सत्यमेव जयते

भारतीय पुनर्वास परिषद्

Curriculum Framework

Master in Prosthetics and Orthotics

(M.P.O.)

Norms, Regulations & Curriculum Framework

2025

Effective from Academic Session 2024-25

Two Years Duration (Annual)

REHABILITATION COUNCIL OF INDIA

(Statutory Body of the Ministry of Social Justice & Empowerment) Department of Empowerment of Persons with Disabilities (Divyangjan) Government of India

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Master in Prosthetics and Orthotics (M.P.O.) Programme

I. PREAMBLE

World Health Organization (WHO) describes Prosthetics and Orthotics as a specialized health care profession that combines a unique blend of clinical and technological skills. The Prosthetic and Orthotic Professionals assess, evaluate patients, prescribe, custom design, fit and follow up the patients using orthoses, prostheses and assistive devices. Prosthetic and Orthotic Professionals also provide appropriate use/gait training for biomedical adaptation for functional mobility and comfort. Prosthetic and Orthotic Professional does not only provide service to persons with neuro- musculoskeletal disorder and persons with disabilities, but also provides service to general health and work related disorder such as foot disorders, fracture, sports injuries, disorders due to aging, tendinitis, muscular pain, aesthetic restoration etc. Prosthetics and Orthotics Professionals play an important role in the comprehensive pre and post-surgical management of amputee and other neuro-musculoskeletal disorders. Prosthetics and Orthotics Professionals make the patient independent, confident, and a useful member of the society through comprehensive prosthetic and orthotic rehabilitation and palliative interventions.

According to the 2011 census, there are 26.8 million people with disabilities in India, out of which 20% or 5.4 million have locomotor disabilities. Moreover, there are 138 million elderly people and 2-3% school going children suffers from pes planus, knock knee, scoliosis and other musculoskeletal disorder. They may require some form of prosthetics, orthotics and assistive technology intervention. Therefore, the total potential demand for prostheses, orthoses and assistive technology intervention in India is around 250 million people. To achieve the 2030 Agenda, it is the need of time to ensure that prosthetics and orthotics services are accessible and affordable for all. According to World Health Organization, one Prosthetics and Orthotics Professional is needed on every 250 persons with physical disabilities and neuro musculoskeletal disorder. Hence, more than 1,00,000 Prosthetics and Orthotics Professional is required meet the current demand of prosthetics, orthotic and assistive technology Intervention for persons with physical disabilities and neuro musculoskeletal disorder of Indian society.

This document refers to the 2 years post graduate program with three specializations viz. Prosthetics, orthotics, and Assistive Technology to create specialized professionals in the field of prosthetics and orthotics. The aim is to create high quality professionals to demonstrate high quality clinical services, P&O education and research in the field. The Program aims to develop specialized human resources in the field of prosthetics and orthotics to meet the increasing demand of the society.

II. NOMENCLATURE (As per the Specialization)

a. MASTER IN PROSTHETICS & ORTHOTICS WITH SPECIALIZATIONIN PROSTHETICS OR

b. MASTER IN PROSTHETICS & ORTHOTICS WITH SPECIALIZATIONIN ORTHOTICS OR

c. MASTER IN PROSTHETICS & ORTHOTICS WITH SPECIALIZATIONIN ASSISTIVE TECHNOLOGY

III. OBJECTIVES:

1. Patient Care

At the end of the MPO Course, the candidates shall be able to

(1) Assess, prescribe and provide comprehensive prosthetic and orthotic management to the individual and the community appropriate to his/her position as a member of the health care team.
(2) Be competent to take preventive, supportive, corrective and rehabilitative steps in respect to the commonly encountered problems related to prosthetics and orthotics.
(3) To carry out Evidence Based Practice in prosthetics and orthotics
(4) Appreciate the psycho-social, cultural, economic, and environmental factors affecting health, and develop humane attitude towards the patients/relatives, in discharging one's professional responsibilities
(5) Be familiar with the various National policies and Acts related to Persons with Disabilities.
(6) Acquire basic management & administrative skills in the areas of materials, financial and human resources related to prosthetics and orthotics
(7) Develop the communication skills to establish effective communication with the stakeholders
(8) Practice prosthetics & orthotics ethics in patient care, service delivery, and research.
(9) Develop an attitude for self-learning and acquire necessary skills including the use of appropriate technologies.

2. Research

The candidate should be able to

(a) Recognize a research problem.

(b) State the objectives in terms of what is expected to be achieved in the end.

(c) Plan a rational approach with full awareness of the statistical validity.

(d) Spell out the methodology and carry out most of the technical procedures required for the study.

(e) Accurately and objectively record on systematic lines the results and observations made.

(f) Analyze the data using appropriate statistical approaches.

(g) Interpret the observations in the light of existing knowledge and highlight in what ways the study has advanced existing knowledge on the subject and what remains to be done.

(h) Draw conclusions which should be reached by logical deduction and he / she should be able to assess evidence both as to its reliability and its relevance.

(i) Write a thesis in accordance with the prescribed instructions.

(j) Be familiar with the ethical aspects of research.

3. TEACHING

He/ she should be able to plan educational programs in Prosthetics and Orthotics in association with his senior colleagues and be familiar with the modern methods of teaching and evaluation.

The candidate should be able to :-

- Deliver lectures to undergraduates and hold clinical demonstrations for them.
- Write and discuss a seminar or a symposium and critically discuss it with his colleagues and juniors.
- Methodically summarize internationally published articles according to prescribed instructions and critically evaluate and discuss each selected article.
- Present cases at clinical conferences, discuss them with his colleagues and guide his juniors in groups in evaluation and discussion of these cases.

IV. SCOPE OF THE PROGRAMME

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having P&O Professionals in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of P&O Professionals range from improving access to healthcare services to significant reduction in the cost of care, the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied health professionals in the system, such as in the case of stroke survivors, it is the support of P&O Professionals that significantly enhance their rehabilitation and long term return to normal life. Children with locomotion/ physical difficulties, the elderly, cancer patients, patients with long-term conditions such as diabetes people and amputees; the list of people and potential patients who benefit from P&O Professionals is indefinite.

Thus, the breadth and scope of the P&O practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- The patients having complex and challenging problems resulting from systemic illnesses such as in the case of diabetes, and elderly care to parkinsons, dementia, peripheral vascular disease, Charcot arthropathy.
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and
- With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society.

PROGRAM OUTCOME:

At the end of the program the student must be able to;

- Assess the medical condition of a patient related to their orthotic or prosthetic management using appropriate investigative techniques which include patient history taking and clinical testing.
- Formulate an optimal prosthetic and orthotic solution using information from the patient assessment, other members of the health care team, medical charts, etc.

- Communicate and discuss patient goals and expectations and discuss and debate the prosthetic management with the patient, co-workers and other members of the health care team.
- Reliably measure and capture a positive cast or image of patient / clients' appendage while correctly positioning the body part and if appropriate apply the necessary corrective force system.
- Identify, prescribe and justify selection of appropriate materials and componentry in the fabrication of the prostheses or orthoses.
- Construct the prostheses or orthoses using appropriate fabrication techniques in preparation for the initial fitting.
- Fit the prostheses or orthoses to the patient using static and dynamic functional criteria established from the original assessment.
- Evaluate the quality of the prostheses or orthoses fit to ensure the appropriate interface contouring, force application and trim lines.
- Identify problems related to device fit and/or alignment and be able to suggest and implement appropriate correction.
- Assess and solve prosthetic or orthotic problems as part of short and long term patient care.
- Maintain accurate records of patient treatment and follow up as well as confidentiality of such information.
- Communicate effectively with patient, co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.
- Educate the patient /client and/or caregiver on use, care and function of the prostheses or orthoses.
- Understand the methodology of problem identification, problem solving in a process that includes all stake holders, with the patient at the centre.

PRACTICE SETTINGS

Prosthetics and Orthotics services are delivered in a variety of settings which allow it to achieve its purpose. Prevention, health promotion, treatment/intervention, habilitation and rehabilitation take place

in multiple settings that may include:

- Orthotic and prosthetic facilities
- Hospitals and Super Specialty clinics
- Sports and Ergonomics
- Acute care facilities
- Rehabilitation facilities
- University, education and research facilities
- Rural outreach clinics
- Home health settings
- Skilled nursing facilities
- Community based rehabilitation programmes
- Community settings including primary health care centres, and field settings
- Occupational health centres
- Out-patient clinics
- Private offices, practices, clinics
- Public settings for health promotion
- Schools, including pre-schools and special schools
- Senior citizen centres
- Sports centres/clubs
- Workplaces/companies

V. GENERAL FRAMEWORK OF THE COURSE

A. DURATION OF THE PROGRAMME

Duration of the programme will be of 2 academic years. Each year will have 1200 notional hours.

Students have to successfully complete the program within 4 years from the date of admission.

B. ELIGIBILITY FOR ADMISSION

B.P.O./ B. Sc (P&O) degree from any recognized University in India with minimum 50% marks.

ADMISSION PROCESS AS PER AFFILIATING UNIVERSITY NORMS

All reservations in admission will apply as per Govt. rules for aided and Govt. institutions. The infrastructure will have to be enhanced as per the seats getting increased under reservation policy. Foreign nationals who meet the eligibility criteria may also be allowed to take admission in the MPO program as per the guidelines issued by the Government of India

C. MEDIUM OF INSTRUCTIONS: English.

D. METHODOLOGY

The curriculum is planned for fulltime and physical mode or face to face mode similar to all other bachelor courses. The transactional methodology of the programme includes lectures, demonstration, assignment project work, quiz and discussions, visits to various prosthetics and orthotic centres, practice teaching, participation in community meetings, medical camps and community development programmes.

In first year students will make use of techniques used in the table given below. The use of these techniques addresses many issues such as suboptimal use of resources and equipment, by adequately training the manpower on newer technologies, limitations for imparting practical training in real-life scenarios, and ineffective skills assessment methods among others.

E. INTAKE CAPACITY

The intake per year 10 minimum

F. WORKING DAYS & ATTENDANCE

Each year shall be considered as a unit for the purpose of calculating attendance. Students should attend a minimum of 80% in theory the number of working periods (lectures, seminars/presentation, topic discussion, question-answer session, class test and other curriculum transaction as per the Institute norms) and 90% in clinics during each year. Failure to put in / meet the required attendance by any student renders him / her disqualified to appear in the university examination. The candidate will appear the examination subsequently

after completing requisite attendance if fail to take the examination for want of attendance. Shortage of attendance can be condoned in genuine cases of absenteeism as per rules and guidelines of respective Universities.

G. SEMESTER/ANNUAL PROGRAMME STRUCTURE WITH BREAK UP OF HOURS AND CREDITS (THEORY/PRACTICAL)

CREDIT POINT DISTRIBUTION:

THEORY: -30 notional hours = 1 credit

Break up of Theory Notional Hours

1. 15 hours' lecture hour or direct classroom hour on face to face mode teaching
2. 5 hours' counseling /guidance/query based learning/doubt clearing session with small group learning (sample size of focus group preferable less than 10 students at a time) or individual learning or differentiated instructions
3. 5 hours' self-study/presentation and discussion by student/peer/group
4. 2 hours on verification and feedback on teacher's home task/assignment
5. 2 hours on diagnostic measures and guidance
    a. To Identify the students who are having trouble or need help on a particular topic
    b. To Locate the errors or learning difficulties
    c. To find out the causal factors of slow learning and to take necessary measures
6. 1 hour on internal assessment and feedback

PRACTICAL: - 30 notional hours =1 credit

The 5-point grading system following letter grades recommended by the UGC as given below:

Grades and Grade Points

Letter Grade	Grade Point	Qualitative Level
A	5	Excellent
B	4	Very Good
C	3	Good
D	2	Average
E	1	Unsatisfactory

FIRSTYEAR

Course Code	Title	Theory Hrs	Practical Hrs	Total Hrs	Credit Points	Internal Marks	External Marks	Total Marks
MPO101	Clinical Biomechanics	90	90	180	06	25	75	100
MPO102	Pedagogy in P&O Education & Ethical Issues	90	----	90	03	25	75	100
MPO103	Robotics and Mechatronics	90	90	180	06	25	75	100
MPO104	Research Methodology & Biostatistics	90	--	90	03	25	75	100
MPO105	Entrepreneurship and Start up in P&O and AT	90	-----	90	03	25	75	100
	Dissertation – Synopsis submission and approval		120	120	04	--	--	--
PRACTICAL								
MPO 151	Clinical Practice in Prosthetics, orthotics and Assistive Technology	--	450	450	15	--	--	--
	Total	450	750	1200	40	125	375	500

Note: 1. First year will be common to all 03 specializations.

2. Second year including dissertation shall have specialized subjects

Number of Theory and Examination: 05

Number of Practical and Examination: 01

Dissertation (Synopsis in 1st year and final Thesis submission in 2nd year)

- In the first year the students have to prepare the Research proposal (Synopsis) and present the same in the Seminar/Ethics committee for approval within the timeline/guidelines of concerned University.

- In the second year for respective subject code (MPO 255, MPO 355 and MPO 455) and specialization, student will work on a selected topic of dissertation prepared under supervision and guidance of recognized faculty and will submit the same within due time limit prescribed by the concerned university before appearing find examination

- Final thesis shall be assessed by one internal and one external examiners for 100 marks in which the average of marks assigned by both the examiner shall be awarded to the candidate or it shall be assessed as accepted or as rejected with no marks carried there of as per concerned University norms. In the event of discrepancy between internal & external examiners the dissertation will be referred to a third examiner and his / her verdict on the same will be taken as final.

- The candidates shall submit four copies of dissertation before the commencement of the final theory examination of that year. Candidates who fail to submit their dissertation on or before the stipulated date shall not be permitted to appear for the final year examination.

) SECOND YEAR (SPECIALIZATION IN PROSTHETICS

Course Code	Title	Theory Hrs	Practical Hrs	Total Hrs	Credit Points	Internal Marks	External Marks	Total Marks
MPO201	Clinical Prosthetics Practice in Paediatrics	150	--	150	05	25	75	100
MPO202	Clinical Prosthetics Practice In Sports and Recreation	120	--	120	04	25	75	100
MPO203	Clinical Prosthetics Practice in Adult & Geriatric	120	--	120	04	25	75	100
MPO204	Clinical Prosthetics Practice In Maxillofacial Surgery and Aesthetic Restoration	120	--	120	04	25	75	100
PRACTICAL								
MPO 251	Clinical Prosthetics Practice In Paediatrics	--	120	120	04	25	75	100
MPO 252	Clinical Prosthetics Practice In Sports and Recreation	--	90	90	03	25	75	100
MPO 253	Clinical Prosthetics Practice In Adult & Geriatric	--	90	90	03	25	75	100
MPO 254	Clinical Prosthetics Practice In Maxillofacial Surgery and Cosmetic Restoration	--	90	90	03	25	75	100
MPO255	Dissertation- Thesis	--	300	300	10	---	---	100
		510	690	1200	40	200	600	900

Number of Theory and Examination: 04
Number of Practical and Examination: 04
Dissertation 01

SECOND YEAR (SPECIALIZATION IN ORTHOTICS)

Course Code	Title	Theory Hrs	Practical Hrs	Total Hrs	Credit Points	Internal Marks	External Marks	Total Marks
MPO301	Clinical Orthotics Practice in Pediatrics	150	--	150	05	25	75	100
MPO302	Clinical Orthotics Practice In Sports and Recreation	120	--	120	04	25	75	100
MPO303	Clinical Orthotics Practice in Adult and Geriatric	120	--	120	04	25	75	100
MPO304	Clinical Orthotics Practice in Spinal disorder	120	--	120	04	25	75	100
PRACTICAL								
MPO 351	Clinical Orthotics Practice in Pediatrics	--	120	120	04	25	75	100
MPO 352	Clinical Orthotics Practice In Sports and Recreation	--	90	90	03	25	75	100
MPO 353	Clinical Orthotics Practice in Adult and Geriatric	--	90	90	03	25	75	100
MPO 354	Clinical Orthotics Practice in Spinal disorder	--	90	90	03	25	75	100
MPO355	Dissertation- Thesis	--	300	300	10	---	---	100
		510	690	1200	40	200	600	900

Number of Theory and Examination: 04
Number of Practical and Examination: 04
Dissertation 01

SECOND YEAR (SPECIALIZATION IN ASSISTIVE TECHNOLOGY)

Course Code	Title	Theory Hrs	Practical Hrs	Total Hrs	Credit Points	Internal Marks	External Marks	Total Marks
MPO401	AT in Neurology and Orthopedics	150	--	150	05	25	75	100
MPO402	AT in Transportation and Mobility	120	--	120	04	25	75	100
MPO403	AT in Sports and Recreations	120	--	120	04	25	75	100
MPO404	AT in Geriatric and Paedriatic	120	--	120	04	25	75	100
PRACTICAL								
MPO 451	AT in Neurology and Orthopedics	--	120	120	04	25	75	100
MPO 452	AT in Transportation and Mobility	--	90	90	03	25	75	100
MPO 453	AT in Sports and Recreations	--	90	90	03	25	75	100
MPO 454	AT in Geriatric and Paedriatic	--	90	90	03	25	75	100
MPO455	Dissertation- Thesis	--	300	300	10	---	---	100
		510	690	1200	40	200	600	900

Number of Theory and Examination: 04
Number of Practical and Examination: 04
Dissertation 01

H. EXAMINATION PATTERN

The examination pattern will adhere to the respective University norms. Minimum passing marks for every subject will be 50% both in theory and practical. Each candidate will be given maximum n+ 2 attempts to clear the examination whether annual or semester. Annual Program with Continuous Assessment and TermEnd examination will be followed.

(1) NATURE OF EVALUATION

Internal assessment for theory Courses will not exceed 25% in the theory and practicum wherever applicable or as per respective University norms. Internal Assessment should be calculated by conducting minimum two class tests, two assignments, examination/practical examination and any other activities implemented by the parent organizations/university. Marks of Internal Assessment should be informed to the Students prior to commencement of university examinations.

(2) TRANSITORY REGULATIONS

Whenever a course or scheme of instruction is changed in a particular year, two more examinations immediately following thereafter shall be conducted according to the old syllabus / regulations. Candidates not appearing at the examinations or failing in them shall take the examinations subsequently according to the changed syllabus / regulations/as per University norms.

Criteria of Passing: As per respective University norms

(3) ADEQUACY OF THE SYLLABUS

The syllabus prescribed for the M.P.O. is based on minimum requirements and therefore, Universities and Institutes implementing the M.P.O. programme can exercise flexibility in opting the number of papers without compromising on the adequacy and validity of the contents prescribed by the RCI.

(4) SCHEME OF INSTRUCTION

a. There shall be a University examination at the end of each year. The duration of the theory exam is 3 hours.
b. Every theory question paper shall ordinarily consist of five questions with one question for each unit, subject to the concerned universities regulation.
c. In case of theory papers the continuous evaluation (Internal Assessment) will be for 25 marks. This covers a maximum of 5 marks for attendance & 15 marks for tests, seminars, assignments etc. or as per University norms.

d. For clinical practicum, continuous evaluation (Internal Assessment) will be based on performance of the candidate during the year. Examination for clinical practicum will be held along withtheory papers by the university.

e. The concerned department shall notify in the first week of each year, scheme of continuous evaluation (Internal Assessment) for theory & practical or as per University norms.

f. At least one week prior to the last working day, continuous evaluation (Internal Assessment) marks secured by the candidates shall be displayed on the notice board.

g. In case of repeat test/seminar to candidates who absented themselves, matter may be dealt as per University norms.

h. The statement of continuous evaluation (Internal Assessment) shall be sent to the Registrar(Evaluation)/examination section for both theory and clinical practicum at least one week prior to the commencement of the particular year examination.

I. DISSERTATION

In the first year the students have to prepare the Research proposal (Synopsis) and present the in the Seminar/Ethics committee for approval at the end of the first year. In the 2 nd year, student will work on a selected topic of dissertation prepared under supervision and guidance of recognized faculty member and will submit the same at the end of the year. This shall be assessed by one internal and one external examiners for 200 marks in which event the average of marks assigned by both the examiner shall be awarded to the candidate or it shall be assessed as accepted or as rejected with no marks carried there of as per concerned University norms. In the event of discrepancy between internal & external examiners the dissertation will be referred to a third examiner and his / her verdict on the same will be taken as final. The candidates shall submit four copies of dissertation before the commencement of the theory examination of the 2nd year. Candidates who fail to submit their dissertation on or before the stipulated date shall notbe permitted to appear for the final year examination.

CLINICAL PRACTICE:

Clinical Practice is an integral part and core of Master program in Prosthetics and Orthotics. The students shall attend all types of client population starting from lower limb, spine, upper limb and cranial support in all conditions of disease, disorder, amputation, trauma and congenital anomalies. At the end of the 1st

and 2nd years internal viva voce examination will be carried out for award of internal assessment for clinical work performed throughout the year.

J. CRITERIA OF PASSING: As per respective University Norms

K. BOARD OF EXAMINERS, VALUATION

a. There shall be a Board of Examiners for scrutinizing and approving the question papers and scheme of valuation or as per University rules.
b. The examiners for scrutinizing and approving the question papers and scheme of valuation shall be from outside the institution/university or as per University rules.
c. Double valuation for the theory; dissertation and the average of the marks awarded by the internal and external examiners shall be taken as the final award or as per University rules.
d. In case of 20% or more deviation in the marks awarded by the internal and the external evaluator, the scripts shall be referred to the third evaluator and his evaluation will be final or as per University rules.
e. Grace marks to the candidate will be awarded based on University rules.

CLASSIFICATION OF SUCCESSFUL CANDIDATES

As per rules of the respective universities. Announcement of result, classes and ranks for the course as a whole will be as per the concerned university regulations.

The provision of repeat examination or reappearance or reentry or registration due any reasons including emergency/medical may be considered as per the regulations of concerned university.

MISCELLANEOUS

Any other issue not envisaged above shall be resolved by RCI / the Vice Chancellor in consultation with the appropriate body of the University which shall be final and binding.

L. AWARD OF DEGREE:

The respective University on successful completion of the requirements will award the degree as given below;

A. Master in Prosthetics and Orthotics with specialization in Prosthetics
B. Master in Prosthetics and Orthotics with specialization in Orthotics
C. Master in Prosthetics and Orthotics with specialization in Assistive Technology

This is as per the candidate choice of specialization in second year as Awarded by respective university

M. Registration as Personnel/Professional and Category of Registration:

As per Section 13 of RCI Act, it is mandatory for every rehabilitation professional / personnel to obtain a "Registered Personnel/Professional Certificate" from the Rehabilitation Council of India to work in the field of disability rehabilitation and special education in India. A Student who has attended the training and completed the requirements for all Units successfully will be qualified as a Prosthetist and Orthotist – PROFESSIONAL and be eligible to work in the field of Rehabilitation in India as a **Prosthetist and Orthotist**. As continuous professional growth is necessary for the renewal of the certificate, the rehabilitation professional / personnel should undergo in-service programme periodically to update their professional knowledge. Each registered professional/personnel will be required to get himself /herself renew his registration periodically. The periodicity will be decided by the council from time to time. The activities for enrichment training programmes in the form of Continuous Rehabilitation Education (CRE) is decided by the RCI

The training institution/organization should take appropriate action to ensure that all passed out students are registered with the Council.

VI. INFRASTRUCTURE REQUIREMENTS FOR STARTING THE COURSE (**Indicative/Suggestive,** *latest RCI norms and revision if any from time to time may supersede all including below mentioned criteria)*

A. HUMAN RESOURCE REQUIREMENT

Senior faculty in the discipline of Prosthetics and Orthotics shall be considered as course coordinator/ HoD. The coordinator/ HoD should be the controlling and informant

authority for the correspondence related to the MPO program. He/she should hold qualification of prosthetics and orthotics as laid down by RCI.

l. No.	**Core Faculty**	**Column- I Up to 10 seats**	**Column-II up to 20 seats**
1.	Professor & Head Department of Prosthetics & Orthotics	01	01
2.	Associate Professors (Prosthetics &Orthotics)	00	01
3.	Assistant Professor/Lecturer (Prosthetics & Orthotics)	01	02
4	Demonstrator(Prosthetics & Orthotics)	01	03

B. TEACHER STUDENT RATIO

One: Six (1:6)/ As per RCI Norms

C.QUALIFICATION & EXPERIENCE OF THE CORE FACULTY (Ref: RCI MRR F.No.7-128/RCI/2021 12th May 2021)

S. N.	DESIGNATION	QUALIFICATION & EXPERIENCE in UniversityDepartment	PAY SCALE
1.	Professor (Prosthetics & Orthotics)	**Essential:** a) Master in Prosthetics and Orthotics b) Ph.D. in the core areas c) 5 years teaching experience as Associate Professor in Prosthetics and Orthotics d) Valid RCI Registration **Desirable:** a) Minimum of five publications in index Journal b) Experience of Research Projects/ guiding research in Master/Doctoral level c) Outstanding achievement in the field of Prosthetics & Orthotics	As per UGC
2.	Associate Professor (Prosthetics & Orthotics)	**Essential:** a) Master in Prosthetics and Orthotics b) 10 years teaching experience at PG/UG level c) Valid RCI Registration **Desirable:** a) Ph.D. in the core areas b) Minimum of four publications in index Journal c) Experience of guiding research/Thesis at Master level	As per UGC

3.	Assistant Professor/ Lecture (Prosthetics & Orthotics)	**Essential:** a) Master in Prosthetics &Orthotics b) Valid RCI Registration **Desirable:** 2 year experience in Prosthetics &Orthotics	As per UGC
4.	Demonstrator(P&O)	**Essential:** a) Bachelor in Prosthetics &Orthotics b) Valid RCI Registration **Desirable:** Master in Prosthetics & Orthotics	As per Institute norms
Clinical Staff			
5	Prosthetist & Orthotist/	**Essential:** a) Bachelor in Prosthetics &Orthotics b) Valid RCI Registration	As per Institute norms

NOTE:

- These qualifications are applicable for future recruitment. The case of teachers who are already holding teaching posts and have more than 10 years teaching experience will continue to hold their post in their respective institution.
- Minimum qualification for Assistant Professor should be Master in Prosthetics and Orthotics.
- Minimum of 2 teaching faculty members in core areas will be required for giving recognition for the first year.
- Before the commencement of second academic year one more Faculty member must be appointed.
- In case of Professor not being available, 1 Readers/Associate Professors (additional)should be appointed to accommodate teaching, research guidance and administrative work.
- Faculties with Masters in Prosthetics and Orthotics to be allowed to act as a guide and internal examiner

GUEST/PARTTIME FACULTY REQUIREMENTS FOR THE FOLLOWING DISCIPLINES

1. Mechatronics and Robotics
2. Pedagogy in P&O Education & Administration, Management & Ethical Issues
3. Research Methodology and Biostatistics
4. Entrepreneurship and start up in P&O and AT

D. CLINICAL INFRASTRUCTURE

Hospital set up with OPD facility. Institute may tie up or have MoU with nearby hospital for P&O clinical Practice. Facilities for diagnostic evaluation of Neurological disorders, Diabetics, Fracture, post-surgical, spine, foot disorder, congenital anomalies, locomotor impairment and associated disorders, both functional and organically based. Load and variety of patients should be commensurate with number of courses conducted and to meet the clinical practicum requirement of each year of the course.

E. LIBRARY

There should be a separate library in the Institute / College/ University. It should be easily accessible to the teaching faculty and the students. It should have comfortable seating arrangements for the students and teachers in the institute. There should be separate budget for the library. The library committee should meet regularly for keeping the library updated withcurrent books, journals and other literature. Internet facility should be provided in the library and to the faculty & students. The library should have proper lighting facilities and it should be well- ventilated. It should have a cabin for librarian with intercom phone facility. There should be sufficient number of cupboards, books shelves and racks with glass doors for proper and safe storage of books, magazines, journals, newspapers and other literature. There should be provision for catalogue-cabinets, racks for student's bags, book display racks, bulletin boards and stationeryitems like index cards, borrower's cards, labels, registers etc.

F. INFRASTRUCTURAL REQUIREMENTS: As per affiliation norms

The Institute / College/ University should have separate department and academic block constructed in about 1000 square meters. Adequate hostel accommodation for students should be available in addition to the above-mentioned built up area of the MPO course.

Details of the constructed area given below are for the intake capacity up to 10 students:

S.No.	Name	Minimumsize in Sq.Ft.
Classroom Teaching		

1	Classrooms (02)with audio-visual facility	02@300=600
2	One room for clinical meeting	300
3	Common Multi-Purpose Hall(optional)	2000
4	Two students common room (One for male & one for female students	800
5	Computer Laboratory Room	600
Office/Faculty Members room		
6	One course coordinator room	200
7	One Office Room	150
8	Prosthetics & Orthotics faculty rooms (04)	04@100= 400
Clinical/Lab Facility		
9	Reception & patient registration*	400
10	Waiting room for the patients*	1350
11	Two assessment & Casting Lab (One for men & one for women)	02@200= 400
12	One Plaster room	400
13	Prosthetic Lab including all necessary equipment	750
14	Orthotic Lab including all necessary equipment	750
15	Two trial fitting rooms(One for men & one for women)	02@200= 400
16	Gait training Laboratory	500
17	One Store room	900
18	Advanced Manufacturing LAB/CAD-CAM/ 3-D Printer	500
19	Cosmetic Restoration Lab or Silicon Lab	400
20	Electronics and Design Lab	400
Hostel Facility		
21	Hostel facility	As per intake capacity

* Common area such as lobby may be used for reception and patient waiting.

Note: The above mentioned space shall be used only for Prosthetics & Orthotics training only.

1. **CLASS ROOMS**

There should be at least two classrooms with the capacity of accommodating the number of students admitted in each class. The rooms should be well ventilated/ thermo-conditioning facility with proper lighting system. There should be built in LCD projector/White Boards.

Also there should be a desk/a big table and a chair for the teacher and Racks/ cupboards for keeping teaching aids or any other equipment needed for the conduct of classes.

2. **Record Room**

There should be a separate record room with steel racks, built-in shelves and racks, cupboards and filing cabinets for proper storage of records and other important papers/ documents belonging to

the college.

3. Other Facilities

Safe drinking water and adequate sanitary/toilet facilities should be available for both men and women separately in the college. Toilet facility to the students should be there along with wash basin/ hand washing facilities.

4. Fire Extinguisher

Adequate provision for extinguishing fire should be available as per the local byelaws.

5. Playground

Playground should be spacious for outdoor sports like Volleyball, football, badminton etc.

6. Recreation

There should be facilities for indoor and outdoor games for the students

G. OFFICE FURNITURE AND EQUIPMENT

Course Coordinator/HoD Room:

There must be adequate number of office rooms as per the norms and in proportion to the number of teaching faculty with telephone and internet connection. Senior faculty member in the discipline of Prosthetics and Orthotics shall be course coordinator/ HoD. The coordinator/HoD will be the controlling and informant authority for the correspondence related to the MPO/BPO program. He/she must hold qualification as laid down by RCI.

7. Audiovisual Instruments: Appropriate Number of Audio-visual material should be provided as prescribed.

H. LIST OF TOOLS AND EQUIPMENT REQUIRED FOR MPO PROGRAM

A. LIST OF COMMON EQUIPMENTS

S.n.	Name of equipment	Minimum qty. required
1.	Hot air oven, heating chamber size-36" wx24"dx30"h, with double layer toughened front visible glass with inside light arrangement, max temp. 350degree c 12 kw rating and 1 hp3 phase motor for fan with digital timer thermostat temp controller.	1 no.
2.	Polisher converted to cone sanding, 2 hp 3 phase motor	1 no.
3.	Infra red oven (optional)	1no.
4.	Bench grinder cum sander, 0.5 hp single phase motor, abrasive wheel size 10" x 1"	1 no.

5.	Pillar drilling machine, drilling capacity 25mm, pillar dia 87mm max. Distance spindle to table 600mm, table working surface dia 400mm with 1hp 3 phase motor	1 no.
6.	Bench drilling machine with sand, capacity ½”	1 no.
7.	Industrial leather and canvas sewing machine with ¼” hp motor	1 no.
8.	Adjustable circular saw, circular saw dia 18”, working table size 24”x36”, max depth of cut 5 ½” with 3hp 3 phase motor	1 no.
9.	Belt and disc sander, disc dia. 10”, belt size 6”x 48” with 1 hp 3 phase motor	1 no.
10.	All-purpose saw , temperature range 100-600 degrees c, power input 2000w	1 no.
11.	Hot air gun , temperature range 100-600 degree c, power input 2000w	1 no.
12.	Jig saw machine, sawing depth in wood 54mm, rated 350w	1 no.
13.	High vacuum machine with ¼” hp motor	1 no.
14.	Removable mandrills	3 no.
15.	Mandrill for air suction mounting and draping for sockets	3 no.
17.	Hot water bath for softening low temperature thermoplastic sheets	1 no.

18	Draping frame size (small)	2 no.
19.	Draping frame size (large)	2 no.
20.	Adjustable / fixed grinding and milling machine with dust collector	1no.
21.	Sanding roll	02
22.	Sanding sleeve	02
23.	Sanding drum	02
24.	Tool holder	05

25.	Deep drawing tool set	02
26	Rasp head	01
27.	Hot sealing iron?	02
28.	Staple gun	02
29.	Hand drill machine	04
30.	Cord less hand drill machine	02
31.	Instrumented GAIT ANALYZER AND TRAINER	01
32.	Shoe finishing machine	01
33.	WORKING TABLE WITH PEG BOARD (minimum 10 tables are required for 10 students)	10
34.	Over locking machine	01
35.	Laser aligner	01
36.	Lathe machine (optional)	01
37	Inter locking machine	01
38	3-D Printer and Design software	01
39	Myo trainer or EMG data logger	01
40	Micro motor, vice and all accessories for silicon lab	1 set
41	Foot Scanner/ Diabetic foot Scanner /Gait MaT	01
42	Infrared Oven and Vacuum/suction set	01
43.	Magnifying Glass	02
44.	Universal Braille Kit	02
45.	Refreshable Braille Display	02
46.	Reading glasses	02
47.	Large print Display	02
48.	screen magnifiers	02
49.	White & Sensor Based Cane for blind, each one	02
50.	Smartphone/ Tablet with Specialized software	02
51.	Retro fit Kit	02
52.	Cushion for seating	02
53.	hearing aid (Pocket type, Programmable, Non programmable BTE)	02
54.	AI powered smart vision glass	02
55.	Teaching & Learning Material Kit for IDD Children , one for each group	01
56.	Portable ramp	01
57.	Retro fitment / Adaptation kit for Motor cycle	02
58.	ADL/Self-care Kit for Senior Citizen	02
59.	Recreational kit for blind	02
60.	Tactile Signage	02
61.	ADL kit for Blind	02
62.	Alternative and Augmentative Communication Device	01

B. List of common Tools and Material

S.No.	Name of Equipment	Minimum Qty. Required
1.	Flat file bastard 2nd cut 10", 2nd cut 12"	10 no. each
	Aluminum Flat File 10" & 12"	10 no. each
2.	Round file 6", 8", 2nd cut	10 no. each
3.	Flat file 10" round 2nd cut	10 no each
4.	Triangular file 6", 10" 2nd cut	10 no each
5.	Rasp file half round 10", 12",8"	10 no. each
6.	Rasp file flat 10", 12"	10 no. each
7.	Rasp file round 6", 10"	10 no. each
8.	Screw driver 150x6mm, 200x8mm, 250x8mm	10 no. each
9.	Flat chisel 12mm,20mm,25mm	2no. each
10.	Cold chisel 12mm, 20mm	2no. each
11.	Half round chisel 12mm, 20mm	2 no. each
12.	Ruler steel 600mm, 300mm	2no. each
13.	Steel square with leg 200mm	2 no. each
14.	Caliper inside/outside 200mm	2no. each
15.	Compass/ Driver 200mm Outside/inside caliper	2 no. each
16.	Hammer ball peen 500 gms, 250gms	10 no. each
17.	Mallet hammer with handle	2no. each
18.	Hammer seaming plier (pincer) 10", 12"	4 no. each
19.	Nipper 150mm, 200mm	2 no. each
20.	plier 200mm	10 no. each

21.	Long nose plier 150 mm	10 no. each
22.	Revolving Hole punch 250gms	10 no. each
23.	Centre punch	10 no. each
24.	hole punch 2mm, 3mm	3 no. each
25.	Hole punch set	2 no.
26.	Scissor 10" & 12 "	10 no.each
27.	Hacksaw Frame 300mm	10 no.
28.	Hacksaw blades 300mm	1 pkt of 144 pc
29.	Tap set 3, 4,5,6,7,…….mm	2 no. each
30.	Tap handle	2 no. each
31.	Grip plier	10 no.
32.	Die set 3,4,5,6,7,… mm	2 no. each
33.	Cross pein hammer	10 no.
34.	wire cutter	10 no.
35.	Measuring tape	10 no.
36.	Shoe maker hammer	5 no.

37.	Anvil	2no.
38.	Half round leather Knife (Rapi)	5 no.
39.	Nipper shoe maker 8”	5 no.
40.	Leather knife	2 no.
41.	Bender brace 5.5 mm	1 no.
42.	Bender brace 6.5 mm	1no.
43.	cone sander fine, medium, coarse	10 no. each
44.	Plaster knife 150x200mm, 2000x750x350mm	10 no.
45.	Upper Limb Prosthetic Kit (B/E, A/E, S.D) body powered	2 no. each

46.	Externally powered kit (B/E & A/E)	1 each
47.	Vice limb maker (modified)	1 no.
48.	Bending fork (Set of two pieces)	2 no.
49.	Caliper A-P measurement above knee	2 no.
50.	Ear Protector	05 no.
51.	Nut replacement tool 7mm, 9mm	2 no. each
52.	Heat proof gloves	4 pairs
53.	Cooper rivets ¼”, ½” material	1 kg each
54.	Aluminium rivets ¼”, ½” material	1 kg each
55.	Eyelet punch	10 no.
56.	Rivet head finishing punch	10 no.
57.	Plastic D-rings 1”, 1 ½”, & 2” material	5 pkts each
58.	Buckles 1”, 1 ½’ & 2” Material	5 pktseach
59.	Micrometer	2 no.
60.	Ritz scale for M-L diameter/ALIMCO B.K. caliper	2 no.
61.	Allen keys / T-handheld Allen keys (1mm-10mm)	10 set
62.	Press button	5 pkts
63.	Evathene foam 4mm, 6mm, 8mm thickness	5 sheets each
64.	Polypropylene and co polymer sheets (white) 3mm, 4mm & 5mm thickness	5 sheets each
65.	Dendrite solution	5 ltr (5 tin)
66.	Velcro straps (hook & loop) ¾”, 1” and 2”	2 roll each
67.	Silicone lab material	5
68.	Diabetic insole materials	2
69.	Surlyn / Flexible socket Material	5
70.	Carbon fiber	5
71.	Carbon fiber energy storing foot	5

72.	Low temperature thermo plastic sheets 3.2mm/4.2 mm thickness	5 sheets each
73.	Aluminum strips (4mm) thickness	5 kg.
74.	Aluminum sheet (4mm thickness), 1 mm=18 gauge (BSW)	2 sheet
75.	Drill bits, Full Set Max diameter (7/64", 1/8", 9/64", 5/32", 3/16", 11/64", ¼", 3/8", ½")	1 set
76.	Different modular system for lower limb prostheses	5 set each
77.	Torque wrench	01
78.	Bench Vice	10
79.	Vernier Caliper (adjustable digital)	10
80.	V-BOX	02

B. LIST OF TOOLS AND EQUIPMENT REQUIRED FOR PATIENT EXAMINATION AND CASTING ROOM

S.No.	Name of Equipment	Minimum Qty.Required
1.	Measuring Tape	10
2.	Flexible Steel Rule	10
3.	Aluminum Tripod	02
4.	Casting Apparatus Under Weight Bearing	02
5.	Casting Apparatus For Above Knee Amputee	01
6.	Plaster Bandage Trolley	01
7.	Foot Measuring Device	01
8.	Oscillating Saw – Multimaster	02
9.	Spinal Casting Apparatus	02
10.	Hook Knife	05
11.	Plaster Cutting Scissors	04
12.	Examination Couch	02
13	X-Ray Image Viewer	02
14.	Goniometer	05
15	Pedobarography Machine	01

D: PLASTER MODIFICATION AREA / ROOM

S.No.	Name of Equipment	Minimum Qty Required
1.	Plaster Work Table	02
2.	Plaster Cast Shelf	01
3.	Pipe Vice	05
4.	Plaster Bucket	05
5.	Mixing Bowl	20
6.	Plaster Stirrer	20

7.	Surform File Flat	20
8.	Surform File Round (Blade Only)	15
9.	Surform File Half Round (Blade Only)	15
10.	Plaster Spatula	15
11.	Tape Measure	10
12.	Goniometer	05
13.	Special Plaster Knife	05
14.	Draw Knife	02
15.	Plaster Cutting Scissors	04

16	Mandrills	20
17.	Plaster Separation Sink	01

E: PATIENT TRIAL AREA

S.No.	Name of Equipment	Minimum QtyRequired
1.	Parallel Bar With Mirror On Both Side	01
2.	Portable Heat Gun	01
3.	Cordless Hand Drill Machine	01
4.	Revolving Centre Punch	05

F. LIST OF ADVANCED TOOLS, EQUIPMENTS & MACHINERIES (*):

SL NO.	Name of Equipment	Minimum Qty Required
1.	3D Force plate	01
2.	Foot scanner	01
3.	Foot sensor	01
4.	10 gm Monofilaments	01
5.	Foam box for foot casting	01
6.	3D Motion analysis system with camera and active, passive Marker	01
7.	Podostat	01
8.	Digital Biothesiometer	01
9.	Gait analyser	01
10.	Hand held laser	01
11.	3D Laser Aligner	01
12.	Pinchometer	01
13.	Jammer Hand dynometer	01
14.	Spinal Mouse	01
15.	Electrogoniometer	01
16.	CAD-CAM Lab.	01
17.	3D L.A.S.A.R	01
18.	SCOLIOMETER	01
19.	3D Scanner	01
20.	3D Printer	01
21.	Myo-Lab	01
22.	Spinal Testing Lab	01
23.	Electronic- Testing Lab	01
24.	Silicon Lab	01
25.	Assistive-Technology Lab	01

*The Institute/College may have MoU with Centre where such facilities are available

CLINICAL PRACTICUM-

The student should be able to meet the following learning objectives:

- Assess the medical condition of a patient related to their orthotic or prosthetic management using appropriate investigative techniques which include patient history taking and clinical testing.
- Formulate an optimal prosthetic and orthotic solution using information from the patient assessment, other members of the health care team, medical charts, etc.
- Communicate and discuss patient goals and expectations and discuss and debate the prosthetic management with the patient, co-workers and other members of the health care team.
- Reliably measure and capture a positive cast or image of patient / clients' appendage while correctly positioning the body part and if appropriate apply the necessary corrective force system.
- Identify, prescribe and justify selection of appropriate materials and componentry in the fabrication of the prostheses or orthoses.
- Construct the prostheses or orthoses using appropriate fabrication techniques in preparation for the initial fitting.
- Fit the prostheses or orthoses to the patient using static and dynamic functional criteria established from the original assessment.
- Evaluate the quality of the prostheses or orthoses fit to ensure the appropriate interface contouring, force application and trim lines.
- Identify problems related to device fit and/or alignment and be able to suggest and implement appropriate correction.
- Assess and solve prosthetic or orthotic problems as part of long term patient care.
- Maintain accurate records of patient treatment and follow up as well as
- confidentiality of such information.
- Communicate effectively with patient, co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.
- Educate the patient /client and/or caregiver on use, care and function of the prostheses or orthoses.
- Understand the methodology of problem identification, problem solving in a process that includes all stake holders, with the patient at the center.

VII. PROGRAMME CONTENT

FIRST YEAR

Course Code	Title	Theory Hrs	Practical Hrs	Total Hrs	Credit Points	Internal Marks	External Marks	Total Marks
MPO101	Clinical Biomechanics	90	90	180	06	25	75	100
MPO102	Pedagogy in P&O Education & Ethical Issues	90	----	90	03	25	75	100
MPO103	Robotics and Mechatronics	90	90	180	06	25	75	100
MPO104	Research Methodology & Biostatistics	90	--	90	03	25	75	100
MPO105	Entrepreneurship and Start up in P&O and AT	90	-----	90	03	25	75	100
	Dissertation – Synopsis submission and approval		120	120	04	--	--	--
PRACTICAL								
MPO 151	Clinical Practice in Prosthetics, orthotics and Assistive Technology	--	450	450	15	--	--	--
	Total	450	750	1200	40	125	375	500

TITLE ---- CLINICAL BIOMECHANICS
COURSE CODE--- MPO 101
TEACHING HOURS- Theory(90)
CREDITS --- 03

Course description: The course focused on various clinical conditions and its biomechanics. Clinical conditions ranges from Amputation to Paralysis. This course covers functional anatomy, neurophysiology and mechanical characteristics of humans at the tissues and whole-body levels. Pathomechanics of human movement resultant from disease, abuse or trauma will be examined. Special emphasis will be placed on etiology, testing and correction of functional disorders with special reference to posture, gait and biomechanics in musculoskeletal disorder.

Learning Objectives

- The objective of the course is to gain an understanding of the clinical biomechanics of the spine, pelvis, and extremities as this forms the foundation to be able to scientifically diagnose and apply treatment to correct the alignment
- To stimulate an understanding of the concepts underlying clinical biomechanics, and promote an understanding of how the application of biomechanics can provide insights into balance and locomotive disorders and/or adaptations.
- The fundamentals of the science of biomechanics
- The biomechanics of normal human motion
- The biomechanical basis of selected orthopedic tests
- The biomechanical basis of selected neuromusculoskeletal conditions

Learning Outcome

- Describe a range of common human movement disorders and adaptations.
- Critically evaluate and analyses biomechanical/human movement data.
- Review and critically evaluate the application of biomechanics in the clinical context
- Apply various methods for analyzing and quantifying human movement with focus on biomechanical modeling to determine joint forces and moments.
- Apply biomechanical theory to gain insights into balance, locomotive disorders and/or movement

adaptations.

- Scientifically critique key research articles in the subject area.
- Know about ergonomic principles to design work places
- Joint kinetics calculations and interpretation
- Gain increased knowledge about the role of the sensory systems in balance and mobility control
- Gain increased knowledge about the impact of different heath conditions and pathologies on balance and mobility
- Gain experience with performing critical reviews of published scientific findings
- Gain knowledge and practice performing different clinical tests designed for the assessment of posture and mobility at different stages of lifespan development and/or for different health conditions
- Gain experience reading and performing clinical case reports. Gain project management experience and gain skills to manage and navigate group dynamics over the course of conducting the final case study report
- Gain greater understanding and experience with preparing a clinical case report using the scientific method.

S.NO	TOPIC (Theory)-90 Hours
1.	Normal musculoskeletal and neural control system function (e.g. motor control, sensory inputs)
2.	Biomechanical properties (kinematic and kinetic) of the spine
3.	Biomechanical properties (kinematic and kinetic) of the extremities
4.	Pathomechanics of human movement resultant from disease, abuse or trauma
5.	Clinical Gait Analysis of 5 different pathological conditions and its Kinetics
6.	Gait Initiation, Gait Foot deformation during ground contact to attenuate the reaction forces from the ground
7.	Biomechanics of the intevertebral disc – including function and stability related to load and motion, basic anatomical pathology
8.	Gait Analysis of children with scoliosis. Mechanics of scoliosis brace in postural perturbation
9.	Knee Osteoarthritis and Gait changes, Kinetics of Knee braces
10.	energy Expenditure, Measurement of Energy Expenditure, pathological gait with emphasis on polio, cerebral palsy, dystrophies, hemi paresis, Para paresis
11.	3D and advanced gait and posture analyses; including using inverse dynamics modelling to determine joint moments and muscle powers.
12.	3D Kinetic & kinematic Analysis, motion analysis & force plate analysis of Clinical Conditions
13.	Analysis of body segment in wheel chair propulsion
14.	Biomechanics of shoulder , elbow in Wheel chair

15.	**Applied biomechanics**: Running, stair climbing & changes in gait following various surgeries/ diseases/ disorders. Basic wheelchair skills and assessment training. Gait Analysis in partial foot amputation & prosthetics, Syme's amputation & prosthetics & Transtibial prosthetics, Through knee prosthetics, Transfemoral prosthetics & Hemipelvictomy/ Hip Disarticulation prosthetics, Gait analysis in AFO, KAFO, Bilateral involvement, Gait Training and analysis of gait deviations. Necessary correction in specific Gait Deviations

Practical - 90 hours

- Gait Analysis of all Prosthetic and Orthotic Devices, Analysis, Clinical interpretation, necessary correction in design/fabrication and Documentation.
- Formal write-up of lab practical investigating the biomechanics of human locomotion
- Faculty evaluation of contribution to weekly 'round table' discussion session of key research papers in the subject area

Text Book and References

Sl. No.	Author	Title.	Publisher	Year/Vol
	D. J. DuPlessis	Synopsis of Surgical Anatomy	Williams & Wilkins	
	Henry Gray, Henry Gray, M.D., F.R.S.	Anatomy, Descriptive and Surgical	Creative Media Partners, LLC	2015
	John T. Hansen	Essential Anatomy Dissector Following Grant's Method	Lippincott Williams & Wilkins	2002
	Richard S. Snell	Clinical Anatomy for Medical Students	Lippincott Williams & Wilkins	2008
	Arthur C. Guyton, John Edward Hall	Textbook of Medical Physiology	Elsevier Saunders	2006
	Abul K. Abbas, Jon C. Aster, Vinay Kumar	Robbins and Cotran Pathologic Basis of Disease	Elsevier/Saunders	2015
	Bjorn Knollmann, Laurence L. Brunton, Randa Hilal-Dandan	Goodman and Gilman's The Pharmacological Basis of Therapeutics	McGraw-Hill Education	2018
	Wilbur Pardon Bowen	Applied anatomy and kinesiology	Maven Books	2023
	Peggy A. Houglum, Dolores B Bertoti	Clinical Kinesiology	F.A. Davis	2011
	Kathryn	Kinesiology – Scientific	Brown &	1997

	Luttgens, Nancy Patricia Hamilton	Basis of Human Motion,	Benchmark	
	Fabio Galbusera	Biomechanics of Spine	Elsevier Science	2018
	Ellen Kreighbaum, Katharine M. Barthels	Biomechanics – A Qualitative approach for studying Human Motion	Allyn and Bacon	1996
	Pamela K. Levangie, Cynthia C. Norkin	Joint Structure and Function - A Comprehensive Analysis	F.A. Davis Company	2011
	Margareta Nordin, Victor Hirsch Frankel	Basic Biomechanics of Muscular Skeletal System	Lippincott Williams & Wilkins	2001
	Roger Bartlett	Introduction to Sports biomechanics	Taylor & Francis	2002
	James G. Hay	Biomechanics of Sports	Prentice-Hall	1993
	Devon I. Rubin, Jasper R. Daube	Clinical Neurophysiology	Oxford University Press	2009
	Augustus A. White, Manohar M. Panjabi ·	Clinical Biomechanics of the Spine	Lippincott	1990
	Rose & Gamble	Human Walkin		
	Perry J	Gait analysis		

TITLE ---- PEDAGOGY IN P&O EDUCATION & ETHICAL ISSUES
COURSE CODE--- MPO 102
TEACHING HOURS- Theory(90)
CREDITS --- 03

Course Description: Pedagogy is often described as the act of teaching. The pedagogy adopted by teachers shapes their actions, judgments, and teaching strategies by taking into consideration theories of learning, understandings of students and their needs, and the backgrounds and interests of individual students. Teaching method is an important parameter to be learned by each and all students of Master Program. The intent of Master Program in Prosthetics and Orthotics is also to train the students for future faculties on the said program. This course describes the education, teaching methods in the field of Prosthetics and Orthotics in India and in the world as well. The total syllabus has been planned as per

pedagogical **goals, objectives & outcomes** for each course.

Learning objectives:

- To examine the Epistemological basic of education
- To learn Teaching and Learning Process in education
- To understand the concept and principles of curriculum development
- To understand the formulation of new curriculum
- To develop the ability to read & comprehend
- Become cognizant of key concepts such as measurement and evaluation, assessment, test examination, formative and summative evaluation
- Be exposed to different kinds of assessment that aid student learning
- Learn the different characteristics of standardize test reliability, validity, norms and methods for evaluation content of syllabus.
- Relate and use statistics in educational setting.
- Sensitize the future teachers towards basic understanding of various key concepts of studies
- Learn about gender issues in college, curriculum, textual materials across disciplines, pedagogical process and its interaction with class, caste, religion and region
- Help them understand the contribution of women with disability, women with medical conditions in disadvantage position and other minor groups in social, economic & political development of the society
- Apply the conceptual tools learn regarding gender & sexuality to understand issues related to sexual harassment at the workplace and child sexual abuse in practice.
- Analyze the education programmes and policies, which incorporate local community engagement aspects

Learning Outcome

- Acquired the knowledge of the terms and concepts used in the pedagogical analysis of Prosthetics and Orthotics
- Students should develop knowledge and skill in teaching methods in Prosthetics and Orthotics education
- Apply the knowledge in analyzing different courses in Prosthetics and Orthotics in terms of the techniques and aids for the purpose of education
- Develop skills in the preparation of lesson plan and construction of evaluation tools using

the suitable techniques

- Develop interests in learning recent developments in Prosthetics and Orthotics
- Develop a desirable positive attitude towards the teaching of Prosthetics and Orthotics
- Develop a practical understanding of the technology of teaching Prosthetics and Orthotics and giving them practice in the use of various aids relating to the technology of teaching.
- Get an insight into the organization of co-curricular activities like Prosthetics and Orthotics conferences, CRE, clubs and science exhibition.
- Develop an understanding the nature and scope of Prosthetics and Orthotics education in India and its role in society

Sl .	Topic
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.	**Prosthetics and Orthotics and Education:** History of P&O education in India, Chronological development and its impact, Different Institution of India imparts P&O education or Services, Current issues and trend in Global Education System on P&O, Conceptual tools learn regarding gender & sexuality to understand issues related to sexual harassment at the workplace
3.	**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
4.	**Curriculum** : Meaning and concept ,Basis of curriculum formulation, Framing objectives for curriculum ,Process of curriculum development and factors involved, Evaluation of curriculum
5.	**Method and techniques of teaching**: Lecture, Demonstration ,Discussion, Seminar ,Assignment ,Project ,Case Study
6.	**Planning for teaching** :Bloom's taxonomy of instructional objectives ,Writing instructional objectives in behavioural terms ,Unit planning ,Lesson planning
7.	**Teaching aids** :Types of teaching aids ,Principles of selection, preparation and use of audio-visual aides

8.	**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
9.	**Guidance and counseling:** Meaning & concepts of guidance and counseling ,Principles of guidance and counseling
10.	**Awareness Programme:** Awareness and guidance to the common people about health and disease
11.	**Ethical Issues:** Rules of Professional Conduct. 4. Legal responsibility 5. Code of conduct

Reference Books:

- 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: NewYork
- Michael Marland (Indian Edition, 2005) Craft of the Classroom: A SurvivalGuide, 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. Excerptfrom 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, 6th edition,2015
- Educational psychology: Woolfolk, Anita,9th edition, 2011
- New dimensions of educational technology: Pathal,R.P, 2003

TITLE: Robotics and Mechatronics
COURSECODE--- MPO103
TEACHING HOURS -- 90
CREDITS---03

Course Description: Mechatronics deals with both electrical and mechanical systems. It also includes robotics, electronics, computers, Artificial Intelligence and a variety of other academic disciplines including Prosthetics and Orthotics. This course is very beneficial since it allows students to have a better understanding of robots, to apply in prosthetics and Orthotics and do research on them.

Learning Objective:

- The objectives of this course are Identify robots and its peripherals for satisfactory operation and control of robots for industrial and non-industrial applications
- Understand key elements of Mechatronics system, representation into block diagram
- Understand concept of transfer function, reduction and analysis 3. Understand principles of sensors, its characteristics, interfacing with DAQ microcontroller
- Understand the concept of PLC system and its ladder programming, and significance of PLC systems in industrial application
- Understand the system modeling and analysis in time domain and frequency domain
- Understand control actions such as Proportional, derivative and integral and study its significance in industrial applications
- Use sensors and actuators
- Design basic feedback controllers
- Create Arduino scripts to solve logic and control problems
- Interpret the frequency response of mechatronic components.

Learning Outcomes:

- Identification of key elements of mechatronics system and its representation in terms of block diagram
- Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O
- Interfacing of Sensors, Actuators using appropriate DAQ micro- controller
- Time and Frequency domain analysis of system model (for control application)
- PID control implementation on real time systems

- Development of PLC ladder programming and implementation of real life system.
- List and explain the basic elements of industrial robots
- Analyze robot kinematics and its control methods.
- Classify the various sensors used in robots for better performance
- Summarize various industrial and non-industrial applications of robots.
- Application of MEMS and NEMS

SL NO.	TOPIC
1.	**Sensors:** Measurement of displacement, position, motion, force, torque, strain gauge, pressure flow, temperature sensor sensors, smart sensor. Optical encoder, tactile and proximity, ultrasonic transducers, opto-electrical sensor, gyroscope. Principles and structures of modern micro sensors, micro-fabrication technologies: bulk micromachining, surface micromachining, LIGA, assembly and packaging
2.	**Fundamentals of control system & Signal processing** Basic block diagram of control system, Control schemes–Open loop and closed loop, Laplace Transforms, Mathematical Model of Physical System, PI and PID Controllers, Hydraulic and Pneumatic Controllers, Time Domain Analysis, Transient Response of First and Second Order Systems. Continuous-time and Discrete-time Signals: Representation of signals, Signal classification, Types of signals –Operations on signals Scaling, Shifting, and Transformation of independent variables, Sampling LTI Systems-Continuous-Time and Discrete-Time Fourier transforms.
3.	**Microprocessor:** The architecture and programming of the 8051 processor, the design and programming of the 16-bit 8085 microprocessor and its interaction with a variety of peripheral ICs
4.	**The fundamentals of Micro Electro Mechanical Systems (MEMS)**, including the various materials used in MEMS, semiconductors and solid mechanics used to fabricate MEMS devices, various sensors and actuators, and MEMS applications in disciplines other than Electrical and Mechanical engineering
5.	**Smart materials** for mechatronics applications
6.	PLC System, Interfacing of Sensors, Actuators using appropriate DAQ micro-controller
7.	**Artificial Intelligence, Machine Learning**, representation, problem-solving, machine learning, knowledge acquisition, and learning methodologies, and their benefits and drawbacks, may be used to solve specific engineering problems
8.	**Robotics**: 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
9.	MAT lab, Mimics, FEA/ANSYS/ABAQUS and NVIDIA Isaac Sim & Isaac ROS

Text Books and References

1. Introduction to Circuit Analysis- Robert L. Boylestad, Pearson.
2. A Text Book of Electrical Technology- B.L. Theraja and A.K. Theraja, S Chand & Company Ltd.
3. Fundamentals of Electric Circuits – Charles K. Alexander and Matthew N.O. Sadiku, McGraw Hill Education.
4. Principle of Electronics -V. K. Mehta, S Chand & Company Ltd.
5. Grob's Basic Electronics - Mitchel E. Schultz, McGraw-Hill.
6. Fundamentals of Electrical Engineering - Robert P. Ward, Prentice-Hall.
7. Electronic Circuits: Discrete and Integrated - Donald L. Schilling, Mcgraw-Hill.
8. Modern Control Systems – R. C. Dorf and R. H. Bishop, Addison Wesley.
9. Microprocessors and Microcontrollers - N. Senthil Kumar, OUP India.
10. Digital Signal Processing- John G. Proakis and Dimitris G. Manolakis, Prentice Hall.
11. Tom M. Mitchell- Machine Learning - McGraw Hill Education, International Edition
12. Christopher M. Bishop Pattern Recognition and Machine Learning- Springer, 2nd edition
13. Alpaydin, “Introduction to Machine Learning”, PHI, 2005.
14. Laurence Fausett, “Fundamentals of Neural Networks”, Prentice Hall
15. Russell, Norvig, Artifificial Intelligence: A Modern Approach, Third edition, Prentice Hall,2010
16. Artificial Intelligence: A Modern Approach – S. Russell and P. Norvig, Pearson Education.
17. Artificial Intelligence – E. Rich and K. Knight, Mc-Graw Hill
18. Ian Goodfellow, YoshuaBengio and Aeron Courville,” Deep Learning”, MIT Press, First Edition, 2016.
19. E.WGolding,F.CWiddis,“ElectricalMeasurementsandMeasuringInstruments”,2011,1stedition,Reem Publications Pvt.Ltd,NewDelhi.
20. Allen Mottershed, “Electronic Devices and Circuits”, Prentice Hall International, Third Edition
21. Adel S. Sedra, Kenneth C. Smith & Arun N. Chandorkar, “Microelectronic Theory and Applications”, 2013, 6th edition, Oxford University Press, NewDelhi

TITLE: Research Methodology & Biostatistics
COURSECODE--- MPO104
TEACHINGHOURS - 90-Theory
CREDITS---03

Course Description: Course description: The student would acquire the knowledge of the research problem, design, Sampling, data collection, analysis of data, Testing hypotheses, interpretation and report writing to prosthetics and Orthotics.

Learning objectives:

- Explain the process, types, design, needs, and principles of research.
- Formulate an appropriate research plan in order to solve a clinical problem.
- Examine the concepts of estimation and hypothesis testing with applications to population proportions, means, variances.
- Describe the sampling, data collection and processing of data.
- Examine the data by using different measures.
- Perform effective descriptive statistical analysis as well as statistical inference for a variety of mainstream applications.
- Use appropriate empirical and probability distributions to model data.
- Conduct a basic research study in order to solve a clinical problem.

SL NO.	TOPIC
1.	**Research Preparation and Planning** Objectives of research – Understanding research and its goals. Critical thinking. Techniques for generating research topics. Topic selection and justification. Techniques involved in designing a questionnaire – Methods of scientific enquiry – formulation of hypotheses and testing of the same – Development of a research proposal, problem statement, purpose statement, research questions, gap analysis and hypothesis. Steps in formulating research proposal.
2.	**Research Resources** Sources of information: Literature search. World Wide Web, Online data bases – search tools. Citation indices - Principles underlying impact factor – literature review

	– Case studies, review articles and Meta-analysis – Record of research review -- Role of the librarian. Ethical and Moral Issues in Research, Plagiarism, tools to avoid plagiarism -- Intellectual Property Rights – Copy right laws – Patent rights. Indexed Journal and Predatory journals and its impact on research publication.
3.	**Research Paper Writing & Presentation** Proposal submission for funding agencies, Elements of Style. Organization of proposals, Basic knowledge of funding agencies, Research report writing, Communication skills, Tailoring the presentation to the target audience – Oral presentations, Poster preparations, Submission of research articles for Publication Reputed to journal, Thesis writing, and Research report writing. Elements of excellent presentation: Preparation, Visual and Delivery. Oral Communication skills and Oral defense, Journal Article Critique.
4.	**Data Collection, Analysis and Inference** Basic Statistical Distributions and their applications: Binomial, Poisson, Normal, Exponential, Weibull and Geometric Distributions. Sample size determination & sampling techniques: - sample size calculation as applied to medical research Random sampling, stratified sampling, systematic sampling and cluster sampling. Large Sample Tests and Small Sample Tests: Student–t-test, F-test and $\chi 2$ test, ANOVA, MANOVA and their applications in research studies. Correlation and Regression Analysis-Time series analysis: Forecasting methods. Factor analysis, Cluster Analysis and Discriminant Analysis (Basic ideas only). Principles of Experimentation, Basic Experimental Designs: Completely Randomized Design Randomized Block Design and Latin Square Design. Factorial Designs
5.	**Evidence based Practice(EBP)** : Patient, context and best research evidence, Basis Concepts of translational and applied research - procedures of Clinical trials - knowledge of funding and regulatory institutions. Helsinki declaration - Familiarity with the ICMR ethical guidelines for biomedical research - Institutional Ethics Committee – functions and powers - informed consent. Evidence based practice and its impact, Inter and intra discipline research study
6.	**Research Designs:** Randomized Controlled Trial (RCT), Case Controlled Studies, Cross-sectional studies, Cohort. Qualitative Research, Quantitative Research: Descriptive/Non-experimental, Quasi-experimental , Experimental Observational, Developmental, Correlational, Mixed Methods Research Convergent (parallel/concurrent) Explanatory, Exploratory

Reference Text Book and Journals

Sl. No.	Author	Title	Publisher	Year/Vol.
1.	Ranjit Kumar	Research Methodology A Step-by-Step Guide for Beginners	SAGE Publications	2010
2.	Carolyn Hicks	Research Methods for Clinical Therapists Applied Project Design and Analysis	Churchill Livingstone/Elsevier	2009
3.	Elizabeth Domholdt	Physical Therapy Research Principles and Applications	Saunders	2000
4.	Uwe Flick	Introducing Research Methodology A Beginner's Guide to Doing a Research Project	SAGE Publications	2014
5.	C. R. Kothari	Research Methodology Methods and Techniques	New Age International (P) Limited	2004
6.	World Health Organization	International Classification of Functioning, Disability and Health ICF.	World Health Organization	2001
7.	Adil E. Shamoo, David B. Resnik	Responsible Conduct of Research	Oxford University Press	2009
8.	Allan J. Kimmel	Ethical Issues in Behavioral Research Basic and Applied Perspectives	Wiley	2009
9.	Andy Field, Graham Hole	How to Design and Report Experiments	SAGE Publications	2002
10.	Tiffany Bergin	An Introduction to Data Analysis Quantitative, Qualitative and Mixed Methods	SAGE Publications	2018

TITLE: Entrepreneurship and Start up in P&O and AT
COURSECODE--- MPO105
TEACHINGHOURS - 90-Theory
CREDITS---03

Course Description:

The subject aims to provide a detailed coverage of fundamentals concepts and important issues associated with entrepreneurship. It highlights on the essential skill set a successful entrepreneur should possess as well as the essential elements of an entrepreneurial ecosystem. The subjects focuses on the discussion of important procedures to convert innovative ideas into result-oriented actions and emphasizes use of critical and innovative thinking to add value.

Learning objectives:

- Describe the mechanics of materials and be able to apply these conceptsto the design and construction of devices.
- Compareandcontrastthefunctionalcharacteristicsofprostheticcomponents.
- Formulate appropriate prosthetic and orthotic prescriptions for wide range clinical situations.
- Understand and describe the roles of key members of the healthcare team and identify how they interrelate with the Prosthetist and Orthotists

Learning Outcome

- This course will provides you the opportunity to develop your business plan, as well as to read and evaluate many business plans, synopses, and cases , setting up of workshop, clinic.
- Students will be able to guide promoters and key role holders of start-ups for setting up, stabilizing and scaling up of new enterprises with due regard to the dynamics of entrepreneurial ecosystem .
- They will attain abilities to assist the management in implementing innovative ideas for adding values to the products and organization, stabilize operations and scale up with appropriate execution of business plans.
- They will acquire skill set to perform valuation to facilitate fund raising and devising appropriate exit strategies for early- stage investors.

S.NO	TOPIC (Theory)-90 Hours
1	**Introduction to Entrepreneurship and Start – Ups**: Define Entrepreneurship, characteristics of entrepreneurship, Functions of entrepreneurship, types of Entrepreneurships, concepts of entrepreneur and intrapreneur, Business Structures. M Resources, Micro, Small, Medium Enterprise/ MSME - Industry Registration Process, Startup India, Standup India and Startup registration process,
2	**Business Ideas and their implementation:** Discovering ideas and visualizing the business with Activity map, Product Identification, Business Plan- The Marketing Plan and Financial Plan/ Sources of Capital, Business opportunity identification and evaluation, Market research, Marketing Mix (4Ps- product,price, promotion,place), Importance and concept of Innovation, Sources and Process, Risk analysis and mitigation by SWOT Analysis
3	**Management Practices:** Industry, Commerce and Business, Types of ownership in the organization, Different Leadership Models, Functions of Management- Merits & Demerits, Financial organization and management, Differences between Management and Administration,
4	**Start-up opportunities**: The New Industrial Revolution – The Big Idea- Generate Ideas with Brainstorming- Business Start-up - Ideation- Venture Choices - The Rise of The start up Economy - The Six Forces of Change- The Start-up Equation – The Entrepreneurial Ecosystem – Entrepreneurship in India. Government Initiatives.
5	**Startup Capital Requirements and Legal Environment**: Identifying Startup capital Resource requirements - estimating Startup cash requirements - Develop financial assumptionsConstructing a Process Map - Positioning the venture in the value chain - Launch strategy to reduce risks- Startup financing metrics - The Legal Environment- Approval for New VenturesTaxes or duties payable for new ventures.
6	**Business Model**: Business Founder, Business Plan – Sales Strategies, Business Plan – Funding Requirements, Disability – WHO, ISPO and Other information
7	**Idea to action:** Cultivating innovation- assistive technology, prosthetics / orthotics, idea of business plan/ clinic set up/ workshop set up/ direct sell in assistive technology/ prosthetics and orthotics, entrepreneurs with disabilities: the role of assistive technology, current status and future outlook, High Tech Assistive Technology in Business, Understanding motivations of entrepreneurs in the assistive technology market, AT, Entrepreneurship & Finance - with GDI Hub's Assistive Technology. Evidence on Needs and Business Feasibility in O&P,
8	**Obtaining Business Licenses and permits :** Business Licenses, business permits, choosing a form of business organization, sole proprietorship, partnership, corporations, Limited Liability company.
9	**Project Proposal & Exit strategies**: Project planning and report, Feasibility study, Project cost estimation , Breakeven point, Return on investment and Return on sales

Text Books and References

Sl. No.	Author	Title.	Publisher	Year/Vol
	Paul Burns	New Venture Creation A Framework for Entrepreneurial Start-ups	Bloomsbury Publishing	2018
	Dr. O.P. Gupta	Fundamentals of Entrepreneurship	SBPD Publishing House	2021
	Nitin Zaware	Entrepreneurship Development and Startups Management	Educreation Publishing	2019
	Cristina Sylla, Ido Iurgel	Technology, Innovation, Entrepreneurship and Education 3rd EAI International Conference, TIE 2019, Braga, Portugal, October 17–18, 2019, Proceedings	Springer International Publishing	2020
	Gerardus Blokdyk	Assistive Technology Service Provider Interface How to Build Value	CreateSpace Independent Publishing Platform	2018
	Amevi Acakpovi, Florence Plockey, Glenn Kwabena Gyimah, Nana Yaw Asabere	Technological Innovation Driving Sustainable Entrepreneurial Growth in Developing Nations	IGI Global	2023

Journal:

1. Journal of Biomechanics,(Elsevier).
2. Clinical Biomechanics,(Elsevier).

TITLE: Clinical Practice in Prosthetics, Orthotics and Assistive Technology
COURSE CODE--- MPO151
TEACHING HOURS ---- 450 (Practical)
CREDITS -- 15

Course Description: This should include the supervised manufacture and fitting of all common Prosthetic devices including partial foot, finger, lower extremities and upper extremities and at least exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of a patient related to their prosthetic management using appropriate investigative techniques which include patient history taking and clinicaltesting.*
- *Formulate an optimal prosthetic solution using information from the patient assessment, other members of the rehabilitation team, medical charts, etc.*
- *Communicate and discuss patient goals and expectations and discuss and debate the prosthetic management with the patient, co-workers and other members of the rehabilitation team.*
- *Reliably measure and capture a positive cast or image of clients' appendage while correctly positioning the body part and if appropriate apply the necessary corrective force system.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the device.*
- *Construct the device using appropriate fabrication techniques in preparation for the initial fitting.*
- *Fit the device to the patient using static and dynamic functional criteria established from the original assessment.*
- *Evaluate the quality of the device fit to ensure the appropriate interface contouring, force application and tramlines.*
- *Identify problems related to device fit and/or alignment and be able to suggest and implement appropriate correction.*
- *Assess and solve prosthetic problems as part of long term patient care.*
- *Maintain accurate records of patient treatment and follow up as well as confidentiality of such information.*

- *Communicate effectively with patient, co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.*
- *Educate the patient / client and/or caregiver on use, care and function of the device.*
- *Understand the methodology of problem identification, problem solving in a process that includes all stake holders, with the client at the centre*

Learning outcomes:

- The students should perform a comprehensive assessment of the patient to obtain an understanding of the need of the patient in respect of Assistive Devices(AD)/Orthotic Devices/Prosthetic Devices.
- To understand comprehensive treatment plan by analyzing and integrating information from patient assessment to meet the needs and goals of the patient.
- To work in interdisciplinary teams during interaction with patients, patient family members, peers, colleagues, supervisors, and other team members
- To understand indications, contraindications, wearing schedule, fitment and checkout procedure, clinical parameter documentation, impact analysis, cost to benefit analysis and the practical implication of each devices in clinical services
- To implement the treatment plan by performing the desired steps to deliver the appropriate and affordable Assistive Devices/Orthotic Devices/Prosthetic Devices
- To learn follow up the treatment plan by providing continuing patient care and periodic evaluation to assure/maintain/document optimal fit and function of the orthosis/prosthesis/AD.
- To understand and develop competency and enhance professional practice
- To correlate and understand how the theoretical concepts learned within the didactic coursework are exemplified in clinical settings in the domains of patient evaluation, formulation of the treatment plan, follow-up, documentation, communication, and management functions.
- To learn the ability to understand the recent practice and available Assistive Devices and to view the contemporary world from both local and global perspectives for the benefit of the patient/user group.
- To develop the capacity to reflect critically on shared concerns and think of innovative, creative solutions guided by ethical standards as per Prosthetic /Orthotic/AD need of the patient
- Ability to contribute personally and meaningfully to the community's development
- Demonstrate proficiency in communication skills
- Express thoughts and ideas effectively and proficiently

DETAILED CONTENTS

S.NO	
	Clinical Practice of all Assessment Tools: WHO standards for prosthetics and orthotics assessment package(4-P), PEQ, ISPO COMPASS, TAPES, WHOQO and other questioners based tools
1.	Assessment of minimum 20 patients with various amputation (congenital and acquired) .
2	Plan and execute in minimum 5 patients with higher level and or multiple amputation (congenital and acquired).
3	Use of instrumentation for quantitative outcome measurements in minimum 10 patients with amputation/bilateral upper limb /bilateral lower limb
4	Assessment, fitment and checkout of minimum 20 patients with various disorders/deformity of lower limb, upper limb , spine and cranial/brain
5	Use of instrumentation for quantitative outcome measurements in minimum 20 patients with disorders/deformity
6	Assessment, fitment and checkout in minimum 5 patients in each category using Advanced Orthosis
7	Assessment, fitment and checkout in minimum 5 patients in each category using Advanced Prosthesis
8	Assessment, fitment and checkout in minimum 5 patients in each category using only Assistive Devices
9	Assessment, fitment and checkout in minimum 5 patients in each category using Assistive devices along with Prosthesis
10	Assessment, fitment and checkout in minimum 5 patients in each category using Assistive devices along with Orthosis
11	Each students to fabricate at least on seating device (CP chair, Standing Frame and others) and modify 5 wheel chair/mobility aids seating for appropriate positioning

SECOND YEAR
SPECIALIZATION: PROSTHETICS

Course Code	Title	Theory Hrs	Practical Hrs	Total Hrs	Credit Points	Internal Marks	External Marks	Total Marks
MPO201	Clinical Prosthetics Practice in Paediatrics	150	--	150	05	25	75	100
MPO202	Clinical Prosthetics Practice In Sports and Recreation	120	--	120	04	25	75	100
MPO203	Clinical Prosthetics Practice in Adult & Geriatric	120	--	120	04	25	75	100
MPO204	Clinical Prosthetics Practice In Maxillofacial Surgery and Aesthetic Restoration	120	--	120	04	25	75	100
PRACTICAL								
MPO 251	Clinical Prosthetics Practice In Paediatrics	--	120	120	04	25	75	100
MPO 252	Clinical Prosthetics Practice In Sports and Recreation	--	90	90	03	25	75	100
MPO 253	Clinical Prosthetics Practice In Adult & Geriatric	--	90	90	03	25	75	100
MPO 254	Clinical Prosthetics Practice In Maxillofacial Surgery and Cosmetic Restoration	--	90	90	03	25	75	100
MPO255	Dissertation- Thesis	--	300	300	10	---	---	100
		510	690	1200	40	200	600	900

TITLE: Clinical Prosthetic Practice in Paediatrics
COURSE CODE--- MPO201
TEACHING HOURS ----120 (Theory)
CREDITS -- 4

Course Description: This course is designed to provide students with the knowledge and skills required for clinical practice in the field of prosthetics specifically tailored for paediatric patients. The course integrates theoretical principles, practical applications, and clinical experiences to prepare students for working with children who require orthotic or prosthetic devices.

Learning objectives and *Outcomes:*

- Comprehensive Understanding:
  - Students will acquire a comprehensive understanding prosthetic management tailored to pediatric populations.
- Diagnostic Proficiency:
  - Students will develop diagnostic proficiency in assessing a range of musculoskeletal and neurological conditions relevant to prosthetic interventions.
- Prescription Competence:
  - Students will demonstrate competence in prescribing prosthetic devices based on thorough assessments and diagnostic criteria.
- Paediatric Specialization:
  - Students will be specialized in paediatric prosthetic care, including assessment, evaluation, and management strategies.
- Wound Care Proficiency:
  - Students will acquire proficiency in wound care techniques, particularly in the context of diabetes and paediatric foot care.

- Preventive Strategies:
  - Graduates will develop preventive strategies for sports-related foot injuries and cardio-pulmonary deconditioning in paediatric patients.
- Interdisciplinary Collaboration:
  - Students will understand the importance of interdisciplinary collaboration in providing holistic care to paediatric populations.
- Research and Innovation:
  - Students will be encouraged to engage in research activities, promoting innovation in prosthetic care for paediatric patients.

Learning Outcomes:

- Upon completion of the course, students will have a thorough understanding of the principles and practices of prosthetic management specifically tailored for paediatric patients.
- Students will demonstrate proficiency in conducting comprehensive diagnostic assessments to determine the need for prosthetic interventions in paediatric populations.
- Graduates will be able to prescribe appropriate prosthetic devices based on their evaluations and diagnostic findings, ensuring optimal outcomes for paediatric patients.
- Students will be equipped with specialized knowledge and skills necessary for providing effective prosthetic care to paediatric populations, including assessment, evaluation, and management strategies.
- Graduates will demonstrate proficiency in wound care techniques, particularly in the management of foot conditions in paediatric patients, such as those related to diabetes.
- Upon completion of the course, students will be able to develop and implement preventive strategies to minimize the risk of sports-related foot injuries and cardio-pulmonary reconditioning in paediatric patients.
- Students will appreciate the importance of interdisciplinary collaboration in delivering holistic care to paediatric populations, working effectively with healthcare professionals from various disciplines.
- Graduates will be prepared to engage in research activities aimed at advancing prosthetic care for paediatric patients, fostering innovation and improvement in clinical practice.

DETAILED CONTENTS

S.NO	TOPIC
1.	**The Children with a Limb Deficiency** – Assessment of children of lower extremity and upper extremity functional loss. The Assisting Hand Assessment, Unilateral Below Elbow Test, Prosthetic Upper Extremity Functional Index. Evaluation of functionality in acquired and congenital upper extremity child amputees
2	**The Children with Lower Limb Deficiency** - Developmental prosthesis in congenital deficiency; modular prosthesis; Material and component recommendation in congenital limb absence; Prosthetics design in surgical reconstruction of congenital deficiency, Lower limb Prosthesis in rotation Plasty
3	**Children with Upper Limb Deficiency** - acquired amputation; congenital limb loss; limb difference; limb loss; occupational therapy; paediatric; prosthetics; training; upper limb deficiency
4	**Congenital Transverse and Intersegmental Deficiencies of the Upper Limb** - inter-segmental deficiency; prosthesis; reconstruction surgery; transverse deficiency
5	**Congenital Longitudinal Deficiencies of the Upper Limb** – Prosthesis for humeral hypoplasia; radial hypoplasia; radial longitudinal deficiency; thumb hypoplasia; ulnar longitudinal deficiency; upper limb hypoplasia
6	**Upper Limb Prostheses for Children** -Body- powered prosthesis; congenital deficiency; externally powered prosthesis; limb deficiency;longitudinal deficiency; myoelectric control; passive prosthesis; prosthesis; transverse deficiency, osteo-integration and prosthesis

7	**Paediatric Hand Deficiencies** – Prosthesis for congenital hand deficiency; longitudinal deficiency; polydactyly; symbrachydactyly; syndactyly
8	**Congenital Longitudinal Deficiency of the Tibia**: Clinical presentation, History, Classification: Jones System, Kalamchi and Dawe System, Foot and Other Abnormalities; Etiology; Surgical techniques, Prosthetic options: *Knee Disarticulation, Brown Procedure,* Jones Types 1b and 2 Deficiencies, Jones Type 3 Deficiency, Jones Type 4 Deficiency
9	Paediatric Prosthetic Considerations for amputations Distal to the Knee
10	**Alignment and Foot Function**; Gait Deviations and Skeletal Asymmetry; Partial Foot Amputations, Boyd and Syme Procedures, Transtibial amputation; Prosthetic options: Boyd and Ankle. Gait Deviations and analysis
11	Disarticulation Prostheses, Fibular Deficiency Prostheses, Longitudinal Femoral Deficiency Prosthesis
12	**Congenital Deficiencies of the Femur**: Clinical presentation: pre-natal, post-natal Classification system; Kalamchi's classification system, Surgical Techniques- Foot Ablation, Knee Valgus, Correction of Coxa Vara, Correction of Acetabular Dysplasia, Tibial Lengthening, Knee Fusion, Femoral Lengthening, Rotationalplasty, Rotationplasty Prosthesis, Distal Femoral Focal Deficiency
13	**Knee disarticulation and transfemoral amputation**; Pediatric prosthetic considerations in congenital KD and TF amputations & Acquired amputation; Prosthetic components: mechanical locking and suction suspension; pediatric articulating knee; Surgical reconstruction in congenital Anomalies: proximal femoral focal deficiency (PFFD); rotationplasty; Syme ankle disarticulation and Prosthetic options
14	**Hip disarticulation and hemipelvectomy and prosthetic management**:High-level pediatric amputee; Terminology and classification Hip Disarticulation , Hemipelvectomy , Unilateral Congenital Absence of the Whole Limb; Phocomelia, Separated Conjoined Twins, Hemipelvectomy in Very Young Children, Biomechanics andProsthetic Alignment, Hip Disarticulation Versus Pediatric Considerations, Transpelvic Amputation hindquarter amputation; hip disarticulation; prosthetic management; surgical management
	LUMBOSACRAL AGENESIS: Prevalence and Etiology, Classification, Management, Prosthetic Treatment, knee flexion contracture; spinopelvic instability.
	The child with multiple limb deficiencies: Congenital Multiple Limb Deficiencies: Acquired Multiple; Limb Deficiencies, multimembered limb deficiency; multiple limb deficiency; pediatric;Prosthesis, Prosthetic Components, Integration of Prosthetic Components, Psychological Needs of the Child and Family, Special Aspects of Upper Limb Absence-Scoliosis, Use of Upper Limb Prostheses , Prosthesis for sports & recreation for child amputee
	Emerging Technologies and Innovations: Introduction to cutting-edge technologies in pediatric prosthetics, material and modular components .

Reference Text Book and Journals

Sl.No.	Author	Title	Publisher	Year/Vol.
1	Michael A. Alexander, Dennis J. Mstthews	Pediatric Rehabilitation Principles and	demosmedical	5th ed.

		Practices		
2	Hsu, John D.	AAOS atlas of Orthosis and assistive devices,	Mosby publications/ or N.Y.U. St.Louice, London, Chickago	5th ed.
3	Michelle M. Lusardi PhD PT andCaroline C. Nielsen PhD	Orthotics and Prosthetics in Rehabilitation		3rd ed.
4	Kevin P. Murphy,Mary A. McMahon, Amy J. Houtrom	Pediatric Rehabilitation Principles and Practices	demosmedical	6th ed.
5	Albert M. Cook,Jaan Miller Polgar,Pedro Encarnacao	Assistive Technology Principles and Practice		5th ed.
6.	R Chinnathurai	Short Testbook of Prosthetics & Orthotics		1st ed.
7.	Douglas Murphy	Fundamentals of Amputation Care And Prosthetics		1st ed.

JOURNALS

1. Prosthetics & Orthotics: Journal Articles, BCIT Library
2. Prosthetics and Orthotics International
3. Journal of Prosthetics and Orthotics (JPO)
4. CANADIAN PROSTHETICS & ORTHOTICS JOURNAL
5. Journal of Neuro-Engineering and Rehabilitation
6. Journal of Disability Management and Rehabilitation
7. Disability and Rehabilitation, Taylor & Frances

ITLE: Clinical Prosthetic Practice In Sports and Recreation
COURSE CODE--- MPO202
TEACHING HOURS---- 90 (Theory)
CREDITS -- 3

Course Description: This course is designed to provide prosthetics and orthotics students, with specialized knowledge and skills related to the management of sports and recreational injuries. The focus will be on the application of prosthetic interventions in the context of athletic and recreational activities.

Learning Objectives:

- Define and classify common injuries associated with sports and recreational activities.
- Identify the impact of limb loss and musculoskeletal conditions on athletic performance.
- Analyze the biomechanics of sports-related movements, with a focus on the lower extremities.
- Recognize how prosthetic and orthotic devices contribute to functional improvement and enhanced athletic performance.
- Understand the materials and design considerations for optimizing performance and safety.
- Develop and implement rehabilitation protocols that incorporate prosthetic and orthotic interventions.
- Recognize and address the psychological aspects of rehabilitation for athletes with limb loss or musculoskeletal conditions.

Course Learning Outcomes:

Upon completion of the course, students will be able to:

- Define and Classify Injuries: Identify and classify common injuries associated with sports and recreational activities, considering their impact on athletes with limb loss or musculoskeletal conditions.
- Assess Impact on Athletic Performance: Evaluate the impact of limb loss and musculoskeletal conditions on athletic performance, recognizing the specific challenges and adaptations required for athletes.
- Analyze Biomechanics: Analyze the biomechanics of sports-related movements, particularly focusing on the lower extremities, to understand the unique demands placed on athletes with limb loss or musculoskeletal conditions.
- Evaluate Prosthetic Contributions: Recognize the role of prosthetic and orthotic devices in contributing to functional improvement and enhancing athletic performance, considering factors such as fit, alignment,

and biomechanical compatibility.

- Understand Materials and Design: Understand the materials and design considerations for prosthetic and orthotic devices aimed at optimizing performance and ensuring safety during sports and recreational activities.
- Develop Rehabilitation Protocols: Develop and implement rehabilitation protocols that incorporate prosthetic and orthotic interventions, addressing the specific needs and goals of athletes recovering from sports-related injuries.
- Address Psychological Aspects: Recognize and address the psychological aspects of rehabilitation for athletes with limb loss or musculoskeletal conditions, providing support and guidance to enhance their overall well-being and performance.

S.NO	TOPIC
1.	**Introduction to Sports and Recreational activities for upper and lower limb amputees and congenital anomalies:** Overview of common sports and recreational activity Statistics and prevalence of limb loss or musculoskeletal conditions in athletic populations
2	Personality Assessment and Sports personality. Theories of personality, Personality Assessment, Counseling for sports related injuries and for prosthetic options
3	**Biomechanics of Sports Movements:** Analysis of sports-related movements and the impact on the musculoskeletal system,
4	**Prosthetics Integration in Sports Medicine**: Application of prosthetic devices in sports activity, Rehabilitation strategies using prosthetics for athletes
5	**Assessment Techniques for Athletes**: Clinical assessment methods for athletes with limb loss or musculoskeletal conditions, Functional assessment tools for evaluating athletic performance with or without prosthesis
6	**Adaptive Prostheses for Sports and Recreation**: Psychological Determinants, Technical Aids and Prostheses, Sport-Specific Prostheses, Distance Running, Sprinting, Cycling, Swimming, Water Sports, Winter Sports, Hybrid Recreational Prostheses, Athletic Assessment and Training. bilateral Lower Limb Amputation: Prosthetic Management, Wheelchair Selection, Prosthetic Care, Prosthesis Nonusers, Partial Prosthesis Users, Full-Time and Mixed Users Motivation, Sex-Based Issues, Balancing Support and Independence, Psychological Considerations, Graduated Length Prosthetic Protocol, Hip Disarticulation With Transfemoral Amputation, Component Consideration, Selecting and Fitting the Definitive Knees, Positioning of Prosthetic Knee Joints, Selecting and Fitting the Definitive Feet, Donning Bilateral Prostheses, Outcome Measures in Prosthetics,
7	**Prostheses for Sports and Recreation**: Psychological Determinants, Technical Aids and Prostheses, Sport-Specific management, Running, Sprinting, Cycling, Swimming, Water Sports, Winter Sports, Hybrid Recreational Prostheses, Athletic Assessment and Training.
8	Emerging Technologies in Prosthetics and Orthotics: Potential advancements and their implications for sports-related interventions

Textbooks and References

sl. no.	Author	Title with Edition	Publisher	Year/volume
1	Albert M. Cook, Janice Miller Polgar	Essentials of Assistive Technologies	Elsevier Health Sciences	2011
2	Emily C. Bouck	Assistive Technology	SAGE Publications	2015
3	D. Archambault, G. Kouroupetroglou	Assistive Technology: Shaping a Sustainable and Inclusive World	IOS Press	2023
4	John A. Nesbitt, Conway Greene Editorial Staff, Jean Driscoll	Sports, Everyone!: Recreation and Sports for the Physically Challenged of All Ages	Conway Greene Publishing Company	1995
5	Joseph B. Webster, Douglas P. Murphy	Atlas of Orthoses and Assistive Devices	Elsevier	2018
6	Kevin K Chui, Milagros Jorge, Sheng-Che Yen, Michelle M. Lusardi	Orthotics and Prosthetics in Rehabilitation E-Book: Orthotics and Prosthetics in Rehabilitation E-Book	Elsevier Health Sciences	2019
7	Stefano Federici, Marcia Scherer	Assistive Technology Assessment Handbook	CRC Press	2012
8	Lynn Gitlow, Kathleen Flecky	Assistive Technologies and Environmental Interventions in Healthcare: An Integrated Approach	John Wiley & Sons	2019

TITLE: Clinical Prosthetic Practice in Adult and Geriatric
COURSE CODE--- MPO203
TEACHING HOURS ----120 (Theory)
CREDITS -- 4

Course Descriptions: This course is designed to provide students with the knowledge and skills required for clinical practice in the field of prosthetics specifically tailored for geriatric patients. The course integrates theoretical principles, practical applications, and clinical experiences to prepare students for working with children who require prosthetic devices.

Learning Objectives:

- Comprehensive Understanding:
  - Students will acquire a comprehensive understanding of prosthetic management tailored to geriatric populations.
- Diagnostic Proficiency:
  - Students will develop diagnostic proficiency in assessing a range of musculoskeletal and neurological conditions relevant to prosthetic interventions.
- Prescription Competence:
  - Students will demonstrate competence in prescribing prosthetic devices based on thorough assessments and diagnostic criteria.
- Adult & Geriatric Specialization:
  - Students will be specialized in adult advanced prosthetic and geriatric prosthetic care, including assessment, evaluation, and management strategies.
- Wound Care Proficiency:
  - Students will acquire proficiency in wound care techniques, particularly in the context of geriatric partial foot prosthesis.
- Interdisciplinary Collaboration:
  - Students will understand the importance of interdisciplinary collaboration in providing holistic care to geriatric populations.
- Research and Innovation:
  - Students will be encouraged to engage in research activities, promoting innovation in orthotic and prosthetic care for geriatric patients.

Learning Outcomes: Students will acquire a comprehensive understanding of prosthetic management tailored to geriatric populations.

- Acquire a comprehensive understanding of prosthetic management tailored to geriatric populations, encompassing the unique challenges and considerations specific to this demographic.
- Develop diagnostic proficiency in assessing a range of musculoskeletal and neurological conditions relevant to prosthetic interventions in geriatric patients.

- Demonstrate competence in prescribing prosthetic devices based on thorough assessments and diagnostic criteria specific to the needs of geriatric individuals.

- Become specialized in adult advanced prosthetic and geriatric prosthetic care, including assessment, evaluation, and management strategies tailored to the aging population.

- Acquire proficiency in wound care techniques, particularly in the context of geriatric partial foot prosthesis, addressing the unique wound care needs of older adults.

- Understand the importance of interdisciplinary collaboration in providing holistic care to geriatric populations, working effectively with healthcare professionals from various disciplines to optimize patient outcomes.

- Be encouraged to engage in research activities aimed at promoting innovation in orthotic and prosthetic care for geriatric patients, contributing to advancements in the field and improved patient care for older adults.

SL No	**TOPIC**
1.	**Introduction to Geriatric Prosthetics:** Overview of the unique considerations and challenges in providing prosthetic care to geriatric patients. Physiological cost, associated medical issues and co-morbidity conditions in old ages. Assessment and outcomes measurement tools for geriatric prosthesis
2	**Prescription of Prosthetic Devices in Geriatric:** Understanding various issues on ADL/Vocational activities, Musculoskeletal conditions, Cardiovascular and Respiratory parameters, weight of the Prosthesis **,** compliances of prosthetic devices and all other parameter including stability and neurological conditions
3.	**Prescription of Prostheses in Adult:** Understanding various issues on ADL/Vocational activities, Musculoskeletal conditions, Cardiovascular and Respiratory parameters, weight of the Prosthesis **,** compliances of prosthetic devices and all other parameter including stability and neurological conditions
4	**Geriatric Prosthetics:** Overview of various prosthetic devices designed for customization, fitting, alignment functional training for geriatric prosthetic users.
5	**Cultural Competence and Family-Centered Care:** Cultural and family-specific considerations in prosthetic care.
6	**Emerging Technologies and Innovations:** Introduction to cutting-edge technologies in adult and geriatric geriatric prosthetics.
7	**Complication and Challenging Cases:** Medical conditions and consultation with physician for medical complicated cases**,** Impact of mobility or excess physiological cost in health hazard, assistive devices to augment prosthetic devices, wearing schedule and checkout of prosthesis. Prosthesis, Fitting Assistive devices and Lower Limb Prosthesis in Geriatric
11	**Advancement in Prosthetic Management of Adult & Geriatric :** Comfort, Efficiency, Osseointegration, Microprocessor controlled prosthetic knee joint, shock absorbed prosthetic foot , Smart material, Silicone elastomer, and other high tech prosthesis

Text Books and References

1.	David X. Cifu, Henry L. Lew, Mooyeon Oh-Park	Geriatric Rehabilitation		2018
2	oschka Haltaufderheide, Johanna Hovemann, Jochen Vollmann	Aging Between Participation and Simulation Ethical Dimensions of Socially Assistive Technologies in Elderly Care		2020
3	Bette R Bonder, Vanina Dal Bello-Haas	Functional Performance in Older Adults		2017
4	Bruno Andò, Pietro Siciliano, Vincenzo Marletta	Smart Home Technologies and Services for Geriatric Rehabilitation		2015
5.	Nagender Kumar Suryadevara, Subhas Chandra Mukhopadhyay	Assistive Technology for the Elderly	Elsevier Science	2020
6	Bryan J. Kemp, Laura Ann Mosqueda	Aging with a Disability	Johns Hopkins University Press	2004

TITLE: Clinical Prosthetic Practice in Maxillofacial Surgery and Aesthetic Restoration
COURSE CODE--- MPO204
TEACHING HOURS---- 90 (Theory)
CREDITS -- 3

Course Descriptions: This course is designed to provide students with the knowledge and skills necessary for clinical practice in the field of prosthetics, with a specific emphasis on conditions related to Maxillofacial surgery, post-operative care, follow up and aesthetic restoration. The course integrates theoretical principles, practical applications, and clinical experiences to prepare students for working with individuals who require cosmetic prosthesis.

Learning Objectives and Outcomes:

- Clinical Competence: Develop the ability to clinically examine, diagnose, and recommend appropriate cosmetic prosthesis for a variety of post-operative surgical conditions.
- Operative Proficiency: Attain proficiency in understanding the principles and indications for operative treatments, including surgical interventions for acid victims, cancer and other conditions associated with maxillofacial surgery.
- Complication Management: Demonstrate knowledge in preventing, identifying, and managing complications associated with maxillofacial surgery and surgical interventions.
- Rehabilitation Skills: Acquire skills in prosthetic management, including the application of silicon or aesthetic devices and techniques for rehabilitation in diverse post-surgical cases cases.
- Multidisciplinary Collaboration: Develop an understanding of the collaborative approach between surgeon, plastic surgeon, orthopedics, physiotherapy and prosthetics for comprehensive patient care.
- Device Application: Demonstrate the ability to select and apply appropriate orthopedic devices, considering individual patient needs and specific conditions.
- Clinical Decision-Making: Enhance clinical decision-making skills through the integration of theoretical knowledge with practical application in the management of surgical cases.
- Patient Education: Effectively communicate with patients regarding their conditions, treatment options, and the use of orthopedic devices, empowering them in their rehabilitation journey.

Learning Outcomes:

- Develop clinical competence in examining, diagnosing, and recommending appropriate cosmetic prostheses for various post-operative surgical conditions.

- Attain proficiency in understanding operative principles and indications for surgical treatments related to maxillofacial surgery.
- Demonstrate knowledge in preventing, identifying, and managing complications associated with maxillofacial surgery and surgical interventions.
- Acquire skills in prosthetic management and rehabilitation techniques for diverse post-surgical cases.
- Understand the importance of multidisciplinary collaboration for comprehensive patient care.
- Demonstrate the ability to select and apply appropriate orthopedic devices, considering individual patient needs.
- Enhance clinical decision-making skills through the integration of theoretical knowledge and practical application.
- Effectively communicate with patients regarding their conditions, treatment options, and use of orthopedic devices.

Unit	Topics
1.	General principles of surgery Wound healing, incision wound care, hospital care Control of hemorrhage, electrolyte balance.
2.	Materials and tools: Advanced material and tools used in Maxillofacial and silicon prosthesis
3.	Surgical techniques and Osseo-integration nursing and anesthetic assistance
4.	Craniofacial and Maxillofacial ,Osseo-integration aesthetic Prosthetics
5.	Reconstruction of Defects of the Maxilla and Skull Base
6.	Prosthetics management of deformation
7.	Restoration of Facial Defects Ocular Defects, Basic principles of facial prosthetics, Auricular defects, Orbital defects, Nasal Defects, Large midfacial defects, Use of dental implants to retain facial prosthesis. Use of digital technology in Maxillofacial prosthetics.
8.	Cast Techniques: Impression making & cast fabrication
9.	Understanding color, mixing colors, packing the mold.
10.	Delivery of prosthesis, use of adhesives, care and maintenance
11.	Understand texture, shape, color, materials used, impression techniques, wax trial and fabrication of auricular, nasal and ocular prostheses
12.	Restoration of Facial Defects Ocular Defects, Basic principles of facial prosthetics, Auricular defects, Orbital defects, Nasal Defects, Large mid facial defects, Use of dental implants to retain facial prosthesis. Use of digital technology in Maxillofacial prosthetics.
13.	Acid Victims and their aesthetic restoration

Reference Text Books

S. No.	Title	Author	Publisher	Year/Vol./ Edition
1	AAOS atlas of Orthosis and assistive devices,	Hsu, John D.	Mosby publications/ or N.Y.U. St.Louice, London, Chickago	5th ed.
2	Orthotics and Prosthetics in Rehabilitation	Michelle M. Lusardi PhD PT andCaroline C. Nielsen PhD		3rd ed.
3	Orthotics inFunctional Rehabilitation of the LowerLimb	Deborah A. Nawocze		10th aprl,1997
4	Hand and Upper Extremity Splinting : principles and methods	Fess,Gettle,Philips ElaineEwing,KaranS, Cynthia A	Elsevier Mosby St. Luis B. I. Publications P	3rd ed.
5	Upper Extremity Orthotics	Anderson, Miles H.	Jaypee Publisher New Delhi	1st Dec 1979
6	Prosthetics & Orthotics	Shurr. G. Donald&J.W.Michel		2nd ed.
7	Orthotics	Edestein, Joan E.	Jaypee Publisher New Delhi	1st jan 2004
8	New Advances in Prosthetics and Orthotics	Mark H Bussell		
9	Hand book of silicone prosthesis	Smita Nayak, Prasanna Lenka	Editions Universitaires Europeennes ISBN-10 : 9783639560671 ISBN-13 : 978-3639560671	Jan 2017
10	Biomaterials in Plastic Surgery: Breast Implants	W Peters , H Brandon, K L Jerina , C Wolf, V L Young	By Peters Publisher Elsevier, 1st Edition Kindle	2012

TITLE: Clinical Prosthetic Practice in Paediatrics
COURSE CODE--- MPO251
TEACHING HOURS---- 120 (Practical)
CREDITS -- 4

Course Description: This should include the supervised manufacture and fitting of all common Pediatric Prosthetic devices including partial foot, finger, congenital anomalies, lower extremities and upper extremity amputation cases and at least exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of a Paediatric patient related to their prosthetic management using appropriate investigative techniques, which include patient history taking and clinical testing.*
- *Formulate an optimal prosthetic solution using information from the patient assessment, other members of the rehabilitation team, medical charts, etc.*
- *Communicate and discuss patient goals and expectations and discuss and debate the prosthetic management with the parents/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the device.*
- *Construct the device using appropriate fabrication techniques in preparation for the initial fitting.*
- *Fit the device to the patient using static and dynamic functional criteria established from the original assessment.*
- *Evaluate the quality of the device fit to ensure the appropriate interface contouring, force application and tramlines.*
- *Identify problems related to device fit and/or alignment and be able to suggest and implement appropriate correction.*
- *Assess and solve prosthetic problems as part of long-term patient care.*

- *Maintain accurate records of patient treatment and follow up as well as confidentiality of such information.*
- *Communicate effectively with parents/caregovers co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.*
- *Educate the patient / client and/or caregiver on use, care and function of the device.*
- *Understand the methodology of problem identification, problem solving in a process that includes all stake holders, with the client at the centre*

Learning Outcomes:

Upon completion of the course, students will:

- Demonstrate proficiency in assessing pediatric patients' medical conditions relevant to prosthetic management.
- Develop the ability to formulate and implement optimal prosthetic solutions for pediatric patients.
- Exhibit effective communication skills in discussing patient goals and prosthetic management with stakeholders.
- Select appropriate materials and components for prosthetic construction based on patient needs and clinical assessments.
- Construct prosthetic devices using appropriate fabrication techniques for pediatric patients.
- Fit prosthetic devices to pediatric patients based on static and dynamic functional criteria.
- Evaluate and ensure the quality of device fit, addressing any issues with interface contouring and alignment.
- Identify and address problems related to device fit and alignment, implementing necessary corrections.
- Demonstrate proficiency in problem-solving for long-term prosthetic care in pediatric patients.
- Maintain accurate and confidential records of patient treatment and follow-up.
- Communicate effectively with parents, caregivers, and healthcare professionals, reflecting professionalism in service delivery.
- Educate patients, caregivers, and other stakeholders on the use, care, and function of prosthetic devices for pediatric patients.
- Apply a client-centered approach to problem identification and problem-solving, involving all stakeholders in the process.

SL NO	TOPIC(PRACTICAL)- 120HOURS
01.	Taking case history of a minimum of 20 individuals Paeditric Patients (Different types of lower extremity and upper extremity amputation cases, Congenital anomalies), explore EBP , recent practice, case presentation and clinical findings
02.	Assessment, casting , fabrication , Gait training and training to adopt the device in ADL, Environment planning, accessibility, checkout, discharge summery and clinical correlation of prescription quality index (PQI) in Prosthesis for Lower limb deficiency
03.	Assessment, casting , fabrication , practice in myo-trainer , muscle tuning, motor skill and training to adopt the device in ADL, checkout, discharge summery and clinical correlation of prescription quality index (PQI) Prosthesis for Child with upper limb deficiency
04.	Assessment, casting & fabrication of Prosthesis for Child with Congenital Transverse and Intersegmental Deficiencies of the Upper Limb and lower limb
05.	Assessment, casting & fabrication of Prosthesis for Child with lumbosacral agenesis
06.	Assessment, casting & fabrication of Prosthesis for Child with Multiple limb deficiency
07.	Assessment, casting & fabrication of Prosthesis for Child with Hip disarticulation and hemipelvectomy
08.	Use of instrumentation/ quantitative analysis of outcome measurements in minimum 20 patients with amputation (congenital and acquired) in both lower and upper limb.
09.	Plan and execute in minimum 5 patients in each category using Advanced Prosthesis

TITLE: Clinical Prosthetics Practice In Sports and Recreation
COURSE CODE--- MPO252
TEACHING HOURS ---- 90 (Practical)
CREDITS -- 3

Course Description: This should include the supervised manufacture and fitting of all common prosthetic and orthotics devices for sports and recreational activities for partial foot, finger, congenital anomalies, lower extremities and upper extremity amputation cases all-terrain vehicles, archery, sitting volleyball, and at least exposure to the range of devices not routinely seenin clinical practice.

Learning objectives:

- *Assess the medical condition of a patient related to sports and recreation activites and their prosthetic management using appropriate investigative techniques, which include patient historytaking and clinical testing.*
- *Formulate an optimal prosthetic solution using information from the patient assessment, other members of the rehabilitation team, medical charts, etc.*
- *Communicate and discuss patient goals and expectations and discuss and debate the prosthetic management with the parents/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the device.*
- *Construct the device using appropriate fabrication techniques in preparation for the initial fitting.*
- *Fit the device to the patient using static and dynamic functional criteria established from the original assessment.*
- *Evaluate the quality of the device fit to ensure the appropriate interface contouring, force application and tramlines.*
- *Identify problems related to device fit and/or alignment and be able to suggest and implement appropriate correction.*
- *Assess and solve prosthetic problems as part of long term patient care.*

- *Maintain accurate records of patient treatment and follow up as well as confidentiality of such information.*
- *Communicate effectively with parents/caregovers co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.*
- *Educate the patient / client and/or caregiver on use, care and function of the device.*
- *Understand the methodology of problem identification, problem solving in a process that includes all stake holders, with the client at the centre*

Learning Outcomes:

- Demonstrate proficiency in assessing patients' medical conditions related to sports and recreational activities and their prosthetic management.
- Develop the ability to formulate and implement optimal prosthetic solutions tailored to sports and recreational activities.
- Exhibit effective communication skills in discussing patient goals and prosthetic management with stakeholders.
- Select appropriate materials and components for prosthetic construction based on patient needs and clinical assessments specific to sports and recreation.
- Construct prosthetic devices using appropriate fabrication techniques for sports and recreational activities.
- Fit prosthetic devices to patients using static and dynamic functional criteria established during the original assessment.
- Evaluate and ensure the quality of device fit, addressing any issues with interface contouring and alignment.
- Identify and address problems related to device fit and alignment, implementing necessary corrections.
- Demonstrate proficiency in problem-solving for long-term prosthetic care in the context of sports and recreation.
- Maintain accurate and confidential records of patient treatment and follow-up.
- Communicate effectively with patients, caregivers, and healthcare professionals, reflecting professionalism in service delivery.
- Educate patients, caregivers, and other stakeholders on the use, care, and function of prosthetic devices for sports and recreational activities.
- Apply a client-centered approach to problem identification and problem-solving, involving all stakeholders in the process.

SL NO	TOPIC(PRACTICAL)- 90 HOURS
01.	Taking case history of a minimum of 20 individuals Patients with sports and recreations (Different types of lower extremity and upper extremity amputation cases, Congenital anomalies and musculoskeletal conditions in athletic populations
02.	Assessment Modalities and tools for recreational activities
03.	Clinical assessment methods for athletes with limb loss or musculoskeletal conditions, Functional assessment tools for evaluating athletic performance with or without prosthesis.
04.	Assessment, casting & fabrication of Prosthesis for Athletes with upper limb deficiency
05.	Assessment, casting & fabrication of Prosthesis for Athletes with Congenital Transverse and Intersegment Deficiencies of the Upper Limb and lower limb
06.	Assessment, casting & fabrication of Prosthesis for Athletes with lumbosacral agenesis
07.	Assessment, casting & fabrication of Prosthesis for Athletes with Multiple limb deficiency
08.	Assessment, casting , fabrication , Gait training and training to adopt the device in sports enviroment, checkout, discharge summery and clinical correlation of prescription quality index (PQI) of Prosthesis for different recreational activities
09.	Assessment, casting & fabrication of Prosthesis for Running. Swimming, Skiing , Cycling etc.
10.	Training to Patient for donning and doffing technique
11.	Plan and execute in minimum 5 patients in each category using Advanced Prosthetic technology

TITLE: Clinical Prosthetics Practice In Adult & Geriatric
COURSE CODE--- MPO253
TEACHING HOURS ---- 90 (Practical)
CREDITS -- 3

Course Description: This should include the supervised manufacture and fitting of all common prosthetic devices for Geriatric and adult cases for partial foot, finger, congenital anomalies, lower extremities, upper extremity amputation cases, and at least exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of a Geriatric and adult patient and their prosthetic management using appropriate investigative techniques, which include patient history taking and clinical testing.*
- *Formulate an optimal prosthetic solution using information from the patient assessment, other members of the rehabilitation team, medical charts, etc.*
- *Communicate and discuss patient goals and expectations and discuss and debate the prosthetic management with the Patients/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the device.*
- *Construct the device using appropriate fabrication techniques in preparation for the initial fitting.*
- *Fit the device to the patient using static and dynamic functional criteria established from the original assessment.*
- *Assess and solve prosthetic problems as part of long term patient care.*
- *Maintain accurate records of patient treatment and follow up as well as confidentiality of such information.*

- *Communicate effectively with parents/caregovers co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.*
- *Educate the patient / client and/or caregiver on use, care and function of the device.*

Learning Outcomes:

Upon completion of the course, students will:

- *Demonstrate proficiency in assessing the medical condition of geriatric and adult patients and their prosthetic management needs.*
- *Develop the ability to formulate and implement optimal prosthetic solutions tailored to geriatric and adult populations.*
- *Exhibit effective communication skills in discussing patient goals and prosthetic management with stakeholders.*
- *Select appropriate materials and components for prosthetic construction based on patient needs and clinical assessments specific to geriatric and adult populations.*
- *Construct prosthetic devices using appropriate fabrication techniques for geriatric and adult patients.*
- *Fit prosthetic devices to patients using static and dynamic functional criteria established during the original assessment.*
- *Assess and solve prosthetic problems as part of long-term patient care in the geriatric and adult population.*
- *Maintain accurate and confidential records of patient treatment and follow-up.*
- *Communicate effectively with patients, caregivers, and healthcare professionals, reflecting professionalism in service delivery.*
- *Educate patients, caregivers, and other stakeholders on the use, care, and function of prosthetic devices for geriatric and adult patients.*

SL NO	TOPIC(PRACTICAL)- 90 HOURS
01.	Taking case history of a minimum of 20 individuals (For Each Geriatric and Adult)
02.	Assessment Modalities and tools for Geriatric and adult amputee Population
03.	Clinical assessment methods and, Functional assessment tools limb loss or musculoskeletal conditions.

04.	Assessment, casting & fabrication of Prosthesis for upper limb deficiency and amputation for Geriatric and adult cases
05.	Assessment, casting & fabrication of Prosthesis for Athletes with Congenital Transverse and Intersegment Deficiencies of the Upper Limb and lower limb and amputation for Geriatric and adult cases
06.	Assessment, casting & fabrication of Prosthesis for and amputation for Geriatric and adult cases
07.	Assessment, casting & fabrication of Prosthesis for Multiple limb deficiency and amputation for Geriatric and adult cases
08.	Training and donning and doffing technique to Patient
09.	Assessment, casting , fabrication , Gait training and training to adopt the device in ADL, Environment planning, accessibility, checkout, discharge summery and clinical correlation of prescription quality index (PQI) in prescribed Prosthesis
10 .	Plan and execute in minimum 5 patients in each category using Advanced Prosthetic technology

TITLE: Clinical Prosthetics Practice In Maxillofacial Surgery and Cosmetic Restoration
COURSE CODE--- MPO254
TEACHING HOURS ---- 90 (Practical)
CREDITS -- 3

Course Description: This should include the supervised manufacture and fitting of Cosmetic silicone prosthesis for Finger, Partial foot and Partial Hand Prosthesis and Ear and nose Prosthesis and at least exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition for Cosmetic Prosthesis*
- *Formulate an optimal prosthetic solution using information from the patient assessment, other members of the rehabilitation team, medical charts, etc.*
- *Communicate and discuss patient goals and expectations and discuss and debate the prosthetic management with the Patients/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the device.*
- *Construct the device using appropriate fabrication techniques in preparation for the initial fitting.*
- *Fit the device to the patient using static and dynamic functional criteria established from the original assessment.*

Learning Outcomes:

Upon completion of the course, students will:

- *Demonstrate proficiency in assessing medical conditions for various cosmetic prostheses, including fingers, partial foot, partial hand, ear, and nose prostheses.*
- *Develop the ability to formulate and implement optimal prosthetic solutions tailored to individual patient needs.*
- *Exhibit effective communication skills in discussing patient goals and prosthetic management with stakeholders.*

- *Select appropriate materials and components for cosmetic prosthetic construction based on patient needs and clinical assessments.*
- *Construct cosmetic prosthetic devices using appropriate fabrication techniques, ensuring optimal fit and functionality.*
- *Fit cosmetic prosthetic devices to patients using static and dynamic functional criteria established during the original assessment, ensuring comfort and functionality.*

SL NO	TOPIC(PRACTICAL)- 90 HOURS
01.	Learn different Silicone Materials and associated tools
02.	Fabrication of Silicone Prosthesis for Finger and Digit Amputations
03.	Fabrication of Silicone Prosthesis for Partial hand Amputations
04.	Fabrication of Silicone Prosthesis for Toes and Partial foot Amputations
05.	Fabrication of Silicone Prosthesis for Ear and Nose Amputations
06	Fabrication and fitment of Silicone Prosthesis with Osseo-integration stud in Ear/Finger/Any part of the body

SECOND YEAR (SPECIALIZATION IN ORTHOTICS)

Course Code	Title	Theory Hrs	Practical Hrs	Total Hrs	Credit Points	Internal Marks	External Marks	Total Marks
MPO301	Clinical Orthotics Practice in Pediatrics	150	--	150	05	25	75	100
MPO302	Clinical Orthotics Practice In Sports and Recreation	120	--	120	04	25	75	100
MPO303	Clinical Orthotics Practice in Geriatric	120	--	120	04	25	75	100
MPO304	Clinical Orthotics Practice in Spinal disorder	120	--	120	04	25	75	100
PRACTICAL								
MPO 351	Clinical Orthotics Practice in Pediatrics	--	120	120	04	25	75	100
MPO 352	Clinical Orthotics Practice In Sports and Recreation	--	90	90	03	25	75	100
MPO 353	Clinical Orthotics Practice in Geriatric	--	90	90	03	25	75	100
MPO 354	Clinical Orthotics Practice in Spinal disorder	--	90	90	03	25	75	100
MPO355	Dissertation- Thesis	--	300	300	10	---	---	100
		510	690	1200	40	200	600	900

TITLE: Clinical Orthotic Practice in Pediatrics
COURSE CODE--- MPO 301
TEACHING HOURS---- 90 (Theory)
CREDITS -- 3

Course Description: This course is designed to provide students with the knowledge and skills required for clinical practice in the field of orthotics specifically tailored for paediatric patients. The course integrates theoretical principles, practical applications, and clinical experiences to prepare students for working with children who require orthotic devices.

Learning objectives*:*

- Comprehensive Understanding:
  - Students will acquire a comprehensive understanding of orthotic management tailored to pediatric populations.
- Diagnostic Proficiency:
  - Students will develop diagnostic proficiency in assessing a range of musculoskeletal and neurological conditions relevant to orthotic interventions.
- Prescription Competence:
  - Students will demonstrate competence in prescribing orthotic devices based on thorough assessments and diagnostic criteria.
- Paediatric Specialization:
  - Students will be specialized in paediatric orthotic care, including assessment, evaluation, and management strategies.
- Wound Care Proficiency:
  - Students will acquire proficiency in wound care techniques, particularly in the context of paediatric foot care.

- Preventive Strategies:
  - Graduates will develop preventive strategies for sports-related foot injuries in paediatric patients.
- Interdisciplinary Collaboration:
  - Students will understand the importance of interdisciplinary collaboration in providing holistic care to paediatric populations.
- Research and Innovation:
  - Students will be encouraged to engage in research activities, promoting innovation in orthotic care for paediatric patients.

Learning Outcomes:

Upon completion of the course, students will:

- *Acquire a comprehensive understanding of orthotic management tailored to pediatric populations, enabling them to address diverse patient needs.*

- *Develop diagnostic proficiency in assessing a wide range of musculoskeletal and neurological conditions in children, facilitating accurate orthotic interventions.*
- *Demonstrate competence in prescribing appropriate orthotic devices for pediatric patients, ensuring optimal treatment outcomes.*
- *Specialize in pediatric orthotic care, exhibiting proficiency in assessment, evaluation, and management strategies tailored to children's unique requirements.*
- *Attain proficiency in wound care techniques, particularly focusing on pediatric foot care, to address specific patient needs effectively.*
- *Develop preventive strategies for sports-related foot injuries in pediatric patients, contributing to injury prevention and patient well-being.*
- *Appreciate the significance of interdisciplinary collaboration in providing comprehensive care to pediatric populations, fostering effective teamwork and patient-centred care.*
- *Engage in research activities to advance orthotic care for paediatric patients, contributing to ongoing innovation and improvement in pediatric orthotic practices.*

S. no.	Topics
1.	Clinical Orthotic Practice in Children: Define pediatrics, Goals and Objectives of Orthotic management in pediatrics, Clinical Evaluation phases ofrehabilitation. (multidisciplinary approach)
2.	Advance Orthotic Management in Pediatrics. Growth and development- Maternal and neonatal fracture contributing to high risk baby, CP, Myopathy, Spin bifida, Still's disease, Acute CNS infection, Lung infection, CTEV, CDH, Erb's palsy, arthrogryposis multiplex congenita, rehabilitation, congenital Deficits of thehand. Pediatric limb deficiencies
3.	Orthotic management in relation to growth and development of a child from birth to 12 yrs. of age indicating physical and adaptive developments
4.	Orthotic management of Cerebral Palsy- Classification, clinical features and assessment based on musculo skeleta1 system. Orthotic management in relation to associated defects like mental retardation, microcephaly, hearing and speech impairment, squint and convulsion. Special consideration of orthotic material in hyper tone or spasticity.
5.	Orthotic management of Muscular Dystrophy- Various forms mode of inheritance, clinical manifestations and its orthotic management
6.	Orthotic management of Spina Bifida, Meningo myelocele- Outline of development clinical manifestations, bladder bowel control, hydrocephalus. Special consideration of orthotic material in sensory loss.
7.	Orthosis in acute pediatric distress syndrome, neonatological & pediatric surgical care and cardiovascular problems.
8.	Cranial Remolding Orthosis, Plagiocephaly, Brachycephaly, Scaphocephaly

Reference:

- Comprehensive management of upper limb amputee[Atkirs ,D.J] 1989.
- Functional restoration of adults & children with upper extremity amptutation
- :Meies, Robert H. ed, 2004,demas,NY.
- Upper extremity : Traumatic injuries & conditions – Child,S .(1997)
- Orthotics & Prosthetics in rehabilitation : lusaudi ,Michelle M , 2nd edition ;
- 2007.

- Orthotics in functional rehabilitation of the lower limb : Nowoczenski ,Deborah
- A ; 1997.
- Prosthetics & Orthotics : Seymour , Ron ; 2002.
- Prosthetics & Orthotics : Shurr ,G. Donald , 2nd edition ; 2000.
- Prosthetics & Orthotics patient management ,Carroll ,Kevin ; 2006.
- Therapy for amputee : Engstorm ,Barbare , 3rd edition , 1999.
- Orthotics in rehabilitation ,Mckee ,pat ; 1998.
- Ergonomics for therapist , Jacobs ,Karens ,ed ,3rd 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 –Brechner ,T; 1990.
- Comprehensive management of upper limb amputee,Atkins ,D.J ; 1989.
- Hand book of diabetes management ,Zazworsky ,Donna ,ed ; 2006.
- Fuctional fracture bracing [A saniento L.L Latta] ; 2003.
- Orthotics in neurological rehabilitation –Aiseu, Dereos Publication ,New York 1992.
- Orthotics : clinical practice & rehabilitation techonolgy – cluscluillLivingston ,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

TITLE: Clinical Orthotic Practice in Sports and Recreation
COURSECODE--- MPO 302
TEACHING HOURS -- 120
CREDITS---04

Course Description: This course is designed to provide students with specialized knowledge and skills related to the orthotics management of sports and recreational injuries. The focus will be on the application of orthotic interventions in the context of athletic and recreational activities.

Learning Objectives:

- Define and classify common injuries associated with sports and recreational activities.
- Identify the impact of limb loss and musculoskeletal conditions on athletic performance.
- Analyze the biomechanics of sports-related movements, with a focus on the lower extremities.
- Recognize how orthotic devices contribute to functional improvement and enhanced athletic performance.
- Understand the materials and design considerations for optimizing performance and safety.
- Develop and implement rehabilitation protocols that incorporate orthotic interventions.
- Recognize and address the psychological aspects of rehabilitation for athletes with limb injury or musculoskeletal conditions.
- Describe the design principles of sport orthoses
- Describe the goals of sport orthoses
- Compare and contrast the indications and contraindications for prefabricated, custom-fit and custom designed sport orthoses
- Identify various components and materials used in the fabrication of sport orthoses
- Compare and contrast the clinical indications for various sport orthoses designs for the foot/ankle, knee, wrist, elbow and shoulder
- Explain the process of proper orthotic device delivery, fitting and regular follow-up for maintenance of proper device functioning
- Identify therapy training concepts that will benefit the user of sport orthoses
- Describe the expected long-term outcomes of the implementation of a treatment plan for an individual using a sport orthosis

Learning Outcomes:

- *Demonstrate the ability to define and classify common injuries associated with sports and recreational*

activities, facilitating accurate assessment and intervention.

- *Understand the impact of limb loss and musculoskeletal conditions on athletic performance, enabling appropriate orthotic management strategies.*
- *Analyze the biomechanics of sports-related movements, particularly focusing on the lower extremities, to optimize orthotic interventions.*
- *Recognize the role of orthotic devices in enhancing functional improvement and athletic performance in sports and recreational activities.*
- *Apply knowledge of materials and design considerations to optimize the performance and safety of orthotic devices used in sports and recreation.*
- *Develop and implement rehabilitation protocols integrating orthotic interventions, ensuring comprehensive care for athletes with injuries or conditions.*
- *Address the psychological aspects of rehabilitation for athletes, fostering holistic recovery and performance enhancement.*
- *Describe and apply the design principles, goals, and clinical indications of sport orthoses in various athletic contexts.*
- *Differentiate between prefabricated, custom-fit, and custom-designed sport orthoses, considering individual patient needs and activity levels.*
- *Identify and select appropriate components and materials for the fabrication of sport orthoses, ensuring optimal device performance and user comfort.*
- *Evaluate and apply various sport orthoses designs for different anatomical areas, aligning interventions with specific clinical indications.*
- *Demonstrate proficiency in the delivery, fitting, and regular follow-up of orthotic devices to maintain proper functioning and user satisfaction.*
- *Apply therapy training concepts to optimize the effectiveness and usability of sport orthoses, enhancing user outcomes and athletic performance.*

Sl no.	Topic
1.	Evaluation of Physical Fitness: Principles of assessment and prescription programs Evaluation of Physical Fitness Preliminary Health Screening and Classification of Risk Factors Assessment of Body Composition Assessment of Flexibility and designing stretching programs Assessment of cardio-respiratory fitness Assessing and Managing Stress Assessing strength and muscular endurance.
2.	Common injuries and orthotic treatment methods for the ankle, knee, elbow and shoulder.
3.	Orthotics in Clinical Sports Medicine Non Traumatic Medical Conditions Illness, Infections, Hypertension, Urine abnormalities; Venereal Diseases; Exercise induced Asthma; Anemia, Delayed onset muscle soreness (DOMS), Runner's high & exercise addiction. G.I.T. Diseases, Exercises and congestive heart failure, exercise for post coronary & byepass patients, exercise for diabetics.
4.	Orthotic Management in Female Specific problems 1. Sports Amenorrhoea. 2. Injury to female reproductive tract. 3. Menstrual Synchrony. 4. Sex determination. 5. Exercise and pregnancy. 6. Eating disorders in athletes
5.	Orthotic Management in age Specific Problems 1. Issues in the adolescents and children involved in sports 2. Issues in The Geriatric athletes Medical Aspects of Sports Medicine, Memory foam Orthosis
6.	Orthotic Management & Exercise for gait and posture in Common Pulmonary & Cardiac Conditions a. induced bronchial obstruction b. Exercise in chronic airway obstruction c. Air pollution and exercise.
7.	Orthotics for special categories a. Child and adolescent athlete's problems b. Special problems of older athletes c. Special concerns for handicapped athletes
8.	Orthotics Postural & Gait care in Cardio pulmonary Resuscitation 1. Shock management 2. Internal and External bleeding 3. Splinting 4. Stretcher use-Handling and transfer 5. Management of Cardiac arrest 6. Acute asthma 7. Epilepsy drowning 8. Burn 9. Heat stroke and Heat illness
9.	Orthotics in Common acute and overuse injuries of: a. Shoulder girdle, Shoulder, Arm, Elbow, Forearm, Wrist & hand b. Pelvis, hip, thigh, knee, leg, ankle & foot, Spine, Head.
10.	Orthotics in Sports specific injuries, fracture brace, plaster or fiberglass cast, with special emphasis on the specific risk factor, nature of sports, kind of medical intervention anticipated and prevention with respect to individual sports
11.	Orthotic foot care Diabetes patients. Orthotics in Spinal deformity and sports. Orthotics in Emergency Care and Cardiopulmonary Therapeutics. Orthotics in Sporting emergencies & first aid and pharmacological treatment of injuries in the athletes. Orthoses for protective equipment to the sports
12.	Individual events: Field & Track, Team events: Hockey, Cricket, and Football, Contact and Non-contact sports, Water sports specific injuries, Over Use Training

	in Sports Physical Medicine. ,
14.	Advanced Orthosis in sports injury

Textbooks and References

sl. no.	Author	Title with Edition	Publisher	Year/ volume
1	Albert M. Cook, Janice Miller Polgar	Essentials of Assistive Technologies	Elsevier Health Sciences	2011
2	Emily C. Bouck	Assistive Technology	SAGE Publications	2015
3	D. Archambault, G. Kouroupetroglou	Assistive Technology: Shaping a Sustainable and Inclusive World	IOS Press	2023
4	John A. Nesbitt, Conway Greene Editorial Staff, Jean Driscoll	Sports, Everyone!: Recreation and Sports for the Physically Challenged of All Ages	Conway Greene Publishing Company	1995
5	Joseph B. Webster, Douglas P. Murphy	Atlas of Orthoses and Assistive Devices	Elsevier	2018
6	Kevin K Chui, Milagros Jorge, Sheng-Che Yen, Michelle M. Lusardi	Orthotics and Prosthetics in Rehabilitation E-Book: Orthotics and Prosthetics in Rehabilitation E-Book	Elsevier Health Sciences	2019
7	Stefano Federici, Marcia Scherer	Assistive Technology Assessment Handbook	CRC Press	2012
8	Lynn Gitlow, Kathleen Flecky	Assistive Technologies and Environmental Interventions in Healthcare: An Integrated Approach	John Wiley & Sons	2019

TITLE: Clinical Orthotic Practices in Geriatric
COURSECODE--- MPO 303
TEACHING HOURS -- 120
CREDITS---04

Course Description: This course is designed to provide students with the knowledge and skills required for clinical practice in the field of orthotics specifically tailored for geriatric patients. The course integrates theoretical principles, practical applications, and clinical experiences to prepare students for working with children who require orthotic devices.

Learning Objectives:

- *Acquire a comprehensive understanding of orthotic management tailored to geriatric populations.*
- *Develop diagnostic proficiency in assessing a range of musculoskeletal and neurological conditions relevant to orthotic interventions in geriatric patients.*
- *Demonstrate competence in prescribing orthotic devices based on thorough assessments and diagnostic criteria specific to geriatric care.*
- *Specialize in geriatric orthotic care, including assessment, evaluation, and management strategies tailored to the needs of elderly patients.*
- *Acquire proficiency in wound care techniques, particularly in the context of foot care for geriatric patients.*
- *Develop preventive strategies for sports-related foot injuries and other musculoskeletal conditions prevalent in geriatric patients.*
- *Understand the importance of interdisciplinary collaboration in providing holistic care to geriatric populations, integrating orthotic interventions with other healthcare disciplines.*
- *Be encouraged to engage in research activities, promoting innovation and evidence-based practices in orthotic care for geriatric patients.*

Learning Outcomes:

- *Demonstrate a comprehensive understanding of orthotic management specific to geriatric populations, applying theoretical principles to clinical practice.*
- *Exhibit diagnostic proficiency in assessing musculoskeletal and neurological conditions in geriatric patients, facilitating accurate orthotic interventions.*

- *Successfully prescribe orthotic devices based on thorough assessments and diagnostic criteria, addressing the unique needs and limitations of elderly patients.*
- *Specialize in geriatric orthotic care, demonstrating competency in assessment, evaluation, and management strategies tailored to the geriatric population.*
- *Apply proficiency in wound care techniques, ensuring effective management of foot care issues common among geriatric patients.*
- *Develop and implement preventive strategies for sports-related foot injuries and other musculoskeletal conditions prevalent in geriatric patients, promoting active aging.*
- *Collaborate effectively with interdisciplinary healthcare teams to provide holistic care to geriatric populations, integrating orthotic interventions with other healthcare disciplines.*
- *Engage in research activities to promote innovation and evidence-based practices in orthotic care for geriatric patients, contributing to advancements in the field.*

Sl no.	Topic
1.	Introduction in the principle of geriatric orthotic rehabilitation: Principle and concept of geriatric Assessment, Implication of an aging population for orthotic rehabilitation : Demography, mortality, and morbidity.
2.	Age-related changes in cardiovascular and pulmonary system and Orthotic postural support, Advanced Knee Ankle Foot Orthosis , Advanced Hip Knee Ankle Foot Orthosis, Standing Frame, Reciprocative Gait Orthosis
3.	Advanced orthotic treatment in age-related changes in musculoskeletal system. - Sensory changes in older adults
4.	Advanced orthotic treatment age-related changes in nervous system and cognition
5.	Orthotic treatment on Physiological Response to gait & Posture in Elderly.
6.	Orthotic management in geriatric fracture, Complication related geriatric fracture, Role of orthotic management, Rational for functional bracing, Functional bracing of geriatric diaphyseal humerus fractures, Functional bracing of geriatric diaphyseal ulnar fractures, Functional bracing of geriatric Colles fractures, 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.
7.	Orthotic Treatment in Osteoporosis and Fragility Fracture, Orthotic Treatment in Fall Prevention and Intervention.
8.	Orthotic Treatment in Nervous Svstem Disorders. Orthotic Treatment in Peripheral Nervous System. Orthotic Treatment in Central Nervous System Disorders.
9.	Orthotic Treatment in Affecting Mobility in Older Adults, Orthotic Treatment in Vascular Disorders Affecting Mobility.
10.	Orthotic Treatment in Arthritis and Joint Replacement. Orthotic Treatment in Prevention of Hospital-Acquired. Orthotic Treatment in Mobility.
11.	Orthotic Treatment Rehabilitation in Musculoskeletal and Sports Injuries in Older Adults. Orthotic Treatment in Geriatric Psychiatric and Cognitive Disorders: Depression, Dementia, and Delirium. Orthotic Treatment in Assistive Technologies for Geriatric Population.

Books and References

1.	David X. Cifu, Henry L. Lew, Mooyeon Oh-Park	Geriatric Rehabilitation		2018
2.	oschka Haltaufderheide, Johanna Hovemann, Jochen Vollmann	Aging Between Participation and Simulation Ethical Dimensions of Socially Assistive		2020

		Technologies in Elderly Care		
3.	Bette R Bonder, Vanina Dal Bello-Haas	Functional Performance in Older Adults		2017
4.	Bruno Andò, Pietro Siciliano, Vincenzo Marletta	Smart Home Technologies and Services for Geriatric Rehabilitation		2015
5.	Nagender Kumar Suryadevara, Subhas Chandra Mukhopadhyay	Assistive Technology for the Elderly	Elsevier Science	2020
6.	Bryan J. Kemp, Laura Ann Mosqueda	Aging with a Disability	Johns Hopkins University Press	2004

Text

TITLE: Clinical Orthotic Practice in Spinal disorders
COURSECODE--- MPO304
TEACHING HOURS -- 120
CREDITS---04

Course Description: This course is designed to provide students with specialized knowledge and skills related to the orthotic management of spinal pathologies and disorders. Candidates/Students will explore the application of orthotic interventions in the context of spinal conditions, with a focus on assessment, design, and rehabilitation strategies.

Learning Objectives:

- Understand Spinal Pathologies
- Impact of spinal conditions on mobility, function, and quality of life
- Analyse the biomechanics of the spine and its role in various spinal pathologies.
- Relate biomechanical principles to the design and function of orthotic devices for spinal support.
- Evaluate materials and design considerations for spinal orthoses
- Apply appropriate clinical assessment techniques for individuals with spinal disorders
- Develop treatment plans that incorporate orthotic interventions for spinal conditions.
- Modify prosthetic and orthotic interventions to meet the developmental and age-specific needs of patients.
- Adhere to legal standards and responsibilities when providing orthotic services for spinal conditions.
- Engage in networking and collaboration with professionals in the spinal rehabilitation community.

Learning Outcomes:

- *Demonstrate a comprehensive understanding of various spinal pathologies, their etiology, and progression.*
- *Assess the impact of spinal conditions on mobility, function, and quality of life through case studies and clinical scenarios.*
- *Analyze the biomechanics of the spine and its implications for designing orthotic interventions for different spinal pathologies.*
- *Design and fabricate orthotic devices for spinal support, considering biomechanical principles and patient-specific needs.*
- *Evaluate and select appropriate materials and design features for spinal orthosis based on clinical*

indications and patient requirements.

- *Conduct thorough clinical assessments using appropriate techniques and tools to identify spinal disorders accurately.*
- *Develop effective treatment plans integrating orthotic interventions to address the specific needs and goals of patients with spinal conditions.*
- *Modify prosthetic and orthotic interventions to accommodate the developmental stages and age-specific requirements of patients with spinal disorders.*
- *Demonstrate knowledge of legal standards and ethical considerations governing the provision of orthotic services for spinal conditions.*
- *Engage in interdisciplinary collaboration and networking with professionals in the spinal rehabilitation community to enhance patient care and outcomes.*

Sl no.	Topic
1	Spinal orthosis & its Design: Technology in Spinal Orthosis, Various 3-D advanced spinal orthosis. Assessment and outcomes measurement in spinal orthosis.
	Biomechanics of Spinal disorders: Scoliosis, Kyphosis and Lordosis. Mechanical principles and loading of spine. Follower load and spinal stability
2	Technological guidelines for spinal Orthosis, Equilibrium condition, body segment dynamics, 3D effect on spine, visceral organ alignment, and progression factors, Centre of Pressure.
3	Orthotic management of Spinal cord injuries – Mechanism of Injury signs & Symptoms investigations includingElectro diagnosis, splinting, implant bracing and Rehabilitation Congenital and acquired – Pathomechanics, Clinical Features – Treatment – Conservative – Manipulation Bracing, Splinting & Surgical Treatment – Rehabilitation Osteoarticular, 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.
4	Orthotic management of Spinal Tuberculosis: Bacteriology – Pathology – Symptomatology – Investigation, Diagnosis – Management – Conservative & Surgical Infections, Principles of Spinal orthosis in TB spine. Biomechanics of TB spine and its management

6	Orthosis for Spinal pain: Pathophysiology, Treatment recommendations Cervical pain: Mechanism of action of lumber orthosis, Motion restriction, Unloading ofspinal column, Side effect and other consideration, Outcome studies and effectiveness of lumber orthosis
7	Lumbar pain: Mechanism of action of lumber orthosis,Motion restriction,Unloading of spinal column,Side effect and other consideration,Outcome studies and effectiveness of lumber orthosis ,Orthosis for spinal deformities.
8	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, digitalmeasurement techniques, Surgical intervention for scoliosis, Nonsurgical intervention for scoliosis, Orthotic management
9	Kyphosis and lodrosis: Pathophysiology, Biomechanical consideration, Treatment consideration, Orthoticmanagement, Scheuermann's kyphosis , post traumatic kyphosis
10	Spondylosis, spondylisthesis & spondylysis: ,Pathophysiology, Biomechanical consideration, Classification ,Treatment consideration, Orthotic management.
11	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, Lumber 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, Odontiod fracture, Jefferson fracture, Current issues and research.
13	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.
14	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 aligment, balance and compensation.
15	Torticollis & its Orthotic Management

Text Books and Reference:

sl.no.	Author	Title with Edition	Publisher	Year/volume
1.	Norbert Boos	Spinal Disorders Fundamentals of Diagnosis and Treatment	Springer Berlin Heidelberg	2008
	Thomas N. Byrne, Stephen G. Waxman, Edward C. Benzel	Diseases of the Spine and Spinal Cord	Oxford University Press, USA	2000
3.	Jason C Eck, Christian P DiPaola	Essentials of Spinal Disorders	Jaypee Brothers Medical Publishers Pvt. Limited	2014
4.	KentonD.Leatherman Rober A. Dickson	The Management of Spinal deformities	Butter worth HeinemannLtd. Linacre House, Jordon Hill,Oxford OX2 BDP2 BDP	
5	Seymour, Ron	Prosthetics & Orthotics LowerLimb& Spine		2002

Others Associated Books:

1. Rehabilitaion of spine : Liebenson, Craid ed, 2nd edition
2. Clinical biomechanics of the spine : White, Augustan, Lippincott, Williams, 2nd edition
3. Essentials of prosthetics & orthotics : Agarwal , AK ;2013.Orthotics : Edelstein ,joan E ; 2002.43
4. Orthotics & Prosthetics in rehabilitation : lusaudi ,Michelle M , 2nd edition ; 2007.
5. Orthotics in functional rehabilitation of the lower limb : Nowoczenski ,Deborah A ; 1997.
6. Prosthetics & Orthotics : Seymour , Ron ; 2002.
7. Prosthetics & Orthotics : Shurr ,G. Donald , 2nd edition ; 2000.
8. Prosthetics & Orthotics patient management ,Carroll ,Kevin ; 2006.
9. Orthotics in rehabilitation ,Mckee ,pat ; 1998 .[JP Morgan].
10. Ergonomics for therapist , Jacobs ,Karens ,ed ,3rd edition; 2008.
11. AO manual of fracture management ,Wagner ,Michael ; 2006.
12. AO Principales of fracture management ,Ruedi,Thomas P ; 2000.
13. Common problems in pain management ,Ferrer –Brechner ,T; 1990.
14. AAOS Atlas of orthosis & assistive devices [John D. HSU].
15. Orthotics in neurological rehabilitation –Aiseu, Dereos Publication ,New York ,1992.
16. Orthotics : clinical practice & rehabilitation techonolgy – cluscluill Livingston ,Redford ,J.B. ; 1993

Practical

TITLE: Clinical Orthotic Practice in Pediatrics
COURSE CODE--- MPO 351
TEACHING HOURS ----120 (Practical)
CREDITS -- 4

Course Description: This should include assessment, the supervised manufacture and fitting of all common advanced pediatrics orthosis for different pediatrics conditions and in all type of exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of pediatrics patient and prescription of appropriate orthotic interversion which include patient history taking and clinical testing.*
- *Communicate and discuss patient goals and expectations and discuss and debate on the pedritics patient management with the Patients/parents/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the Orthosis.*
- *Construct the Orthotic device using appropriate fabrication techniques in preparation for the initial fitting.*
- *Evaluate the quality of the orthosis fit to ensure the appropriate interface contouring, force application and tramlines.*
- *Assess and solve Assistive device problems as part of long term patient care.*
- *Maintain accurate records of patient treatment and follow up as well as confidentiality of such information.*
- *Communicate effectively with Patients/parents/caregivers, co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.*
- *Educate the patient / client and/or caregiver on use, care and function of the Orthotic device.*

Learning Outcomes:

- *Demonstrate proficiency in assessing pediatric patients' medical conditions and prescribing appropriate orthotic interventions based on thorough patient assessment.*
- *Effectively communicate with patients, parents, caregivers, and members of the rehabilitation team to establish clear goals and management plans.*
- *Select and justify suitable materials and components for constructing orthotic devices tailored to the specific needs of pediatric patients.*
- *Apply appropriate fabrication techniques to construct orthotic devices accurately and efficiently.*
- *Evaluate orthosis fit to ensure optimal interface contouring, force application, and alignment for pediatric patients.*
- *Demonstrate problem-solving skills in addressing assistive device issues as part of ongoing patient care.*
- *Maintain accurate and confidential records of patient treatment and follow-up to ensure continuity of care.*
- *Communicate professionally and effectively with all stakeholders involved in the patient's care.*

  Educate patients, clients, and/or caregivers on the proper use, care, and maintenance of orthotic devices to optimize outcomes and promote independence

Sl.No	TOPIC(PRACTICAL)- 120 HOURS
1	Assessment & fabrication of Advance Orthosis in Paediatrics', CP, Myopathy, Spin bifida, Still's disease, Acute CNS infection, Lung infection, CTEV, CDH, Erb's palsy
2	Assessment & fabrication of Advanced Orthosis in arthrogryphosis multiplex congenita, Prehabilitation ,congenital Deficitis of the hand. Pediatric limb deficiencies.
3	Assessment & fabrication of advanced Orthosis in CP, Spina Bifida, Spinal cord ,DDMinjury,CNS disorders, Acute pediatric distress syndrome,
4	Assessment & fabrication of Advanced Orthosis in Muscular Dystrophy,Orthotic management in pediatric post-surgical care
5	Assessment, casting , fabrication , Gait training and training to adopt the device in ADL, checkout, discharge summery and clinical correlation of prescription quality index (PQI) in prescribed Advance Orthosis for different activities of the child/children

TITLE: Clinical Orthotic Practice in Sports and Recreation
COURSECODE--- MPO 352
Practical HOURS -- 90
CREDITS---03

Course Description: This should include assessment, the supervised manufacture and fitting of all common advanced orthosis for different Sports and recreational activities in all type of exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of patient with sports and recreational activities and prescription for appropriate orthotic interversion which include patient history taking and clinical testing.*
- *Communicate and discuss patient goals and expectations and discuss and debate on the sports and recreation for patient management with the Patients/parents/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the sports Orthosis.*
- *Construct the Orthotic device using appropriate fabrication techniques in preparation for sports and recreational activities for the initial fitting.*
- *Evaluate the quality of the orthosis fit to ensure the appropriate interface contouring, force application and tramlines.*
- *Communicate effectively with Patients/parents/caregivers, co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.*
- *Educate the patient / client and/or caregiver on use, care and function of the Orthotic device*

Learning Outcomes:

- *Demonstrate proficiency in assessing patients engaged in sports and recreational activities, identifying relevant medical conditions, and prescribing appropriate orthotic interventions based on thorough patient assessment.*
- *Effectively communicate with patients, parents, caregivers, and members of the rehabilitation team to establish clear goals and management plans tailored to sports and recreation.*

- *Select and justify suitable materials and components for constructing orthotic devices optimized for sports and recreational activities.*
- *Apply appropriate fabrication techniques to construct orthotic devices accurately and efficiently, meeting the demands of sports and recreational activities.*
- *Evaluate orthosis fit to ensure optimal interface contouring, force application, and alignment, enhancing performance and preventing injury during sports and recreation.*
- *Demonstrate professional communication skills with all stakeholders involved in the patient's care, ensuring effective collaboration and quality service delivery.*
- *Provide comprehensive education to patients, clients, and/or caregivers on the proper use, care, and maintenance of orthotic devices specific to sports and recreational activities, promoting safety and performance optimization.*

Sl no.	Topic(PRACTICAL)-90 HOURS
	Assessment & fabrication of Advanced sports and recreational and Demonstration of Principles of assessment and prescription programs Evaluation.
2.	Assessment & fabrication of Advanced Practical Demonstration of Kin anthropometric study group measurements.
3.	Assessment & fabrication of Advanced Demonstration of Body composition Different Body composition Various methods to estimate body composition .
4.	Assessment & fabrication of Advanced Practical Demonstration of Carter method of somatotyping rating scales Kinanthropometric measurements First, Second and Third Components
5.	Assessment & fabrication of Advanced orthosis in Clinical Sports Medicine Non Traumatic Medical Conditions Illness, Infections,Venereal Diseases; Recommended Exercise induced Asthma; Anemia, Delayed onset muscle soreness (DOMS), Runner's high & exercise addiction. G.I.T. Diseases, Exercises and congestive heart failure, exercise for post coronary & byepass patients, exercise for diabetics.
6.	Assessment & fabrication of Advanced Orthosis Management in Female Specific problems
7.	Assessment & fabrication of Advanced orthosis in age Specific Problems
8.	Assessment & fabrication of Advanced orthosis & Exercise for gait and posture in Common Pulmonary & Cardiac Conditions
9.	Assessment & fabrication of Advanced orthosis for special categories a. Child and adolescent athlete's problems b. Special problems of older athletes c. Special concerns for handicapped athletes
10.	Advanced Orthotic management in Common acute and overuse injuries of lower and upper extremity.
11.	Assessment & fabrication of Advanced orthosis management in Sports specific injuries,

12.	Assessment & fabrication of Advanced orthosis in foot care Diabetes patients. Assessment & fabrication of Advanced orthosis in Spinal deformity and sports. Assessment & fabrication of Advanced orthosis in Emergency Care and Cardiopulmonary Therapeutics. Assessment & fabrication of Advanced orthosis in Sporting emergencies injuries in the athletes. Assessment & fabrication of Advanced orthosis for protective equipment to the sports

TITLE: Clinical Orthotic Practices in Geriatric
COURSECODE--- MPO 353
PRACTICAL HOURS -- 90
CREDITS---03

Course Description: This should include assessment, the supervised manufacture and fitting of all common advanced orthosis for geriatric patients of different activities in all type of exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of patient geriatric activities and prescription for appropriate orthotic interversion which include patient history taking and clinical testing.*
- *Communicate and discuss patient goals and expectations and discuss and debate on the for geriatric patient management with the Patients/parents/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the Orthosis.*
- *Construct the Orthotic device using appropriate fabrication techniques in preparation for geriatric activities for the initial fitting.*
- *Evaluate the quality of the orthosis fit to ensure the appropriate interface contouring, force application and tramlines.*
- *Communicate effectively with Patients/parents/caregivers, co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.*
- *Educate the patient / client and/or caregiver on use, care and function of the Orthotic device*

Learning Outcomes:

- *Demonstrate proficiency in assessing the medical condition of geriatric patients and prescribing appropriate orthotic interventions based on comprehensive patient assessment.*
- *Effectively communicate with geriatric patients, their families, caregivers, and members of the rehabilitation team to establish clear goals and management plans tailored to geriatric activities.*
- *Select and justify suitable materials and components for constructing orthotic devices optimized for the needs and activities of geriatric patients.*

- *Apply appropriate fabrication techniques to construct orthotic devices accurately and efficiently, ensuring comfort and functionality for geriatric activities.*
- *Evaluate orthosis fit to ensure optimal interface contouring, force application, and alignment, promoting mobility and independence in geriatric patients.*
- *Demonstrate professional communication skills with all stakeholders involved in the care of geriatric patients, fostering collaboration and providing high-quality service.*
- *Provide comprehensive education to geriatric patients, their families, caregivers, and/or clients on the proper use, care, and maintenance of orthotic devices, promoting independence and enhancing quality of life.*

Sl no.	Topic(PRACTICAL)- 90 HOURS
1.	Assessment & fabrication of Advanced orthosis for postural support, Advanced KAFO,HKAFO, Standing Frame, RGO
2	Assessment & fabrication of Advanced orthosis in age-related changes in musculoskeletal system. - Sensory changes in older adults
3	Assessment & fabrication of Advanced orthosis in age-related changes in nervous system and cognition
4	Assessment & fabrication of Advanced orthosis on Physiological Response to gait & Posture in Elderly.
5	Assessment & fabrication of Advanced orthosis of geriatric fracture, Rational for functional bracing, Assessment & fabrication of Advanced orthosis Functional bracing of geriatric diaphyseal humerus fractures, Assessment & fabrication of Advanced orthosis for Functional bracing of geriatric diaphyseal ulnar fractures, Assessment & fabrication of Advanced orthosis for Functional bracing of geriatric Colles fractures,
6	Assessment & fabrication of Advanced orthosis in Osteoporosis and Fragility Fracture, Assessment & fabrication of Advanced orthosis in Fall Prevention and Intervention.
7	Assessment & fabrication of Advanced orthosis in Nervous System Disorders. Assessment & fabrication of Advanced orthosis in Peripheral Nervous System . Assessment & fabrication of Advanced orthosis in Central Nervous System Disorders.
8	Assessment & fabrication of Advanced orthosis in Affecting Mobility in Older Adults, Assessment & fabrication of Advanced orthosis in Vascular Disorders Affecting Mobility.
9	Assessment & fabrication of Advanced orthosis in Arthritis and Joint Replacement. Assessment & fabrication of Advanced orthosis in Prevention of Hospital-Acquired.
10	Assessment & fabrication of Advanced orthosis in Musculoskeletal and Sports Injuries in Older Adults. Assessment & fabrication of Advanced orthosis in Geriatric Psychiatric and Cognitive Disorders:

JOURNALS

1. Prosthetics & Orthotics: Journal Articles, BCIT Library
2. Prosthetics and Orthotics International
3. Journal of Prosthetics and Orthotics (JPO)
4. CANADIAN PROSTHETICS & ORTHOTICS JOURNAL
5. Journal of Neuro-Engineering and Rehabilitation
6. Journal of Disability Management and Rehabilitation
7. Disability and Rehabilitation, Taylor & Frances

TITLE: Clinical Orthotic Practice in Spinal disorders
COURSECODE--- MPO354
TEACHING HOURS -- 90
CREDITS---03

Course Description: This should include assessment, the supervised manufacture and fitting of all common advanced orthosis for spinal disorders patients of different activities in all type of exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of patient with spinal disorders activities and prescription for appropriate orthotic interversion which include patient history taking and clinical testing.*
- *Communicate and discuss patient goals and expectations and discuss and debate on the for spinal orthosis for management with the Patients/parents/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the Orthosis.*
- *Construct the Orthotic spinal braces using appropriate fabrication techniques in preparation for activities for the initial fitting.*
- *Evaluate the quality of the orthosis fit to ensure the appropriate interface contouring, force application and tramlines.*
- *Communicate effectively with Patients/parents/caregivers, co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a*

professional attitude on the part of the student.

- *Educate the patient / client and/or caregiver on use, care and function of the Orthotic device*

Learning Outcomes:

- *Demonstrate proficiency in assessing the medical condition of patients with spinal disorders and prescribing appropriate orthotic interventions based on comprehensive patient assessment.*
- *Effectively communicate with patients, parents, caregivers, and members of the rehabilitation team to establish clear goals and management plans tailored to spinal orthosis.*
- *Select and justify suitable materials and components for constructing orthotic spinal braces optimized for the needs and activities of patients with spinal disorders.*
- *Apply appropriate fabrication techniques to construct orthotic spinal braces accurately and efficiently, ensuring comfort and support for various activities.*
- *Evaluate orthosis fit to ensure optimal interface contouring, force application, and alignment, promoting stability and mobility for patients with spinal disorders.*
- *Demonstrate professional communication skills with all stakeholders involved in the care of patients with spinal disorders, fostering collaboration and providing high-quality service.*
- *Provide comprehensive education to patients, clients, and/or caregivers on the proper use, care, and maintenance of orthotic spinal braces, empowering them to optimize functionality and quality of life.*

Sl no.	Topics
1	Assessment & fabrication of Advanced orthosis in Spinal cord injuries Assessment & fabrication of Advanced orthosis in Congenital and acquired deformities.
2	Assessment & fabrication of Advanced orthosis in Tuberculosis
3	Assessment & fabrication of Advanced orthosis in Orthosis for Spinal pain, Cervical orthosis, TLSO, Lumber orthosis, Advanced Bracing in Lumbar pain
4	Assessment & fabrication of Advanced orthosis in Spondylosis, spondylisthesis & spondylysis. Assessment & fabrication of Advanced orthosis in spinal instability: Assessment & fabrication of Advanced orthosis in Orthosis for spinal fracture and trauma
5	Assessment & fabrication of Advanced orthosis in Lumbar pain: Assessment & fabrication of Advanced orthosis of Scoliosis : Practical demonstration evaluation, assessment, 3 D bracing fabrication,

6	Assessment & fabrication of Advanced orthosis in Kyphosis : Assessment & fabrication of Advanced orthosis in Scheuermann's kyphosis , post traumatic kyphosis
7	Assessment & fabrication of Advanced orthosis for spinal cord injured patient. Assessment & fabrication of Advanced orthosis in Osteoporosis. Posture training support, Lumbosacral-corset and TLSO- saggital plane control, Posterior shell TLSO, 3 D and all types TLSO, CTLSO.
8	Assessment, casting , fabrication , wearing schdule and training to adopt the device in ADL, checkout, discharge summery and clinical correlation of prescription quality index (PQI) in prescribed Advance spinal Orthosis for different activities of the child/children

SECOND YEAR (SPECIALIZATION IN ASSISTIVE TECHNOLOGY)

Course Code	Title	Theory Hrs	Practical Hrs	Total Hrs	Credit Points	Internal Marks	External Marks	Total Marks
MPO401	AT in Neurology and Orthopedics	120	--	120	04	25	75	100
MPO402	AT in Transportation and Mobility	120	--	120	04	25	75	100
MPO403	AT in Sports and Recreations	120	--	120	04	25	75	100
MPO404	AT in Geriatric and Paedriatic	120	--	120	04	25	75	100
PRACTICAL								
MPO 451	AT in Neurology and Orthopedics	--	90	90	03	25	75	100
MPO 452	AT in Transportation and Mobility	--	90	90	03	25	75	100
MPO 453	AT in Sports and Recreations	--	120	120	04	25	75	100
MPO 454	AT in Geriatric and Paedriatic	--	120	120	04	25	75	100
MPO455	Dissertation- Thesis	--	300	300	10	---	---	100
		480	720	1200	40	200	600	900

OBJECTIVE OF THIS SPECIALIZATION

- Gain a full appreciation for and an understanding of the engineering, medical, and social aspects associated with the design, development, and use of assistive technology,
- Learn about a wide variety of issues in technology development, including intellectual property rights and best practices in community engagement
- Engage in a comprehensive design experience that includes working with users of assistive technology to identify challenges, prototype solutions, perform user testing, practice iterative design, and communicate results
- To explores the medical, social, ethical, and technical challenges surrounding the design, development, and use of technologies that improve the lives of people with disabilities and geriatric population
- Expose students to the engineering, medical, and social issues facing engineers, researchers, entrepreneurs, clinicians, older adults, and individuals with disabilities in the design, development, and use of assistive technology
- Engage students in a project experience that exercises team working skills (leadership & organization) and applies an engineering design process to address difficulties experienced by individuals with disabilities and older adults
- Provide an opportunity for students to interact with users of assistive technology in the local community along with health care professionals, coaches, and project partners
- Enhance students' problem solving, critical thinking, and communication skills, with specific emphasis on in-class discussions, report writing, and project presentations
- Encourage students to use their engineering skills and design expertise to help individuals with disabilities and older adults increase their independence and improve their quality of life

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TITLE: AT in Neurology and Orthopedics
COURSE CODE--- MPO401
TEACHING HOURS ---- 150 (THEORY)
CREDITS -- 5

Course Descriptions:

This course explores the types and uses of assistive technology. Students compare technologies related to vision, hearing, communication, mobility, fine motor, intellectual, and cognitive disabilities in Neurological and Orthopedics Conditions. Projects enable students to evaluate the needs of people with Neurology and Orthopedics and the community resources, funding sources, and systems available to increase their independence. The course details of Assistive devices that are designed, made, or adapted to assist a person to perform a particular task. Many people with neurological and orthopedic conditions depend on assistive devices to enable them to carry out daily activities and participate actively and productively in community life.

Learning Objectives and Outcomes for AT in Neurology and Orthopedics

- Summarize and explain neurological and orthopedic conditions and related assistive technologies.
- Discover new and developing trends in assistive technology.
- Evaluate appropriate technologies to recommend and apply them to meet the needs of individuals with neurological disabilities.
- Demonstrate the appropriate use and strengths and limitations of disability-specific technologies in a video presentation.

Learning Outcomes:

- Demonstrate a comprehensive understanding of various neurological and orthopedic conditions and the assistive technologies available to support individuals affected by these conditions.
- Identify and critically analyze current trends and advancements in assistive technology, including their potential applications and impacts on individuals with neurological and orthopedic disabilities.

- Apply knowledge and critical thinking skills to assess the unique needs of individuals with neurological disabilities and recommend appropriate assistive technologies to enhance their independence and quality of life.
- Showcase proficiency in using and demonstrating the functionality, strengths, and limitations of disability-specific technologies through well-prepared and informative video presentations.

SL. NO	TOPIC
1	**Introduction to Assistive Technology**: Introduction to assistive technology, Concept, Definition and the Importance of AT, Need of AT in Global and Indian perspective, Levels of Assistive Technology, difference between Assistive Technology and Adaptive Technology, Challenges to access appropriate assistive technology, Assistive technology Service delivery provision, WHO rapid Assistive Technology Assessment (rATA), WHO priority assistive product list, National list of essential assistive product (NLEAP), Schemes of govt. of India for providing assistive devices. Assessment, prescription, user training and follow up of appropriate Assistive technology for locomotor & neurological Disorder.
3.	**Assistive devices(AD) for Orthopedic conditions**: AD for mobility both in pre and post Joint replacement surgery(THR/TKR), Unsteady Gait, Tremors, Chronic Progressive illness, osteoarthritis of knee, osteoarthritis of hip joint, osteoarthritis of upper limb joints, Lower limb amputation, Upper limb amputation, and Multiple amputation, Fracture, over use or cumulative stress disorders.
4.	**Assistive devices for different Neurological condition**: AD in cerebral palsy, Low endurance, Multiple sclerosis, Stroke, acute spinal cord injury, Alzheimers Disease, Amyotrophic Lateral Sclerosis, Ataxis, Brain Tumors, Cerebral Aneurysm, Epilepsy and seizures, Guillain-Barre Syndrome, Head injury, Hydrocephalus, Herniated disc, Meningitis, Muscular dystrophy, Neurocutaneous syndormes, Enchephalitis, Septicemia, Parkinsons disease, Myasthenia Gravis, Nerve injury, Nerve compression,
5.	**Mobility aids**: Assessment and prescription of Mobility Aids, Assessment of gait, balance, cognition and the cardiovascular, musculoskeletal and neurological systems and planning for most optimum AD, different adaptive devices- all types of wheelchair, all types of tricycle, axilla crutch, tripod, cane, walker, pressure relief cushions, creepers, crawlers, trolleys, standing- sitting turntable for mobility impaired, Scooters, Bed cane, Manual and Electric Wheelchairs and foam, gel and air cushions for proper seating and posture.
6.	**Assistive devices for daily life**: Self-help aids for use in activities such as eating, bathing, cooking, dressing, toileting, home maintenance, etc. These include modified eating utensils, adapted books, pencil holders, page turners, Dressing aids, adapted personal hygiene aids.
7.	**Assistive devices for Positioning & ambulatory difficulties:** Adapted seating, cushions, standing tables, positioning belts, braces and wedges to maintain posture, and devices that provide body support to help people perform a range of daily tasks.
8.	**Seating devices**: CP chair, Standing Frame and its seating cushion and attachments in Children and other Neurological Conditions

9.	**Assistive devices for Cognitive or other neurological condition**: Dementia: PDA (Personal Digital Assistant), prospective memory aids (PMAs) and retrospective memory aids (RMAs), Electronic systems that help people control various appliances, switches for telephone, TV, or other appliances which are activated by pressure, eyebrows or breath
10.	**Brain Computer Interface:** EEG and BCI, Spellers, Cursors, Head pointer, Joy stick controller, Wheelchairs, Robotic Arms, Communication and processing of EEG signals, translation of brain signals into command outcomes using artificial intelligence algorithms. BCI signals to control wheelchairs, prosthetic limbs or other assistive technologies.

Reference Text Books

s.no.	Author	Title with Edition	Publisher	Year/Volume
1	Meeko Mitsuko K. Oishi, Ian M. Mitchell, H. F. Machiel Van der Loos	Design and Use of Assistive Technology: Social, Technical, Ethical, and Economic Challenges	Springer Science & Business Media,	2010
2	P. John Clarkson, P. Langdon, P. Robinson	Designing Accessible Technology	Springer Science & Business Media,	2006
3	Stasolla, Fabrizio	Assistive Technologies for Assessment and Recovery of Neurological Impairments	IGI Global	2021
4	Marcia J. Scherer	Assistive Technologies and Other Supports for People With Brain Impairment	Springer Publishing Company	2012
5	D. Jude Hemanth	Handbook of Decision Support Systems for Neurological Disorders	Academic Press	2021
6	Ladan Najafi, Donna Cowan	Handbook of Electronic Assistive Technology	Academic Press	2018
7	Brian O'Neill, Alex Gillespie	Assistive Technology for Cognition: A handbook for clinicians and developers	Psychology Press	2014
8	Meeko Mitsuko K. Oishi, Ian M. Mitchell, H. F. Machiel Van der Loos	Design and Use of Assistive Technology: Social, Technical, Ethical, and Economic Challenges	Springer Science & Business Media	2010
9	Hariton Costin, Björn Schuller, Adina Magda Florea	Recent Advances in Intelligent Assistive Technologies: Paradigms and Applications	Springer Nature	2019
10	R A Cooper	Wheel chair selection & configuration	Demos Medical Publishing	1998
11	J. Hughes	Powered Lower Limb Orthotics in Paraplegia		
12	Suzanne Robitalle	The Illustrative Guide to Assistive Technology and Devices	Demos Medical Pubilishing	2009
13	Aisev, Dereus	Orthotics in Neurological Rehabiliation	Demos Medical Pubilishing	1992

TITLE: AT in Transportation and Mobility
COURSE CODE--- MPO402
TEACHING HOURS ---- 120 (THEORY)
CREDITS -- 4

Course Description: This course will introduce students to a distinctly view of the role that Assistive technology will play in facilitating shared mobility, disrupting transportation markets, and reshaping multimodal transportation systems for Geriatric and people with Mobility Impairment function. The topic will cover various AT, its specification, availability, cost/benefit , interface , measurement , fitment and training to user.

Learning Objectives and outcomes:

- At the end of this course, students should expect to have learned about Assistive technology for transport and the future of urban mobility from the multiple perspectives of the people responsible for implementing
- To gain a limited technical understanding of the predominant products/solutions in Assisitve transportation technology today, as well as demonstrate a critical understanding of the urban design, equity, accessibility, and sustainability implications of assisitve technology in city environments
- Students should gain knowledge and skill on access audit and its implementation
- Understanding basics measurement techniques, dimension and layout of Assistive Technology products
- Explain the appropriate use of assistive technology through experience, exploration, reflection, and application
- Describe low, mid, high, and newer technologies applications through reflection, observation, and application
- Identify best practice strategies for identifying and delivering Universal Design

- Demonstrate the complexities of selecting assistive technology
- Define principles of adaptations of computer hard and software and its interface to upper extremities Prosthetics and Orthotics
- Understand the options of modifying computers, tablets and cellular phones for different populations and its interface
- Analyze Wheel chair, tricycle and other outdoor mobility seating devides, various attachments and suggest solutions - assess aspects of wheelchairs in terms of seating and daily function
- Understanding the concept and its implementation in performing basic wheelchair skills and teach them
- Suggest principles of safety in transport
- Understand the factors that can cause pressure ulcers and choose appropriate wheelchair cushions for a person's needs
- Understand the complexities of adapting driving.

Learning Outcomes:

- *Gain comprehensive knowledge of Assistive Technology for transport and the future of urban mobility, considering various perspectives involved in implementation.*
- *Develop critical understanding and analysis of urban design, equity, accessibility, and sustainability implications of Assistive Technology in city environments.*
- *Acquire proficiency in conducting access audits and implementing measurement techniques for Assistive Technology products.*
- *Demonstrate competence in the appropriate use and application of assistive technology through practical experience and reflection.*
- *Identify and apply various technological solutions, including low, mid, high, and newer technologies, in real-world scenarios.*
- *Implement best practices for Universal Design in the selection and delivery of assistive technology solutions.*
- *Navigate the complexities of selecting assistive technology and adapt computer hardware and software interfaces to upper extremities Prosthetics and Orthotics.*
- *Modify digital devices for diverse populations and comprehend their interfaces.*
- *Evaluate and recommend solutions for wheelchair and outdoor mobility seating, considering individual needs and daily functionality.*

- *Demonstrate proficiency in teaching basic wheelchair skills and ensuring safety in transport.*
- *Apply knowledge of pressure ulcer prevention and select appropriate wheelchair cushions accordingly.*
- *Understand the challenges and adaptations required for driving with disabilities.*

SL. NO	TOPIC
1	**Introduction of the role of Assistive technology (AT) and Infrastructure for Transportation and Mobility**: Infrastructure in Rural and Urban Areas for AT, AT in shared mobility, disrupting transportation markets, and reshaping multi-modal urban transportation systems; analyses of governance issues; the interaction between private markets and regulators; changes in the nature of infrastructure and urban planning required to accommodate the wired future of transportation.
2	**Accessibility:** Rules and Policy on Accessibility, CPWD guidelines on accessibility of physical environment, Digital environment accessibility, Accessible India Campaign (AIC), Accessibility of public transport, public buildings, public place, websites, apps etc , Accessibility standards. AT evaluation. Accessibility Audit .
3	**Universal design**: The principles of universal design: Equitable, Flexibility, Simple and Intuitive, Perceptible Information, Low Physical Effort and Size and Space for Approach. Application to various physical spaces, such as buildings, parks, and outdoor spaces for barrier break transportation and mobility. Universal design principles to a building by including features such as ramps, wide doorways, and elevators that are designed to accommodate people with mobility impairments, while also making the space more convenient for everyone.
5	**Assistive technology for Driving Activities:** Personal Vehicle Accessibility Evaluation and Modification, Driver training, Assistive devices/adapted driving techniques- adoptive mirrors¸ Mechanical hand controls, Zero-effort steering, Extended steering columns Driving simulator and others,
6	**Assistive Technology for Air Travel**- Requirements and Test Methods Related to Mobility Devices, Mobility Device Information, Principles and Training for Air Travel, Mobility Device Communication and Procedures Prior to Air Travel, Mobility Device Handling Procedures for Stowage and Transport in Commercial Aircraft, Labeling and Design Requirements for Wheelchairs Designed for Stowage and Transport in Commercial Aircraft
8	**Home/workplace modifications**: Structural adaptation that remove or reduce physical barriers such as ramps, lifts, modification in the bathroom to make it accessible, automatic door openers and expanded doorways etc. Environmental Control System (ECS)

Text Books and References:

Sl. No.	Author	Title	Publisher	Year/Vol.
1.	Giulio E. Lancioni Nirbhay N. Singh	Assistive Technologies for People with Diverse Abilities	Springer ISBN: 9781489980298	2014-01-07
2.	Meeko Mitsuko K. Oishi ; Ian M. Mitchell ; H. F. Machiel Van der Loos	Design and Use of Assistive Technology	Springer ISBN: 9781441973012	2010-09-16
3	Grant and Alison	Access Audit Handbook:	RIBA Publishing ISBN: 9781859464922	2nd edition01/07/2013
4	CENTRAL PUBLIC WORKS DEPARTMENT	Hand Book on BARRIER FREE AND ACCESSIBILITY	URL : http://cpwd.gov.in)	2014
5	CENTRAL PUBLIC WORKS DEPARTMENT	CPWD works Manua1 2022 and standard operating procedures 2022	Director General CPWD	2022
6	By Albert M. Cook, PhD, PE and Janice Miller Polgar, BScOT, PhD, FCAOT	Essentials of Assistive Technologies, 1st Edition	Elsevier SBN : 9780323075367	2011
7	Authors: Albert M. Cook, Janice Miller	Assistive Technologies Principles and Practice	Elsevier ISBN: 9780323523387	5th Edition -

	Polgar, Pedro Encarnação		eBook ISBN: 9780 323523370	December 26, 2016
8	Teodiano Bastos-Filho, Dinesh Kumar, Sridhar Poosapadi Arjunan	Devices for Mobility and Manipulation for People with Reduced Abilities	ISBN 9781138073 784 by CRC Press	April 21, 2017
9	Saranya Srinivasan and Lyle L. Lloyd	Assistive Technology For Mobility, Seating, And Positioning	Publisher: Brill ISBN: 9781780522 951	01 Jan 2011
10	E Steinfeld	Universal Design - Creating Inclusive Environments Hardcover – Illustrated,	John Wiley & Sons Inc.	19 April 2012
11	Robert F. Erlandson	Universal and Accessible Design for Products, Services	CRC Press ISBN-0849374936	1st edition 3 August 2007
12	Sylvia Longmire	Everything You Need to Know About Wheelchair Accessible Cruising	ISBN- 978-1734511307	2020

TITLE: AT in Sports and Recreations
COURSE CODE--- MPO403
TEACHING HOURS ----120 (THEORY)
CREDITS -- 4

Course Descriptions:

This course provides an introduction to the fundamental principles and practices related to multiple areas of assistive technology. This includes: wheelchair seating and mobility, adaptive sports and recreation, environmental control and home automation, computer and Smart Phone access, cognitive aids, adaptive driving, vehicle modifications, transportation safety, environmental accessibility as well as prosthetics and orthotics. The curriculum provides a foundation for assistive technology devices, services, strategies and practices and builds on the foundation in Sports and Recreations

Learning objectives and Outcomes:

- Students learn how to develop and implement assistive technology (AT) devices and services.
- Students learn to know sport wheel chair, sport aids, seating and wheeled mobility, electronic activities of daily living, and home automation.
- Students learn how to develop and implement assistive technology devices and services in adapted sports and recreation.
- The course includes technology for Paralympics sports, summer sports, winter sports, video games, and recreation.
- The course will review principles of anthropometrics, biomechanics and ergonomics as it applies to adapted sports and recreation.

Learning Outcomes:

- *Demonstrate competency in developing and implementing assistive technology devices and services to meet the needs of individuals across various domains.*
- *Acquire expertise in the features and functionalities of sport wheelchairs, sport aids, seating and wheeled mobility, electronic activities of daily living, and home automation.*
- *Apply knowledge and skills to develop and implement assistive technology solutions for adapted sports and recreation, considering the specific requirements and preferences of athletes.*
- *Utilize assistive technology effectively in various sports and recreation settings, including*

Paralympic sports, summer sports, winter sports, video games, and recreational activities.

Analyze and apply principles of anthropometrics, biomechanics, and ergonomics to optimize performance and comfort in adapted sports and recreation contexts

SL. NO	TOPIC
1.	**Introduction:** Assistive technology in Past and present**.** Assistive Technology Decision Making Guide from problem identification to follow up, SETT (Student, Environment, Task, and Tool), Sports and recreation Human Work and Work Environment (HWWE) assessment: Physical assessment, environment assessment and residual sensory and function assessment
2.	**Assistive technology for recreation and leisure activities**- Assessment of outdoor/indoor recreation activities and Assistive technology, Analysis of need, selection of optimum solution, Tools & Strategies, Implementation Plan and outcome measurements.
3.	**Adaptive devices in sports** -All-terrain vehicles, Equestrian sports- Horseback riding, Extreme sports- Off-road mountain biking, Rock climbing and high ropes courses, Paragliding, hang gliding, and skydiving, Flying, Fencing, Fishing, Fitness, Hunting, Ice hockey, Paddling sports, Powerlifting, Power soccer, Quad rugby, Sailing, Shooting, Scuba diving, Shooting, Snow skiing, Softball, Swimming, Table tennis, Tennis, Track and field, Water skiing, Archery, Basketball, Billiards, Boating, Bowling, Cycling Adapted sporting equipment (e.g. fishing rods, golf clubs), Switch-adapted digital camera, Switch-adapted toys, Adapted gardening tools, Adapted board games ,Adapted playing cards and card holders, Wheelchair accessible tent
4.	**Assistive technology for sports and recreational, leisure activities for persons with disabilities:** Special equipment and AD for Congenital anomalies, Lower limb amputations, upper limb amputation, Spinal deformities, Spinal cord injury, Fracture, Dwarfism, Marfans syndrome and all other Orthopedic and neurological disorders
5.	**Assistive technology for outdoor recreation:** Switch adapted toys, playing card shuffler, camera mounts, Image Stabilization Binoculars, Adaptive Fishing Rod, Adaptive shooting rest, Rifle mount, and Gun Mount, Pool lift and adapted sporting equipment, Saratoga exercise hand cycle., Stationary bridge rest and mobile bridge, Telescoping and articulated camera mount, and pneumatic sip-and-puff remote shutter control.

Text Books and References:

SL No	Author	Title with Edition	Publisher	Year /volume
1	Albert M. Cook, Janice Miller Polgar	Essentials of Assistive Technologies	Elsevier Health Sciences	2011
2	Emily C. Bouck	Assistive Technology	SAGE Publications	2015
3	D. Archambault, G. Kouroupetroglou	Assistive Technology: Shaping a Sustainable and Inclusive World	IOS Press	2023
4	John A. Nesbitt, Conway Greene Editorial Staff, Jean Driscoll	Sports, Everyone!: Recreation and Sports for the Physically Challenged of All Ages	Conway Greene Publishing Company	1995
5	Joseph B. Webster, Douglas P. Murphy	Atlas of Orthoses and Assistive Devices	Elsevier	2018
6	Kevin K Chui, Milagros Jorge, Sheng-Che Yen, Michelle M. Lusardi	Orthotics and Prosthetics in Rehabilitation E-Book: Orthotics and Prosthetics in Rehabilitation E-Book	Elsevier Health Sciences	2019
7	Stefano Federici, Marcia Scherer	Assistive Technology Assessment Handbook	CRC Press	2012
8	Lynn Gitlow, Kathleen Flecky	Assistive Technologies and Environmental Interventions in Healthcare: An Integrated Approach	John Wiley &Sons	2019

TITLE: AT in Geriatric and Paedriatic
COURSE CODE--- MPO 404
TEACHING HOURS ----120 (THEORY)
CREDITS -- 04

Course Description:

Assistive Technology for the Elderly addresses the intricacies involved in the design and development of assisted technologies for the elderly, covering smart systems such as magnifying book contents, speaking electronic devices, alarms for doors and windows, smart alert bands, panic buttons, medication dispensers and reminders, Wander Gard, physiological parameters monitoring systems and smart home monitoring systems. This course is aimed at those who are responsible for designing assistive technology intended to be used by the geriatric and paedriatic. It lays out the technology that is already available and covers user needs and state-of-the-art technologies and methodologies.

Learning objectives and outcomes:

- Focuses on practical devices and technology for Prosthetic and Orthotic Professionals
- Offers deep coverage of sensor based assistive technologies that are for elderly people with dementia, physical disabilities and people living alone
- Covers assistive technology ecosystems and offers case studies for practical application
- Define adaptive equipment and AT, and review various types
- Discuss the purpose of adaptive equipment and AT
- Review appropriate use of adaptive equipment and AT relative to age, cognition, family needs, and support
- Summarize important considerations related to growth, environment, and specific diagnoses
- Recognize the practical considerations associated with use of adaptive equipment and AT, including evaluation, funding, documentation of need, and fitting

Learning Outcomes:

- *Gain practical knowledge of devices and technologies relevant to Prosthetic and Orthotic Professionals for enhancing the lives of elderly and pediatric populations.*
- *Acquire a comprehensive understanding of sensor-based assistive technologies tailored to the needs of elderly individuals with dementia, physical disabilities, and those living independently.*
- *Apply knowledge of assistive technology ecosystems through case studies, demonstrating practical*

application in real-world scenarios.

- *Identify and differentiate various types of adaptive equipment and AT, recognizing their specific functionalities and applications.*
- *Understand the purpose and benefits of adaptive equipment and AT in addressing the unique needs of elderly and pediatric individuals.*
- *Evaluate and recommend appropriate adaptive equipment and AT solutions based on individual factors such as age, cognition, and support requirements.*
- *Consider growth, environmental factors, and specific diagnoses when selecting and implementing adaptive equipment and AT.*
- *Navigate the practical aspects of using adaptive equipment and AT, including evaluation procedures, funding options, documentation requirements, and fitting processes.*

SL NO.	TOPIC
	Assistive Technology for Geriatric: Introduction to health challenges of aging and its impact on mobility and ADL. Assistive devices for Independent living and comfort, virtual assistants, visual and communication aids, and memory aids. Smart homes and voiceassistants, Alarm signalers with light/sound/vibration, Fall Detector
1	**Walking Devices:** Design and fitment of Stander, a Frame and differentstanding frame, walking frame, parapodium Different types of cane , quad pods, offset, standard canes, crutches, walker, four wheeled walker and other Gait Orthotics
2	**Life care/ Self Care Devices**: Design and fitment of Elevated bed and lounge furniture, Elevated toilet seats Shower chairs and grab bars, Non-slip surface on chair, blocks for feet, bolster or rolled towel for positioning, adapted or alternate chair, side-lying frames, standing frame, floor sitter, chair insert, Custom-fitted wheelchair straps and head supports, trays and adapted desk/table, bean bag chairs, grab rail, Universal cuff, Reacher, Electric can openers and grip tools, reading, leisure, bed room, housekeeping and laundry, Personal digital assistant (PDA), Pill organizer, Pressure relief mattresses, Simplified mobiles phone
4	**Assistive Devices in Kitchen:** Veggie/fruit choppers Pot and pan holders, Safety chopping boards ,Anti-slip mats and stools , Easy pourkettle and other, Adoptive utensils including Plate, cup, glass ,spoon etc
10	**AT in Paedriatic for Mobility:** Walking stick, crutch, walking frame, manualand powered wheelchair, tricycle Artificial leg or hand, leg or hand splint, clubfoot brace Corner chair, supportive seat, standing frame Adapted cutlery and cooking utensils, dressing stick, shower seat, toilet seat, toilet frame,feeding robot
11	**AT in Education for Children with Hearing impairments:** Introduction to hearing, speech impairment, Deaf blindness, assistive listening, hearing aid, Augmentative and Alternative communication (AAC), cochlear implant, Artificial Electronic Larynx, voice prosthesis, voice amplifier, Deaf blind communicator, AI integrated assistive devices for auditory verbal therapy (AVT), Basic Indian sign language (ISL), Tactile sign ,Task lists, picture schedule and calendar, picture based instructions Timer, manual or automatic reminder, smartphone with adapted task lists, schedules, calendars and audio recorder Adapted toys and games

12	**AT in Education for Children with Visual impairments:** Definition, types and functional assessment, orientation and mobility devices Cane – White & Sensor Based Cane, AI powered smart vision glass, Braille device for reading & writing, Braille Slate and stylus, Braille writer, Braille embosser, tactile diagram, embossed Model, Tylor frame, Abacus, Electronic devices: note taker, Refreshable braille Display, Digital Accessible Information Systems (DAISY), Smart Phone Accessibility, Screen reader, Text to speech software, optical character recognition, epub etc , GPS based Navigation System, Low vision Aid :- Optical, Non optical, Eyeglass, Large print Display, screen magnifiers
13	**AT in Education for Children with Cognitive impairment:** Introduction to intellectual developmental disabilities (IDD), specific learning disorder (SLD), Autism spectrum disorder (ASD). Teaching learning material (TLM) kit, Multi-sensory integrated educational and developmental (MSIED) kit, AAC for cognitive impairment, Tables that can be moved up and down , Adaptive scissors and art supplies ,Keyturners ,Aids for positioning in bed or on couches and chairs
14	**AT Designs and Development**: Design theories, idea generation, fabrication machines, hand tool techniques, and appropriate materials that relate to custom design and custom fabrication of low-tech adaptive equipment, different methods for evaluating access methods and controls used to operate computers, communication devices and powered wheelchairs. Instruction alsoaddresses device features and integration factors. Includes hands-on labs

Text Books and References

Sl.No.	Author	Title	Publisher	Year/Vol.
1	Michael A. Alexander, Dennis J. Mstthews	Pediatric Rehabilitation Principles and Practices	demosmedical	5th ed.
2	Hsu, John D.	AAOS atlas of Orthosis and assistive devices,	Mosby publications/ or N.Y.U. St.Louice, London, Chickago	5th ed.
3	Michelle M. Lusardi PhD PT andCaroline C. Nielsen PhD	Orthotics and Prosthetics in Rehabilitation		3rd ed.
4	Kevin P. Murphy,Mary A. McMahon, Amy J. Houtrom	Pediatric Rehabilitation Principles and Practices	demosmedical	6th ed.
5	Albert M. Cook,Jaan Miller Polgar,Pedro Encarnacao	Assistive Technology Principles and Practice		5th ed.
6.	R Chinnathurai	Short Testbook of Prosthetics & Orthotics		1st ed.
7.	Douglas Murphy	Fundamentals of Amputation Care And Prosthetics		1sted.
8.	David X. Cifu, Henry L. Lew, Mooyeon Oh-Park	Geriatric Rehabilitation		2018
9.	oschka Haltaufderheide, Johanna Hovemann, Jochen Vollmann	Aging Between Participation and Simulation Ethical Dimensions of Socially Assistive Technologies in Elderly Care		2020
10.	Bette R Bonder, VaninaDal Bello-Haas	Functional Performance in Older Adults		2017
11.	Bruno Andò, Pietro Siciliano, Vincenzo Marletta	Smart Home Technologies and Services for Geriatric Rehabilitation		2015

12	Nagender Kumar Suryadevara, Subhas Chandra Mukhopadhyay	Assistive Technology for the Elderly	Elsevier Science	2020
13	Bryan J. Kemp, Laura Ann Mosqueda	Aging with a Disability	Johns Hopkins University Press	2004

Practical

TITLE: AT in Neurology and Orthopedics
COURSE CODE--- MPO451
TEACHING HOURS ----120 (Practical)
CREDITS -- 04

Course Description: This should include assessment, the supervised manufacture and fitting of all common assistive devices and technology for different neurological and orthopedically conditions in all types of age groups of Patients and at least exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of a neurological and orthopedic patient and prescription of appropriate assistive technology which include patient history taking and clinical testing.*
- *Communicate and discuss patient goals and expectations and discuss and debate the neurological and orthopedic patient management with the Patients/parents/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the Assistive device.*
- *Construct the Assistive device using appropriate fabrication techniques in preparation for the initial fitting.*

- *Evaluate the quality of the Assistive device fit to ensure the appropriate interface contouring, force application and tramlines.*
- *Assess and solve Assistive device problems as part of long term patient care.*
- *Maintain accurate records of patient treatment and follow up as well as confidentiality of such information.*
- *Communicate effectively with Patients/parents/caregivers, co-workers, and other health care professionals in such a manner that will ensure the highest quality of service and reflect a professional attitude on the part of the student.*
- *Educate the patient / client and/or caregiver on use, care and function of the Assistive device.*

 Learning Outcomes:

 Demonstrate proficiency in assessing the medical condition of neurological and orthopedic patients and prescribing appropriate assistive technology solutions based on thorough patient assessment.

 Effectively engage with patients, families, caregivers, and interdisciplinary team members to establish clear communication channels and develop patient-centered management plans.

 Select and justify suitable materials and components for constructing assistive devices, considering patient-specific needs and preferences.

 Apply appropriate fabrication techniques to construct assistive devices accurately and efficiently, ensuring optimal fit and function.

 Evaluate the fit and performance of assistive devices, making necessary adjustments to enhance patient comfort and usability.

 Demonstrate problem-solving skills in addressing assistive device issues, promoting long-term patient satisfaction and adherence.

 Maintain comprehensive and confidential records of patient treatment and follow-up, ensuring continuity of care and compliance with regulatory standards.

 Communicate professionally and effectively with all stakeholders involved in patient care, fostering collaboration and ensuring the delivery of high-quality services.

 Provide comprehensive education to patients, clients, and/or caregivers on the proper use, care, and maintenance of assistive devices, promoting independence and improving overall quality of life.

SL NO	TOPIC(PRACTICAL)- 90 HOURS
01.	Taking case history of a minimum of 20 individuals and assessment for assistive technology
02.	Assessment, design, fabrication and outcomes measures of assistive devices for different orthopedically conditions like Joint replacement surgery(THA/TKR), Unsteady Gait, Tremors, Chronic Progressive illness, osteoarthritis of knee, osteoarthritis of hip joint, osteoarthritis of upper limb joints, Lower limb amputation, Upper limb amputation, Multiple amputation, Fracture , over use syndrome.
03.	Assessment, design & fabrication of assistive devices Neurological conditions like cerebral palsy, Low endurance, Multiple sclerosis, Stroke, acute spinal cord injury, Alzheimer's Disease, Amyotrophic Lateral Scerosis, Ataxis, Bell's Palsy, Brain Tumors, Cerebral Aneurysm, Epilepsy and seizures, Guillain-Barre Syndrome, Head injury, Hydrocephalus, Herniated disc, Meningitis, Muscular dystrophy, Neurocutaneous syndormes, Enchephalitis, Septicemia, Parkinsons disease, Myasthenia Gravis, Nerve injury, Nerve compression.
04.	Assessment, casting, fabrication, Gait training and training to adopt the device in ADL, Environment planning, accessibility, checkout, discharge summery and clinical correlation of prescription quality index (PQI) in prescribed assistive devices for different activities of Daily living
05.	Fabrication of Adapted seating, cushions, standing tables, positioning belts, braces, Standing frame
06.	Assessment, prescription and design of appropriate assistive technology for Cognitive or other neurological condition

TITLE: AT in Transportation and Mobility
COURSE CODE--- MPO452
TEACHING HOURS---- 90 (Practical)
CREDITS -- 3

Course Description: This should include assessment, design, the supervised manufacture and training of different assistive technology required for transportation and mobility for different pathological, Neurological and orthopedically conditions and at least exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of a patient and appropriate prescription which include patient history taking and clinical testing.*

- *Communicate and discuss patient goals and expectations and discuss and debate the management with the parents/caregivers, co-workers and other members of the rehabilitation team.*
- *Identify, prescribe and justify selection of appropriate materials and component in the construction of the device.*
- *Evaluate the quality of the device fit to ensure the appropriate interface contouring, force application and tramlines.*
- *Educate the patient / client and/or caregiver on use, care and function of the device.*
- *Proper training of patient using appropriate assistive technology required for transportation and mobility*

Learning Outcomes:

- *Upon completion of this course, students will be able to accurately assess the medical condition of patients and prescribe appropriate assistive technology for transportation and mobility based on thorough patient history taking and clinical testing.*
- *Students will demonstrate effective communication skills in discussing patient goals, expectations, and management strategies with various stakeholders, including patients, parents/caregivers, co-workers, and rehabilitation team members.*
- *Students will be able to identify, prescribe, and justify the selection of appropriate materials and components for constructing assistive technology devices tailored to individual patient needs.*
- *Students will be proficient in evaluating the quality of device fit, ensuring optimal interface contouring, force application, and tramlines for enhanced patient comfort and functionality.*
- *Upon completion of the course, students will effectively educate patients, clients, and/or caregivers on the proper use, care, and function of assistive technology devices for transportation and mobility.*
- *Students will demonstrate competence in providing comprehensive training to patients, empowering them with the necessary skills to effectively utilize assistive technology required for transportation and mobility.*

SL NO	TOPIC(PRACTICAL)- 90 HOURS
1.	Assessment, prescription and design of appropriate assistive technology for transportation and mobility for minimum 10 cases
2.	Modification of seating device, discussion with Automobile Engineer or supplier/manufacturer of Automobile and changes of vehicle steering, brake, clause, manual and automatic gearing system as per the need of users
3.	Evaluation of Accessibility standards

4.	Assessment and evaluation of Assistive technology for driving and related activities
5.	Assessment and evaluation of Home/workplace modifications
6.	Assessment, evaluation and design of vehicle modification for transportation and mobility for different conditions
7.	Plan and execute in minimum 5 patients in each category
8.	Assessment, planning and procurement, training to adopt the device in transport interface Environment planning, accessibility, checkout, discharge summery and clinical correlation of prescription quality index (PQI) in prescribed assistive devices for different activities of Daily living

TITLE: AT in Sports and Recreations
COURSE CODE--- MPO453
TEACHING HOURS ---- 90 (Practical)
CREDITS -- 03

Course Description: This should include assessment, design, the supervised manufacture and training of different assistive technology and assistive technology services, strategies and practices for sports and recreational activities and at least exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition and need of a Sports person with different pathological conditions related to their requirement for sports and recreational activities using appropriate investigative techniques which include patient history taking and clinical testing.*
- *Formulate an optimal assistive technology solution using information from the patient assessment, other members of the rehabilitation team, medical charts, etc.*
- Assessment and evaluation to develop and implement assistive technology (AT) devices and services.
- Assessment and evaluation of sport wheel chair, sport aids, seating and wheeled mobility, electronic activities of daily living, and home automation.
- The course includes technology for Paralympics sports, summer sports, winter sports, video games, and recreation.

Learning Outcomes:

- *Upon completion of this course, students will demonstrate proficiency in assessing the medical condition and needs of athletes participating in sports and recreational activities, utilizing appropriate investigative techniques and patient history taking.*

- *Students will be able to develop optimal assistive technology solutions by synthesizing information gathered from patient assessments, collaborating with rehabilitation team members, and reviewing medical records, ensuring tailored interventions for individual athletes.*
- *Students will gain the skills necessary to conduct comprehensive assessments and evaluations, leading to the successful development and implementation of assistive technology devices and services aimed at enhancing athlete participation and performance.*
- *Upon completion of the course, students will be proficient in evaluating and assessing sport-specific equipment, including sport wheelchairs, aids, seating and wheeled mobility, electronic activities of daily living, and home automation systems, to optimize athlete engagement and success in sports and recreational activities.*
- *Students will demonstrate competency in exploring and integrating assistive technology solutions across a diverse range of sports and recreational pursuits, including Paralympic sports, summer sports, winter sports, video games, and recreational activities, fostering inclusivity and accessibility for athletes of all abilities.*
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SL NO	TOPIC(PRACTICAL)- 120 HOURS
01.	Assessment, evaluation and design of assistive technology for Equestrian sports, Extreme sports like Off-road mountain biking, Rock climbing and high ropes courses, hang gliding, Paddling sports for person with different pathological, neurological and orthopedics conditions
02.	Assessment, evaluation and design of assistive technology for Powerlifting, Power soccer, Quad rugby, Sailing, Shooting, Scuba diving, Shooting, Swimming, Table tennis, Tennis, Track and field, for person with different pathological, neurological and orthopedics conditions
03.	Assessment, evaluation and design of assistive technology for arts and crafts, gardening, and photography, Board games and card games, Camping for person with different pathological, neurological and orthopedics conditions
04.	Assessment, evaluation and design of assistive technology for Music and theater arts
05.	Plan and execute in minimum 5 patients in each category
06.	Assessment, planning and procurement, training to adopt the device in sports Environment planning, accessibility, checkout, discharge summery and clinical correlation of prescription quality index (PQI) in prescribed assistive devices for different sports

TITLE: AT in Geriatric and Paediatric
COURSE CODE--- MPO454
TEACHING HOURS ---- 90 (Practical)
CREDITS -- 03

Course Description: This should include assessment, supervised manufacture and fitting of all common assistive devices for different neurological, orthopedic and general healthcare conditions for Geriatric and Pediatrics group and at least exposure to the range of devices not routinely seen in clinical practice.

Learning objectives:

- *Assess the medical condition of a* Geriatric and *Pediatrics patient related to their management using appropriate investigative techniques which include patient history taking and clinical testing.*
- *Formulate optimal using information from the patient assessment, other members of the rehabilitation team, medical charts, etc.*
- *Communicate and discuss patient goals and expectations and discuss and the management with the parents/caregivers, co-workers and other members of the rehabilitation team.*

Learning Outcomes:

- *Upon completion of this course, students will demonstrate proficiency in assessing the medical condition of geriatric and pediatric patients, employing appropriate investigative techniques such as patient history taking and clinical testing to inform management strategies.*
- *Students will be able to develop optimal assistive technology solutions by synthesizing information gathered from patient assessments, collaborating with rehabilitation team members, and reviewing medical records, ensuring personalized interventions for geriatric and pediatric populations.*
- *Students will gain the skills necessary to effectively communicate with patients, parents/caregivers, co-workers, and rehabilitation team members, facilitating discussions on patient goals, expectations, and management strategies to optimize care outcomes.*
- *Upon completion of the course, students will be proficient in supervising the manufacture and fitting of common assistive devices for geriatric and pediatric patients, ensuring precision and efficacy in device application to meet individual patient needs.*

- *Students will demonstrate an expanded understanding and familiarity with a diverse range of assistive devices not routinely encountered in clinical practice, enhancing their knowledge and expertise in the field of assistive technology for geriatric and pediatric populations.*

SL NO	TOPIC(PRACTICAL)- 120 HOURS
01.	Assessment, prescription and design of appropriate assistive technology for Geriatric and pediatric group of Patients
02.	Assessment and design of Walking frames for freedom of movement
03.	Assessment and design of Life care Devices for geriatric patients
	Assessment and design of Walking Devices
	Assessment and design of Adaptive devices for activities of daily living for Geriatric and pediatric Patients
04.	Assessment and design of assistive devices for Education in Children with different types of Disability
05.	Plan and execute in minimum 5 patients in each category
06.	Assessment, planning and procurement, training to adopt the device in sports Environment planning, accessibility, checkout, discharge summery and clinical correlation of prescription quality index (PQI) in prescribed assistive devices for different conditions in geriatrics

TITLE: Dissertation- Thesis
COURSE CODE--- MPO455
TEACHING HOURS---- 300 (Practical)
CREDITS -- 10

As per the University guidelines and guidelines mentioned the course curriculum