

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		Biomedical Engineering		
Semester		VIII			Version		2.0.0.0		
Effective from Academic Year			2017-18		Effective for the batch Admitted in			July 2017	
Subject code		2BM802		Subject Name		Prosthetic & Orthotic Engineering			
Teaching scheme					Examination scheme (Marks)				
(Per week)		Lecture(DT)		Practical(Lab.)		Total			
	L	TU	P	TW		CE	SEE	Total	
Credit	4	-	1	-	5	Theory	40	60	100
Hours	4	-	2	-	6	Practical	25	25	50
Pre-requisites: Good Knowledge of Biomechanics, various injuries and disorders of human body									
<b>Learning Outcome:</b> The educational objectives of the course are to educate students to attain the following:									
<ul style="list-style-type: none"> <li>• Fundamentals of orthotics &amp; prosthetics</li> <li>• Difference between universal design &amp; orphan technology</li> <li>• Design of upper limb &amp; lower limb prosthesis</li> <li>• Biomechanical factors to be considered while designing prosthesis</li> <li>• Fundamental of design ergonomics &amp; role of biomechanics in ergonomics</li> </ul>									
<b>Theory syllabus</b>									
Unit	Content								Hrs.
1	<b>INTRODUCTION TO PROSTHETICS &amp; ORTHOTICS</b> Introduction to Rehabilitation Engineering, Universal design v/s orphan technology in Rehabilitation, Basics of Prosthesis & Orthosis, Need of prosthetic & orthotic devices, Classification of orthosis devices on the basis of the regions & function, Prosthesis v/s orthosis, Emerging trends in field of orthosis & prosthesis								6
2	<b>CARDIAC PROSTHETIC DEVICES</b> Emerging design of the artificial heart and circulatory assist devices, Types of Artificial heart and circulatory assist devices, Types and functionality of heart valves and stents, Artificial heart-lung machine, IABP, Various design problems in current cardiac prosthesis								8
3	<b>PROSTHETIC &amp; SUPPORTIVE DEVICES FOR UPPER EXTREMITIES</b> Traumatic injuries of upper extremities, Air splints for traumatic injuries, Dynamic splints for RN palsy, cervical orthosis, Types of cervical orthosis, upper limb prosthesis components, Design aspects of upper limb prosthetic device, Body powered and externally powered prosthetic arm								10
4	<b>PROSTHETIC &amp; SUPPORTIVE DEVICES FOR LOWER EXTREMITIES</b> Osteoarthritis, Various levels of osteoarthritis, Knee brace for Knee OA, Polio and level of severity of polio, Calipers for polio, Prosthetic devices for Above knee & below knee amputations, Components & design aspects of lower limb prosthesis, Single axis foot, Multiple axis foot, SACH foot, Dynamic response foot								10
5	<b>SENSORY PROSTHETIC &amp; ORTHOTIC DEVICES</b> Visual System: Visual Augmentation, Tactual Vision Substitution, Recent development in retinal devices, Auditory Vision Substitution, Auditory System: Auditory Augmentation, Visual Auditory Substitution, Tactual Auditory Substitution. Tactual System: Tactual Augmentation, Tactual Substitution, Cochlear implant devices, Artificial larynx.								8
6	<b>PROSTHETIC &amp; ORTHOTIC DEVICE FOR MOBILITY</b> Categories of Wheelchairs, Wheelchair Structure and Component Design, Ergonomics of Wheel chair propulsion, Power Wheelchair: Electrical Systems and its Control								7
7	<b>RECENT ADVANCEMENT IN REHABILITATION ENGINEERING</b> Computer applications in Rehabilitation Engineering, Interfaces in Compensation for visual perception, Improvement of orientation and mobility, Computer-assisted lip reading, Brain computer								6
Practical content: <b>Term Work and Practical shall be based on the above syllabus.</b>									
<b>Text Books:</b>									
1	Prosthetics and Orthotics By: Donald G. Shurr et al.2e Pub.: Prentice Hal								
2	Rehabilitation Engineering By Robinson C.J, Pub.: CRC Press								
<b>Reference Books</b>									
1	Rehabilitation Technology By Ballabio E. et al, Pub.: I.O.S Press								
2	Orthotics and Prosthetics in Rehabilitation by Michelle M. Lusardi, Caroline C. Nielsen, Pub.: Saunders Elsevier								