002.
- Atlas of amputation & limb deficiencies: smith ,Douglash ;2004.
- Essentials of prosthetics & orthotics : Agarwal , AK ;2013.
- Orthotics & Prosthetics in rehabilitation : lusaudi ,Michelle M , 2<sup>nd</sup> edition ; 2007.
- Prosthetics & Orthotics : Seymour , Ron ; 2002.
- Prosthetics & Orthotics : Shurr ,G. Donald , 2<sup>nd</sup> edition ; 2000.
- Prosthetics & Orthotics patient management ,Carroll ,Kevin ; 2006.
- Ergonomics for therapist , Jacobs ,Karens ,ed ,3<sup>rd</sup> edition; 2008.
- Common problems in pain management ,Ferrer –Brechtner ,T; 1990.
- Comprehensive management of upper limb amputee,Atkins ,D.J ; 1989.
- Hand book of diabetes management ,Zazworsky ,Donna ,ed ; 2006.

<b>TITLE----- Advanced Upper Extremity Orthotics</b>
<b>COURSE CODE--- MPO 202</b>
<b>TEACHING HOURS---- 60</b>
<b>CREDITS --- As per affiliated university norms</b>

## **Objectives**

### **1. Gene ral Consideration**

Functional Anatomy of Hand.  
Bio-mechanical consideration in upper extremity orthotics.  
Design & fabrication principles.

2. Assessment & analysis of upper extremity specific to orthotic intervention.

3. Upper extremity orthotics & its classification.

4. Orthosis for Shoulder & Elbow.

5. Forearm based orthosis.

6. Hand, Finger, Thumb based orthosis.

### **7. Orthotic management of stroke and brain injured patient:**

General principle, Pathophysiology, Various treatment option, Orthotic treatment, Ergonomic consideration

### **8. Orthotic management of spinal cord injury:**

Pathophysiology, Historical perspective, Assessment and diagnostic tool, Level of injury, Treatment consideration and recommendation, Surgical management, Orthotic management, Research studies and outcome measures

### **9. Orthotic management of burned hand:**

Pathophysiology, Historical perspective, Rehabilitation intervention, Assessment and diagnostic tool, Treatment consideration and recommendation, Therapeutic management, Orthotic management, Splinting outcome, Research studies and outcome measures,

### **10. Orthotic management of the arthritic hand and wrist:**

Pathophysiology, Treatment recommendation, Surgical management, Non surgical management, Orthotic management and principles, Mechanism of action, Ulnar deviation orthoses in rheumatoid arthritis, Post operative care, Post operative orthotic management, Research studies and outcome measures

### **11. Orthotic management of brachial plexus injuries:**

Pathophysiology, Role of medical treatment, Treatment consideration, Role of orthosis and various principle, Research studies and outcome measures

### **12. Orthotic management of upper limb fracture:**

Type of fracture, Complication related fracture, Role of orthotic management, Rational for functional bracing, Functional bracing of diaphyseal humerus fractures, Functional bracing of diaphyseal ulnar fractures, Functional bracing of Colles fractures, Orthoses for protective equipment to the sports, Material used in orthotics, Orthotic consideration, Mechanism of action, Applied biomechanical principle, Open - cell and closed-cell splint, Pneumatic device, Research studies and outcome measures

### 13. Orthotic management of overuse disorders of the upper limb:

Pathophysiology, Treatment plan, Biomechanical consideration, Orthotic management, Lateral epicondylitis, Capital tunnel syndrome, Carpal tunnel syndrome, De Quervain tenosynovitis, Trigger finger (stenosing tenosynovitis), CMC arthritis, Operative management, Post operative orthotic management

#### Reference:

- Comprehensive management of upper limb amputee [ Atkins, D.J ] 1989.
- Functional restoration of adults & children with upper extremity amputation :Meies, Robert H. ed, 2004,demas, NY.
- Upper extremity : Traumatic injuries & conditions – Child, S. ( 1997 )
- Orthotics & Prosthetics in rehabilitation : Lusardi, Michelle M , 2<sup>nd</sup> edition ; 2007.
- Orthotics in functional rehabilitation of the lower limb : Nowoczenski, Deborah A ; 1997.
- Prosthetics & Orthotics : Seymour, Ron ; 2002.
- Prosthetics & Orthotics : Shurr, G. Donald , 2<sup>nd</sup> edition ; 2000.
- Prosthetics & Orthotics patient management, Carroll, Kevin ; 2006.
- Therapy for amputee : Engstrom, Barbare , 3<sup>rd</sup> edition , 1999.
- Orthotics in rehabilitation, Mckee, Pat ; 1998.
- Ergonomics for therapist, Jacobs, Karens, ed, 3<sup>rd</sup> edition; 2008.
- AO manual of fracture management, Wagner, Michael ; 2006.
- AO Principles of fracture management, Ruedi, Thomas P ; 2000.
- Common problems in pain management, Ferrer –Brechtner, T; 1990.
- Comprehensive management of upper limb amputee, Atkins, D.J ; 1989.
- Hand book of diabetes management, Zazworsky, Donna, ed ; 2006.
- Functional fracture bracing [ A saniento L.L Latta ] ; 2003.
- Orthotics in neurological rehabilitation –Aiseu, Dereos Publication, New York 1992.
- Orthotics : clinical practice & rehabilitation technology – cluscluill Livingston, Redford, J.B. ; 1993.
- Atlas of limb prosthetics –Bowker, P & Michace, D. chaps, C.V Mosby.
- Prosthetics and Orthotics: Shurr & Micheal
- Orthotics A Comprehensive Clinical Approach- Edelstein & Brucker



<b>TITLE----- Advanced Spinal Orthotics</b>
<b>COURSE CODE--- MPO 203</b>
<b>TEACHING HOURS---- 60</b>
<b>CREDITS --- As per affiliated university norms</b>

**1. Biomechanics of spine**

Physical characteristics of the spine  
The transmitting problem  
Other limiting factor  
Normal kinematics  
Application of force and its resolution  
Creep and biomechanical adaptation

**2. Spinal orthosis & its Classification**

Soft spinal orthosis  
Semi rigid spinal orthosis  
Rigid spinal orthosis.

**3. Principles & Components of spinal Orthosis.**

**4. Technological guidelines for spinal Orthosis**

Equilibrium condition, body segment dynamics, 3D effect on spine, visceral organ alignment, progression factors, Centre of Pressure

**5. Orthosis for Spinal pain: Pathophysiology, Treatment recommendations**

Cervical pain: Mechanism of action of lumbar orthosis, Motion restriction, Unloading of spinal column, Side effect and other consideration, Outcome studies and effectiveness of lumbar orthosis

Lumbar pain: Mechanism of action of lumbar orthosis, Motion restriction, Unloading of spinal column, Side effect and other consideration, Outcome studies and effectiveness of lumbar orthosis, Orthosis for spinal deformities.

**6. Orthotic management of Scoliosis :**

Anatomical consideration, Pathophysiology, Biomechanical consideration involved in treatment, Terminology and Classification of scoliosis, Test and measures used in the clinical examination, Treatment consideration, Use of Radiograph in Diagnosis, digital measurement techniques, Surgical intervention for scoliosis, Nonsurgical intervention for scoliosis, Orthotic management

### **7. Kyphosis :**

Pathophysiology, Biomechanical consideration ,Treatment consideration,Orthotic management, Scheuermann's kyphosis , post traumatic kyphosis

### **8. Spondylosis, spondylolisthesis & spondylolysis:**

Pathophysiology, Biomechanical consideration, Classification ,Treatment consideration, Orthotic management.

### **9. Orthosis for spinal fracture and trauma:**

Pathophysiology of fracture, Mechanism of injury, Classification of fracture, effects and complications of spinal fractures, Cervical spine fracture, Facet joint dislocation, Thoracic and thoraco-lumbar spine fracture, Lumbar spine fracture, Post operative care, Important consideration for orthotic postoperative management, Orthotic treatment in spinal fracture, Compression fracture, Burst fracture, Seat belt fracture, Chance fracture, Hangman fracture, Odontoid fracture, Jefferson fracture, Current issues and research.

### **10. Orthosis for spinal cord injured patient:**

Level of injury ,Pathophysiology, problem in spinal cord injury, Biomechanical consideration, Treatment consideration, Impact of orthotic management in SCI patient, Type of orthotic device used in SCI patient, Current issue and researches.

### **11. Orthosis for Osteoporosis:**

Pathophysiology, Biomechanical consideration, Clinical assessment and Orthotic management, Treatment consideration, Posture training support, Lumbosacral corset and dorsolumbosacral corset, TLSO- saggital plane control, Posterior shell TLSO, Management of acute and chronic pain, Current issues and research.

### **12. Orthosis in spinal instability:**

Biomechanics, Pathophysiology in spinal instability, Role of Orthotic treatment, Type of spinal orthosis, Cervical orthosis, Cervicothoracic orthosis, Sterno occipito mandibular immobilizers, Yale cervicothoracic orthosis, Minerva cervicothoracic orthosis, Halo orthosis, WISS orthosis, Other cervicothoracic orthosis. Effects of body alignment, balance and compensation.

### **Reference:**

- Rehabilitation of spine : Liebensohn, Craid ed, 2<sup>nd</sup> edition
- Clinical biomechanics of the spine : White, Augustan, Lippincott, Williams, 2<sup>nd</sup> edition
- Essentials of prosthetics & orthotics : Agarwal , AK ;2013.
- Orthotics : Edelstein ,joan E ; 2002.

- Orthotics & Prosthetics in rehabilitation : Iusaudi ,Michelle M , 2<sup>nd</sup> edition ; 2007.
- Orthotics in functional rehabilitation of the lower limb : Nowoczenski ,Deborah A ; 1997.
- Prosthetics & Orthotics : Seymour , Ron ; 2002.
- Prosthetics & Orthotics : Shurr ,G. Donald , 2<sup>nd</sup> edition ; 2000.
- Prosthetics & Orthotics patient management ,Carroll ,Kevin ; 2006.
- Orthotics in rehabilitation ,Mckee ,pat ; 1998 .[ JP Morgan].
- Ergonomics for therapist , Jacobs ,Karens ,ed ,3<sup>rd</sup> edition; 2008.
- AO manual of fracture management ,Wagner ,Michael ; 2006.
- AO Principales of fracture management ,Ruedi,Thomas P ; 2000.
- Common problems in pain management ,Ferrer –Brechtner ,T; 1990.
- AAOS Atlas of orthosis & assistive devices [ John D. HSU ].
- Orthotics in neurological rehabilitation –Aiseu, Dereos Publication ,New York 1992.
- Orthotics : clinical practice & rehabilitation technology – cluscluill Livingston ,Redford ,J.B. ; 1993.

<b>TITLE----- Pedagogy in P&amp;O Education &amp; Administration, Legal, Ethical Issues</b>
<b>COURSE CODE--- MPO 204</b>
<b>TEACHING HOURS----- 60</b>
<b>CREDITS --- As per affiliated university norms</b>

### **Part -I : Pedagogy in P&O Education**

1. **Education:** Introduction-Educational Philosophy- Idealism Naturalism, Pragmatism ,Aims of Education ,Functions of Education ,Formal, informal and non formal Education ,Agencies of Education ,Current issues and Trends in Higher Education ,Issue of quality in Higher Education ,Autonomy and Accountability, Privatization of Education
2. **Concept of Teaching and Learning :**Meaning and scope of Educational Psychology, Meaning and Relationship between teaching and learning, Learning Theories ,Dynamics of behaviour ,Individual differences
3. **Curriculum :** Meaning and concept ,Basis of curriculum formulation, Framing objectives for curriculum ,Process of curriculum development and factors involved, Evaluation of curriculum
4. **Method and techniques of teaching :** Lecture, Demonstration ,Discussion, Seminar ,Assignment ,Project ,Case Study
5. **Planning for teaching :**Bloom's taxonomy of instructional objectives ,Writing instructional objectives in behavioural terms ,Unit planning ,Lesson planning
6. **Teaching aids :**Types of teaching aids ,Principles of selection, preparation and use of audio-visual aids
7. **Measurement and Evaluation :** Nature of educational measurement: meaning, process, types of tests ,Construction of an achievement test and its analysis ,Standardized test ,Introduction of some standardized tools, important tests of intelligence, Aptitude and personality, Continuous and comprehensive evaluation
8. **Guidance and counseling :** Meaning & concepts of guidance and counseling ,Principles of guidance and counseling
9. **Awareness Programme:** Awareness and guidance to the common people about health and disease.

**Part -II : Administration, Legal Ethical Issues**

1. Hospital and rehab organization - Functions and types
2. Roles of Prosthetist & Orthotist in different hierarchy/ work set up.
3. Rules of Professional Conduct.
4. Legal responsibility
5. Code of conduct
6. Functions of P&O associations
7. Role of the International Health Agencies
8. Liability and obligations in the case of medical legal action
9. Law of disability & discrimination confidentiality of the Patient's status.
10. National and International policies/ acts /scheme as relevant to P&O profession  
(Consumer protection law, health law, MCI, RCI and others)

**Reference:**

- Badheka Gijubhai (2006) Diwaswapna. Montessori Bal Shikshan Samiti: Churu, Rajaldesar.
- Brown George and E.C. Wragg (1993) Questioning, Routledge: UK
- Brown George and E.C.Wragg (1993), Explaining, Routledge : UK.
- Elisabeth Dunne and Bennet Neville (1990) Talking and Learning in Groups. Routledge .
- Holt, John (1990) Learning All the Time. Addison-Wesley Publishing Co: New York
- Michael Marland (Indian Edition, 2005) Craft of the Classroom: A Survival Guide, Heinemann Educational,
- Johnson, D.W. and R.T. Johanson (1999) Learning Together and Alone: Cooperative Competitive and individualistic learning. (5th edition).
- Allyn & Bacom: Boston Pollard, Andrew (2002) Reflective Teaching. Continuum: London
- Freeman, Richard & Lewis, Roger (Indian reprint, 2005), Planning and Implementing Assessment, Routledge Falmer (
- Mukunda Usha (2008) Inculcating and enhancing the reading habit. Excerpt from a training manual for librarians in the southern region as part of an NCERT workshop in January 2008.
- Educational objectives: Stones E ,2012
- Educational psychology: Tuckman, Bruce W, 2011
- Educational psychology: C.L.Kundu, 6<sup>th</sup> edition,2015
- Educational psychology: Woolfolk, Anita,9<sup>th</sup> edition, 2011
- New dimensions of educational technology: Pathal,R.P, 2003

<b>TITLE----- Clinical Practice in Upper Extremity Prosthetics</b>
<b>COURSE CODE--- MPO251</b>
<b>TEACHING HOURS---- 200 ( Practical)</b>
<b>CREDITS --- As per affiliated university norms</b>

### **Objectives**

1. The student should be able to assess, diagnose, plan and execute the prosthetic treatment for children and adults with various amputation (congenital and acquired).
2. To maintain clinical record.
3. Assessment of minimum 20 patients with various amputation (congenital and acquired) .
4. Use of instrumentation in minimum 10 patients with amputation (congenital and acquired).
5. Plan and execute in minimum 5 patients with amputation (congenital and acquired).

<b>TITLE----- CLinical Practice in Upper Extremity Orthotics</b>
<b>COURSE CODE--- MPO 252</b>
<b>TEACHING HOURS----- 160 ( Practical)</b>
<b>CREDITS --- As per affiliated university norms</b>

### **Objectives**

1. The student should be able to assess, diagnose, plan and execute the orthotic treatment for children and adults with various disorders/deformity.
2. To maintain clinical record.
3. Assessment of minimum 20 patients with various disorders/deformity.
4. Use of instrumentation in minimum 20 patients with disorders/deformity.
5. Plan and execute in minimum 5 patients in each category.

<b>TITLE----- Clinical Practice in Spinal Orthotics</b>
<b>COURSE CODE--- MPO 253</b>
<b>TEACHING HOURS---- 200 ( Practical)</b>
<b>CREDITS --- As per affiliated university norms</b>

**Objectives**

1. The student should be able to assess, diagnose, plan and execute the treatment for children and adults with various disorders/deformity of spine.
2. To maintain clinical record.
3. Assessment of minimum 20 patients with various disorders/deformity.
4. Use of instrumentation in minimum 20 patients with disorders/deformity.
5. Plan and execute in minimum 5 patients in each category.



<b>TITLE----- DISSERTATION</b>
<b>COURSE CODE--- MPO 254</b>
<b>TEACHING HOURS---- 640 ( 220 in 1<sup>ST</sup> year &amp; 420 in 2<sup>nd</sup> year ) ( Practical)</b>
<b>CREDITS --- As per affiliated university norms</b>

Student will select a topic in his/her area of interest, in consultation with a supervisor/Guide, qualified for the purpose as recommended by the council/University for and carry out an independent dissertation, which will involve making research proposal, conduct of the work as per the documented methodology, statistical analysis, dissertation writing. The work will build on the knowledge acquired through study of research methodology and Biostatistics. Each candidate shall submit three copies of a dissertation well in advance before the commencement of 2<sup>nd</sup> Year Examination.

Evaluation of the dissertation will be done by the examiner (s) appointed by the University.

The approved guide for the dissertation will be allocated to the candidate immediately after the admission in the MPO Programme.