



सत्यमेव जयते



भारतीय पुनर्वास परिषद्

Certificate Course in Bench Skills

C.B.S.

May, 2023

(w.e.f. 2023-24)

REHABILITATION COUNCIL OF INDIA

(Statutory Body of the Ministry of Social Justice & Empowerment)

Department of Empowerment of Persons with Disabilities (Divyangjan)

Government of India

B-22, Qutab Institutional Area

New Delhi – 110 016

www.rehabcouncil.nic.in

Preface

Access to prostheses, orthoses, and assistive devices can mediate the process of social inclusion, improve the quality of life for persons with disabilities and anybody having a physical impairment or functional limitations. This will enable them to live healthy, productive, independent, and dignified lives and to participate in education, the labour market, and social life. P&O technology plays a crucial role to mitigate the gap between the common man and the persons who need it.

The UNCRPD and the Sustainable Development Goals (SDGs) are global initiatives that aim to create an inclusive society where everyone can contribute to the country's development. But in India, we are yet to achieve the desired goals due to the lack of awareness, affordability of technologically appropriate prostheses, orthoses, and assistive technology.

The Government of India is putting all efforts to ensure "the approach to improve access to assistive technology and products, including prostheses and orthoses," and everyone should have sufficient access to it.

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 who may also require some form of assistive device. Therefore, the total potential demand for assistive devices in India is around 144 million people. To achieve the 2030 Agenda for SDGs, we need to ensure that these devices are accessible and affordable for all.

The aim of the course is to impart training of bench skills to develop bench workers for assembly and fitting of Orthopedic appliances, artificial limbs and other Assistive devices under the supervision of Prosthetists & Orthotist. This will ease the work of the Prosthetists and Orthotist thereby improve the service delivery to the Persons with disabilities, geriatric population and other locomotor & neurologically afflicted persons.

In the light of New Education Policy (NEP-2020) and advancement of technology inclusion of all people including Divyangjan and elderly population are essential for the towards sustainable development. The syllabus is reviewed and restructured as per the guidelines of National Credit Frame Work 2022. The credit accumulated by the candidate will be redeposited in Academic bank of Credit (ABC). This credit will be redeemed as per need to enhance their career growth.

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I. Preamble

In Locomotor disability forms the major proportion (20%) of the total disability population in India and they are using some prostheses and Orthoses and aids and appliances. In view of this, there is need of non-clinical service providers those who will support Prosthetists & Orthotists in fabrication of Prostheses, Orthoses and other Assistive devices. They will possess knowledge of material science, engineering tools, assembling of components related to prosthetics & orthotics. These categories of personnel have no clinical contact with users. They may work under the instructions of qualified Prosthetists and orthotists for the users to resolve as and when there is need of repair and maintenance of Prostheses, Orthoses and other Assistive devices. Any technical / clinical issues can be resolved in the direct supervision of Prosthetists and Orthotists.

Rehabilitation Council of India aims to provide 12 months training course (full-time studies) for students from India as well as from other countries to be a Bench Worker to cater the broader need of the Society.

II. Nomenclature of the programme: Certificate Course in Bench Skills (CCBS)

III. Objectives of the programme: To impart training of bench skills to develop bench workers for assembly and fitting of Orthopedic appliances, artificial limbs and other Assistive devices under the supervision of Prosthetists & Orthotist.

IV. Scope of the Programme: The Scope of Bench Skills Personnel is to fabricate prostheses and orthoses following the technical specification prepared by the clinician and working under the Prosthetists & Orthotists clinician's supervision. the Bench Skills Personnel processes materials, assembles components, makes the product ready for fitting and finishes the product for final delivery. Bench Skills Personnel know the materials, technical processes and provide repair and maintenance services. He must know when to refer back to the supervising clinician for review.

Bench Skills Personnel can be employed by private clinics of Prosthetists & Orthotists, private P & O agencies, not for profit charitable agencies, Govt. Organizations and PSUs.

V. General Framework of the programme:

- a) Duration of the programme:** Duration of the programme will be of 1 year with 1200 hours leading to 40 credits (30 hours = 1 credit). The weightage to the programme will be 70% practical and 30% theory. The course work will comprise of 840 hours of practical and 360 hours of theory. The theory hours will also include 60 hours of Employability skills (Soft Skills), a separate module developed by RCI. This will enable and empower the trainees with readiness for applying, working as professionals in supporting diverse students across different setups. The resources for the same are freely downloadable at www.employabilityskills.net. The module will also have a weightage of 60:40 of practical and theory with formative assessment at internal and the final exam.

- b) **Eligibility:** Passed 10th class with at least 50% marks in regular schooling mode from a recognized Indian board.
- c) **Medium of Instruction:** English, Hindi or Regional Languages
- d) **Methodology:** Offline Mode with standard teaching methods.
- e) **Intake capacity:** 20
- f) **Minimum attendance/ Working days:** 80% of the total course duration
- g) **Semester /Annual programme structure with breakup of hours and credits (Theory / Practical):** Annual Program with Term End examination.
- h) **Examination pattern: Internal/External/ Practical/Viva:** 30 % Theory and 70% Practical, 40% internal and 60% External.
- i) **Criteria of Passing:** 40% Theory and 50% Practical.
- j) **Board of Examiners/ Examination Scheme:** As per NBER norms, Continuous Assessment and Term End Examination.
- k) **Award of Degree:** Certificate in Bench Skills, Awarded by NBER
- l) **Registration as Personnel/Professional and Category of Registration:** 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 modules successfully will be qualified as a **Rehabilitation Technician - Personnel** and be eligible to work in the field of Rehabilitation in India as a **Rehabilitation Technician**. 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.

VI. Infrastructure requirements for starting the programme:

a. Human Resource Requirement:

Institutions already running BPO program are eligible to run the proposed CBS course and the core faculty of BPO program as listed below will be the faculty in the proposed CBS course. Senior faculty in the discipline of Prosthetics and Orthotics shall be considered as course coordinator. The coordinator should be the controlling and informant authority for the correspondence related to the CBS program. He/she should hold qualification as laid down by RCI.

S.No.	Core Faculty	Column I For 10 seats	Column II For 20 seats	Column III for 30 seats
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1.	Assistant Professor s(Prosthetics & Orthotics)/ Course coordinator	01	01	02
2.	Demonstrator (P&O)/Tutor (Prosthetist& Orthotist)	01	02	03

GUEST/PART TIME FACULTY REQUIREMENTS FOR THE FOLLOWING DISCIPLINES: Elementary leather Technology for footwear modification and surgical Boot making (Ministerial staff & others are not included)

- b. Teacher Student Ratio: 1:10
- c. Professional Qualifications of Faculty in Core Areas: As per the RCI model recruitment rule.
- d. Clinical Infrastructure (as applicable): Should be attached with Rehabilitation Institute / Hospital with minimum 30 Prosthetics, Orthotics and Assistive Devices Cases per month.
- e. Library: A library equipped with basic books on various disabilities, General nursing care, First aid, hospital waste disposal, basic sciences, social, psychological and vocational rehabilitation should be a pre-requisite. In addition, useful video on DPR will be preferred.
- f. Physical Space required (Classrooms/labs/therapy rooms/seminar halls etc. as and when applicable): The Institute should have separate department and academic block. Adequate hostel accommodation for students should be available in addition to the abovementioned built up area of the CBS course.:
Details of the constructed area given below are for the intake capacity up to 30 students:

S.No.	Name	Minimum size in Sq. Ft.
1.	Classrooms(01NUMBERS) with audio-visual facility	01@300 = 300
2.	One room for clinical meeting	300
3.	One trial fitting rooms	150
4.	One measurement rooms	150
5.	Prosthetic Lab	1050
6.	Orthotic Lab	1050
7.	Prosthetics & Orthotics faculty rooms	150
8.	Two students common room (One for male &one for	600

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	female students	
9.	One Office Room	150
10.	One course coordinator room	150
11.	Computer Laboratory Room	300
12.	One Store room	600
13	Gait training Laboratory	450

- g. Office Furniture and equipment: Students Class room bench and chairs as per the number of seats, Table chairs for the faculties, library facility.
- h. Equipment required (As applicable for the programme):

S.No.	Name of Equipment	Minimum Requirement
1.	Hot Air Oven, Heating Chamber Size-36"W x 24"D x 30"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.	01
2.	Polisher Converted To Cone Sanding, 2 Hp3PhaseMotor	01
3.	Infrared Oven (Optional)	01
4.	Bench Grinder Cum Sander, 0.5 Hp Single Phase Motor, Abrasive Wheel Size 10" X1"	01
5.	Pillar Drilling Machine, Drilling Capacity 25mm, and Pillar Dia 87mm Max. Distance Spindle To Table 600mm, Table WorkingSurfaceDia400mmWith1hp3Phase Motor	01
6.	Bench Drilling Machine With Sand, Capacity½"	01
7.	Industrial Leather And Canvas Sewing Machine With¼" Hp Motor	01
8.	Adjustable Circular Saw, Circular Saw Dia 18", Working Table Size 24"X36", MaxDepthofCut5½" With 3hp 3Phase Motor	01
9.	Belt And Disc Sander, Disc Dia. 10", Belt Size6"X48" With 1Hp 3Phase Motor	01
10.	All-Purpose Saw, Temperature Range 100-600 Degrees C, Power Input 2000w	01

11.	Hot Air Gun, Temperature Range 100-600 Degree C, Power Input 2000w	01
12.	Jig Saw Machine, Sawing Depth In Wood 54mm, Rated 350w	01
13.	High vacuum machine with ¼” hp motor	01
14.	Removable mandrills	03
15.	Mandrill for air suction mounting and draping for sockets	03
17.	Hot water bath for softening low temperature thermoplastic Sheets	01
18.	Draping frame size (small)	02
19.	Draping frame size (large)	02
20.	Adjustable / fixed grinding and milling Machine with dust Collector	01
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 (Optional	01
32.	Shoe finishing machine	01
33.	Working Table with Peg Board (Minimum 12 tables are required for 24students)	12
34.	Over locking machine	01
35.	Laser aligner	01
36.	Lathe machine	01
37.	Inter locking machine	01

LIST OF TOOLS AND EQUIPMENT REQUIRED

S. No.	Name of Equipment / tool	Minimum Requirements
1.	Flat file bastard 2 nd cut 10”, 2 nd cut 12”	10
2.	Aluminum Flat File 10” & 12”	10
3.	Round file 6”, 8”, 2 nd cut	10

4.	Flat file 10" round 2 nd cut	10
5.	Triangular file 6", 10" 2 nd cut	10
6.	Rasp file half round 10", 12", 8"	10
7.	Rasp file flat 10", 12"	10
8.	Rasp file round 6", 10"	10
9.	Screw driver 150x6mm, 200x8mm, 250x8mm	10
10.	Flat chisel 12mm, 20mm, 25mm	02
11.	Cold chisel 12mm, 20mm	02
12.	Half round chisel 12mm, 20mm	02
13.	Ruler steel 600mm, 300mm	02
14.	Steel square with leg 200mm	02
15.	Caliper inside/outside 200mm	02
16.	Compass/ Driver 200mm Outside/ inside caliper	02
17.	Hammer ballpeen 500gms, 250gms	10
18.	Mallet hammer with handle	02
19.	Hammer seaming plier (pincer) 10", 12"	04
20.	Nipper 150mm, 200mm	02
21.	Plier 200mm	10
22.	Long nose plier 150mm	10
23.	Revolving Hole punch 250gms	10
24.	Centre punch	10
25.	Hole punch 2mm, 3mm	03
26.	Hole punch set	02
27.	Scissor 10" & 12"	10
28.	Hacksaw Frame 300mm	10
29.	Hacksaw blades 300mm	1pkt
30.	Tap set 3, 4, 5, 6, 7,mm	02
31.	Tap handle	02
32.	Gripplier	10
33.	Die set 3, 4, 5, 6, 7,mm	02
34.	Cross pein hammer	10
35.	Wire cutter	10
36.	Measuring tape	10
37.	Shoe maker hammer	05
38.	Anvil	02
39.	Half round leather Knife (Rapi)	05
40.	Nipper shoe maker 8"	05
41.	Leather knife	02

42.	Benderbrace5.5mm	01
43.	Benderbrace6.5mm	01
44.	Cone sander fine, medium, coarse	10
45.	Plaster knife	10
46.	Upper Limb Prosthetic Kit (B/E,A/E, S.D) body powered	02
47.	Externally powered kit(B/E&A/E)	01
48.	Vice limb maker (modified)	01
49.	Bending fork (Set of two pieces)	02
50.	Caliper A-P measurement above knee	02
51.	Ear Protector	05
52.	Nutreplacementtool7mm,9mm	02
53.	Heat proof gloves	4pairs
54.	Copper rivets ¼”,½”	1kgeach
55.	Aluminium rivets ¼”, ½”	1kgeach
56.	Eyelet punch	10
57.	Rivethead finishing punch	10
58.	PlasticD-rings1”,1½”,&2”	5pktseach
59.	Buckles1”,1½’&2”	5pktseach
60.	Micrometer	02
61.	Ritz scale for M-L diameter/ALIMCO B.K.caliper	02
62.	Allen keys /T-hand held Allen keys (1mm-10mm)	10set
63.	Press button	5pkts
64.	Evathene foam 4mm, 6mm, 8mm Thickness	5sheets each
65.	Polypropylene and copolymer sheets (white)3mm, 4mm & 5mm thickness	5sheets each
66.	Dendrite solution	5ltr (5tin)
67.	Velcro straps (hook & loop) ¾”, 1” and 2”	2 roll each
68.	Nappa leather	5000d/m
69.	Low temperature thermoplastic sheets 3.2mm/4.2mmthickness	5sheets each
70.	Aluminum strips(4mm) thickness	05 kg.
71.	Aluminium sheet(4mmthicknes),1 mm=18gauge(BSW)	02 sheet
72.	Drill bits, Full Set Max diameter (7/64”,1/8”,9/64”,5/32”,3/16”,11/64”,1/4”,3/8”, 1/2”)	01set

73.	Different modular system for lower limb Prostheses	5 set each
74.	Torque wrench	01
75.	Bench Vice	10
76.	Vernier Caliper (adjustable digital)	10

LIST OF TOOLS AND EQUIPMENT REQUIRED – CASTING ROOM

S.No.	Name of Equipment	Minimum Requirement
1.	Measuring tape	10
2.	Flexible steel rule	10
3.	Aluminum tripod	02
4.	Casting apparatus	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.	Goniometer	05
14.	Pedobarography machine	01

LIST OF TOOLS AND EQUIPMENT REQUIRED PLASTER MODIFICATION AREA

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

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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

LIST OF TOOLS AND EQUIPMENT REQUIRED – PATIENT TRIAL AREA

S.No.	Name of Equipment	Minimum Requirement
1.	Parallel Bar with Mirror on Both Side	01
2.	Portable Heat Gun	01
3.	Chordless Hand Drill Machine	01
4.	Revolving Centre Punch	05

VII. Programme Content

a) Paper wise Objectives /Learning outcomes

Objectives	Learning outcomes
To teach Elementary study on HumanBody Structure	To know about structure of skeletal system. Locate and identify anatomical regions of the human body. Locate and identify anatomical structures that surround and protect the vital organs.
To teach introduction to Disability, CBR and ICT	To learn about 21 types of disability, rehabilitation and rehabilitation team composition, To know about CBR matrix of 5 components: Health, Education, Livelihood, Social and empowerment. To perform basic ICT operations, access digital resources and develop 21st Century Competencies (CC), design thinking skills and computational thinking skills.

<p>To teach Elementary Material Science And Workshop practice with machine & tools</p>	<p>To know about Work Bench, Bench vice, Hammers of different types, Files of various types, Chisels, Scrappers & their uses. Hack saws, wrenches, surface plate, angle plate, V-block Centre Punches, dividers & trammels, feeler & surface gauges etc Knowledge of operating and maintenance of different machines required in Limb Fitting Centres, such as Sewing machines, Electric Oven, Grinders, Drill Machines, Jigsaw, Hot Air Gun etc.</p> <p>To know about Materials used in Orthotics & Prosthetics such as Plastics, wood, aluminum, iron, rubber, foam, leather etc. Workshop safety and first aid and Handling and transportation of patients, persons with disabilities.</p>
<p>To teach Bench Skills of Orthotics, Prosthetics & Assistive Devices</p>	<p>To know about Orthoses, Prostheses, Assistive Devices, their components, Preparation of negative cast, Positive cast, Molding of Orthosis, Drilling-Machine operation for orthosis assembling, Grinding, buffing, polishing of Orthosis, Assembling of Orthotic Components, Molding and lamination of Sockets, Drilling-Machine operation for Prosthesis assembling, Grinding, buffing, polishing of Prosthesis, Assembling of Prosthetics Components, Wheel Chairs & Tricycle: Types, design, strength and special purpose wheel chair/ Tricycle dimensions. Crutches, Canes and Sticks: Measurements, Strength, types etc. Walkers/ other mobility aids, Repair and maintenance of all items.</p>
<p>To teach Surgical Boot Making & Leather Work , Disposal of Biomedical Waste</p>	<p>To know making of Surgical Boot, shoe modifications, stitching of straps, padding, Leather Work , Safe segregation of Biomedical Waste.</p>
<p>To teach about ethics, soft skills, citizenship, ADIP, technologies, brief about all 21 disabilities orientation, disabling conditions of geriatric population all Govt. schemes in disability sector,</p>	<p>To learn about ethics, soft skills, citizenship, ADIP Scheme, Niramaya Scheme, DDRS Scheme, technologies, brief about all 21 disabilities orientation, disabling conditions of geriatric population all Govt. schemes in disability sector, diagnostic tools health, nutrition, general care</p>

diagnostic tools health, nutrition, general care giving, concession and benefits for the persons with disability under various Govt. schemes, communication skills.	giving, concession and benefits for the persons with disability under various Govt. schemes, communication skills.
To teach about different Employability Skills	To learn Introduction to Employability Skills, Constitutional Values: Citizenship, Importance of Employability Skills, Basic English Skills, Communication Skills, Essential Digital Skills, Introduction to Mobile Applications, Customer Service, Getting Ready for Apprenticeships and Jobs.

- b) Units and Chapter details to be mentioned along with credits/marks and number of hours (Theory / Practical) & Paper wise list of Reference Books / Suggested reading Units and Chapter details to be mentioned along with credits/marks and number of hours (Theory/Practical):

S.No	Subject Code	Subject Proposed	Theory Hours	Practical/ Demonstration Hours	Total Hours	Theory Credits	Practical Credits	Total Credits	Examination
1.	CBS101	Elementary study on Human Body Structure	30	-	30	1	-	1	2 hrs
2.	CBS102	Introduction to Disability, CBR and ICT	60		60	2		2	2 hrs
3.	CBS103	Elementary Material Science And Workshop practice with machine &	60		60	2		2	2 hrs

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		tools							
4.	CBS104	Bench Skills in Orthotics , Prosthetics & Assistive Devices	90	-	90	3	---	3	2 hrs
5.	CBS105	Surgical Boot Making & Leather Work , Disposal of Biomedical Waste	60		60	2	-	2	3 hrs
6.	CBS106	Practical of code CBS102		90	90	-	3	3	6 hrs
7.	CBS107	Practical of code CBS103		90	90		3	3	6 hrs
8.	CBS108	Practical of code CBS104	-	330	330		11	11	6 hrs
9.	CBS109	Practical of code CBS105	-	330	330		11	11	6 hrs
10	CBS110	Employability Skills	60		60	2		2	
		Total	360	840	1200	12		28	

COURSE CODE - CBS101

ELEMENTARY STUDY ON HUMAN BODY STRUCTURE

CREDITS – 01

Total Hours – 30 (Theory-30)

Detailed Contents:

Introduction to human body terminology used, Body land Marks, different types of muscles and blood supply, various Joints, various levels of Amputation, deformities, Hemiplegia, Paraplegia, Leprosy, Arthritis, CBR Concept in Rehabilitation, Govt. Schemes for the persons with disabilities.

REFERENCE BOOKS/ STUDY MATERIAL

Sl. No.	Author	Title	Publisher
1.		Study materials will be provided for each lecture by the faculty.	
2.	Preferable in regional language	Hand Book of Human Anatomy and Physiology	

COURSE CODE---CBS102

INTRODUCTION TO DISABILITY, CBR AND ICT

CREDITS---02

Teaching Hours--60hrs

Description:

To learn about 21 types of disability, rehabilitation and rehabilitation team composition, To know about CBR matrix of 5 components: Health, Education, Livelihood, Social and empowerment. To perform basic ICT operations, access digital resources and develop 21st Century Competencies (CC), design thinking skills and computational thinking skills.

Course Objective:

The student should understand the basic terminology of disability, CBR and ICT .

Learning Objectives:

Understand disability and the various concepts of CBR and ICT.

Detailed Contents:

Disability, 21 Disabilities as the RPwD Act.

Hardware:

C.P.U, monitor, keyboard, mouse, Laptop, tablet, touch screen, Mobile phones, Smartboard, Printer, U.P.S, USB disk, Wifi, Projector, computer Scanner, photocopy machine, calculator **Software:**

OS, App, AI tools, browser, anti-virus, desktop publishing software: open office (word, excel, powerpoint), notepad.

File format: text formats txt, Pdf, docx, xlsx, pptx, .stl, .obj

Assistive software and technology for PwD.

Medical Devices:

Digital Glucose meter, Digital oxygen meter, digital blood pressure meter, digital thermometer, Digital weight machine, etc.

Internet:

Search engine, open source resources, online resources,

Email, Digital wallet, SMS, OTPs, App, No code programming Eg: Drag and drop programming

Picture editing s/w: photos/pictures: jpg, .png

Movie editing s/w: video: .mpg, .avi

CBR skills:

Art & craft based on Local culture/heritage

Jewellery making

Bag/ Basket making (recycled or not)

Handmade paper/books

Tailoring

Weaving

Wood/ Bamboo gifts

Candle / Agarbhatti / Soap making

Rice husk /sugarcane/coal brickette (fuel pods)

COURSECODE---CBS103

ELEMENTARY MATERIAL SCIENCE AND WORKSHOP PRACTICE WITH MACHINE & TOOLS

CREDITS---02

Teaching Hours--60hrs

Course Description:

Work Bench, Bench vice, Hammers of different types, Files of various types, Chisels, Scrappers & their uses. Hack saws, wrenches, surface plate, angle plate, V-block Centre Punches, dividers & trammels, feeler & surface gauges etc. Knowledge of operating and maintenance of different machines required in Limb Fitting Centres, such as Sewing machines, Electric Oven, Grinders, Drill Machines, Jigsaw, Hot Air Gun etc.

Materials used in Orthotics & Prosthetics such as Plastics, wood, aluminum, iron, rubber, foam, leather etc. Work shop safety and first aid and Handling and transportation of patients, persons with disabilities.

Reference Books/ Study Material

Sl.No.	Author	Title	Publisher
1.	V. Raghavan	Material Science and Engineering	PHI learning Pvt. Ltd. New Delhi
2	Preferable in regional language	Study materials will be provided for each lecture by the faculty	

COURSECODE---CBS104

BENCH SKILLS IN ORTHOTICS, PROSTHETICS & ASSISTIVE DEVICES

CREDITS---03

Teaching Hours -- 90hrs

Detailed Contents:

Introduction to Orthotics, Different types of Orthoses, Orthotics Components, Preparation of negative cast, Positive cast, Molding of Orthosis, Drilling-Machine operation for orthosis assembling, Grinding, buffing, polishing of Orthosis, Assembling of Orthotic Components, Introduction to Prosthetics, Different types of Prostheses, Prosthetics Components, Preparation of negative cast, Positive cast, Molding and lamination of Sockets, Drilling-Machine operation for Prosthesis assembling, Grinding, buffing, polishing of Prosthesis, Assembling of Prosthetics Components, Wheel Chairs & Tricycle: Types, design, strength and special purpose wheel chair/Tricycle dimensions. Crutches, Canes and Sticks: Measurements, Strength, types etc. Walkers /other mobility aids

Reference Books/ Study Material

Sl. No.	Author	Title	Publisher
1	Preferable in regionallanguage	Study materials will be provided foreach lecture by the faculty	
2	Raghuwanshi, B.S.	Course in Workshop Technology	Dhanpat Rai, New Delhi

COURSECODE---CBS105

SURGICAL BOOT MAKING, LEATHER WORK & DISPOSAL OF BIOMEDICAL WASTE

CREDITS---03

Teaching Hours -- 90 hours

Course Description:

Measurements techniques of Surgical shoe, design, strength. Elementary leather, rubber and rexin Technology for footwear modification and surgical boot making, repairing. Padding etc. and Safe segregation of Biomedical Waste.

Paper wise list of Reference Books / Suggested reading

Sl.No.	Author	Title	Publisher
1	Preferable in regional language	Study materials will be provided for each lecture by the faculty	
2.	Eiri Board.	Hand Book of Leather And LeatherProducts Technology	Engineers India Research Institute
3.	Anantpreet Singh & Sukhjit Kaur	Biomedical Waste Disposal	Jaypee Publisher
4.	Varun Gupta & A V Suresh	ABC of Footwear Technology	Notion Press

COURSECODE---CBS106

PRACTICALS - INTRODUCTION TO DISABILITY, CBR AND ICT

CREDITS---03

Practical hours--90

Detailed Contents:

Disability, 21 Disabilities as the RPwD Act.

Hardware:

C.P.U, monitor, keyboard, mouse, Laptop , tablet, touch screen, Mobile phones, Smartboard, Printer, U.P.S, USB disk, Wifi, Projector, computer Scanner, photocopy machine, calculator

Software:

OS, App, AI tools, browser, anti-virus, desktop publishing software: open office (word, excel, powerpoint),notepad.

File format: text formats txt, Pdf, docx, xlsx, pptx, .stl, .obj Assistive software and technology for PwD.

Medical Devices:

Digital Glucose meter, Digital oxygen meter, digital blood pressure meter, digital thermometer, Digital weight machine, etc.

Internet:

Search engine, open source resources, online resources,Email, Digital wallet, SMS, OTPs, App, No code programming Eg: Drag and drop programming

Picture editing s/w: photos/pictures: jpg, .png

Movie editing s/w: video: .mpg, .avi

CBR skills:

Art & craft based on Local culture/heritage,Jewellery making, Bag/ Basket making , (recycled or not) Handmade paper/books,Tailoring Weaving, Wood/ Bamboo gifts, Candle / Agarbhatti / Soap making, Rice husk, sugarcane/coal brickette (fuel pods)

COURSE CODE---CBS 107

**PRACTICALS - ELEMENTARY MATERIAL SCIENCE AND WORKSHOP
PRACTICE WITH MACHINE& TOOLS**

CREDITS---03

Practical Hours 90

Course Description:

Each student will be given on the job training and will have to bend, assemble 5 Orthosis. Each student will be given on the job training and will have to prepare pop bandage for measurement, POP solution and pouring for making of mould, assemble and fit 5 prosthesis of different types, lamination of socket and keeping ready of work bench and gait training area.

Dismantling of wheel Chair, Tricycles, Crutches, Walking sticks and reassembling it.

COURSE CODE---CBS 108

**PRACTICALS - BENCH SKILLS OF ORTHOTICS, PROSTHETICS
& ASSISTIVE DEVICES**

CREDITS---11

Practical hours: 330

Course Objective:

The student should learn the necessary bench skills to fabricate and repair orthotics, prosthetics and various assistive technologies.

Learning Objectives:

Understand and relate the materials with tools and equipment during fabrication of prosthesis and orthosis.

Detailed Contents:

Introduction to Orthotics, Different types of Orthoses, Orthotics Components, Preparation of negative cast, Positive cast, Molding of Orthosis, Drilling-Machine operation for orthosis assembling, Grinding, buffing, polishing of Orthosis, Assembling of Orthotic Components, Introduction to Prosthetics, Different types of Prostheses, Prosthetics Components, Preparation of negative cast, Positive cast, Molding and lamination of Sockets, Drilling-Machine operation for Prosthesis assembling, Welding. Grinding, buffing, polishing of Prosthesis, Assembling of Prosthetics Components, Wheel Chairs & Tricycle: Types, design, strength and special purpose wheel chair/Tricycle dimensions. Crutches, Canes and Sticks: Measurements, Strength, types etc. Walkers/other mobility aids

COURSECODE---CBS109

**PRACTICALS OF SURGICAL BOOT MAKING, LEATHER WORK &
DISPOSAL OF BIOMEDICAL WASTE**

CREDITS---11

TEACHING HOURS--330

Course Description:

10 Shoe modifications 3 Surgical Shoe making, padding of prosthesis. Repairing of prosthesis belt, foam finishing, Making of various types of leather straps. Pattern cutting technique.

COURSECODE---CBS110 EMPLOYABILITY SKILLS

CREDITS---02

Teaching Hours: 60hrs

Detailed Contents:

Introduction to Employability Skills: Importance of Employability Skills, Learning Employability Skills Online, Explore the Future of Work.

Constitutional Values: Citizenship: Our Constitution: Guiding Principles, Protecting Our Environment,

Becoming a Professional in the 21st Century: 21st Century Employability Skills, Know Yourself, Critical Thinking and Decision-Making,

Basic English Skills: Motivation to Learn English, Describing Words, Objects, Surroundings and Processes, Listening, Asking and Responding to Questions, Speaking, Kinds of Sentences: Introduction, Introduction to Punctuation, Writing Simple Sentences, Reading and Understanding Job Descriptions, Writing Applications and Cover Letters.

Communication Skills: Importance of Communication, Verbal Communication: Writing, Non-Verbal Communication, Practicing Effective Communication, Workplace Communication: Introduction.

Essential Digital Skills: Introduction to Digital Skills, Basics of Computers, Basics of MS Word, Using Search Engines, Social Media, Internet Safety, Communication Using Email, Introduction to Mobile Applications, Using Online Meeting Tools for Interviews, Exploring Popular Sites for Learning and Career Growth.

Diversity and Inclusion: Diversity in the Workplace, Inclusion in the Workplace,

Financial and Legal Literacy: Introduction to Money Management, Basics of Banking, Online Banking and Digital Transactions, Savings, Legal Literacy,

Career Development and Goal-Setting: Introduction to the World of Work, My Interests and Abilities, Building Your Career Pathway, Job Market Research, Setting Goals for Your Career,

Customer Service: customer service and Relationship Building, Types of Customers, Probing to Identify Customer Needs, Simple Techniques for Communicating with Customers, Closing Sales and Customer Feedback.

Getting Ready for Apprenticeships and Jobs: personal grooming and hygiene, building my Resume, preparing for an Interview, Decoding Interviews, Handling Rejection and Failure, Industrial visit, Reflection after industry visit, Creating jobs through online platforms, applying for jobs through online portal, Enrolling for Apprenticeships

Reference Books/ Study Material

Sl. No.	Author	Title	Publisher
1	Govt. of India, Ministry of skill development and entrepreneurship	Employability skills: student workbook	www.employabilityskills.net

Suggestive Reading (Indian Authors)

List of Reference books in Hindi/Indian Authors for CBS

Sr.No	Title	Author
1	Short Test Book of Prosthetics and Orthotics	Sh. R. Chinnathurai
2	Essentials of Prosthetics and Orthotics	Sh. A.K. Agarwal
3	प्रोस्थेटिक एवं ओर्थोटिक कृत्रिम अंग एवं कैलीपर - Prosthetic and Orthotic	Pr. A.K. Agarwal