

**MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION  
EXAMINATION, MUMBAI -51**

1	Name of syllabus	C. C. in Prosthetics and Orthotics (CPO) (2019-2020)									
2	Course Code	201236									
3	Max No. of Student	25									
4	Duration	1 year									
5	Type	Full time									
6	Nos. of Days/Week	6 Days									
7	Nos. of Hours/Days	7 hrs.									
8	Space Required	Workshop - 300 Sq. Ft. Class room - 200 Sq. Ft. Total - 500 Sq. Ft.									
9	Entry Qualification	HSC									
10	Objective of Syllabus/introduction	This program is envisaged to provide knowledge and practical exposure in orthotics and prosthetics education. The program is designed to prepare individuals to be experts in the field of prosthetics and orthotics technology as a frame work for problem solving. The One-year diploma program in applied science curriculum combines clinical orientation program such as rehabilitation medicine, allied health sciences, prosthetics and orthotics engineering. This program failure to meet the needs of business, technology and health case. The curriculum formed aim to impart knowledge and to train category 3 personnel (bench workers) for assembly and filling of orthopedic appliances, artificial limbs and other rehabilitation aids under the supervision of prosthetics and orthotics. (category 1, profession)									
11	Employment Opportunity	He can get job in various establishment									
12	Teacher's Qualification	Masters or Bachelor degree holders in concern subjects with adequate knowledge of Prosthetics and Orthotics									
13	Training System	<table border="1"> <tr> <th colspan="3">Training System for 1 Year</th></tr> <tr> <th>Theory</th><th>Practical</th><th>Total</th></tr> <tr> <td>6 Hrs.</td><td>18 Hrs.</td><td>24 Hrs.</td></tr> </table>	Training System for 1 Year			Theory	Practical	Total	6 Hrs.	18 Hrs.	24 Hrs.
Training System for 1 Year											
Theory	Practical	Total									
6 Hrs.	18 Hrs.	24 Hrs.									

14	Exam System							
		Sr · N o	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Min. Marks
		1	20123611	Basic Clinical Science (a. Anatomy b. Physiology c. Physical medicine and rehabilitation d. Surgery/ orthopaedics)	TH-I	3 hrs.	100	35
		2	20123712	Workshop practice, machines and tools & materials	TH - II	3 hrs.	100	35
		3	20123713	Orthotics (lower, upper and spinal)	TH-III	3 hrs.	100	35
		4	20123721	Prosthetics (upper and lower)	PR-I	3 hrs.	100	50
		5	20123722	Basics of research methodology and statistics	PR-II	3 hrs.	100	50
		6	20123723	Project work and viva voce	PR-III	3 hrs.	100	50
		7		Observation visit to an agency and case study analysis				
		8		Psychology & Sociology				
		TOTAL			600	255		

## **SYLLABUS**

### **C.C. IN PROSTHETICS AND ORTHOTICS (DPO)**

#### **Paper 1. Basic Clinical Science ( a. Anatomy b. Physiology c. Physical medicine and rehabilitation d. Surgery/ orthopedics.)**

##### **1. Anatomy**

- Introduction to anatomy , surface anatomy , muscular system( different types of muscles and attachment , nerve and blood supply , action, lower extremity) some for upper extremity trunk, abdomen and spine)
- Skeletal system and
- Basic biomechanics .

##### **2 Physiology**

- Introduction to Physiology , circulatory system, cardiac system , - heart and its function — blood pressure — pulse- control of heart.
- Respiratory system, structure of lungs- mechanism of respiration
- Urinary system , mechanism of micturition
- Digestive system, mechanism of defecation .
- Nervous system — chief tracts- reflex action — postural reflex-peripheral nervous system .

##### **3 Surgery/ orthopaedics**

- Introduction to Surgery/ orthopaedics, various levels of amputation , both upper extremity and lower extremity
- Examination of stump skin condition , sensation , contractures deformities etxc.
- Congenital and acquired deformities
- Disease of nervous system — polio myelitis obstetrical paralysis — spastic paralysis — hemiplegia, paraplegia — pyogenic infection — leprosy
- Chronic arthritis — neuropathic arthritis — metabolic disease — rickets — avitaminosis
- **Disorders** : paralysis pain and deformities of spine foot and upper extremity

##### **4. Physical medicine and rehabilitation**

- Introduction to physical medicine and rehabilitation
- Basic knowledge of physical therapy/ occupational therapy
- Basic understanding of human locomotion and gait
- CBR concept in rehabilitation , govt schemes for rehabilitation and concretion to handicapped.

## REFERENCES

1. Prosthetics atlas and orthotics atlas — C V Mosby
2. Orthotics in neurological Rehabilitation - Aisen , Demos publication .
3. Chaurasia's Human Anatomy (2005) Sathish Kumar Jain, CBS Publishers and distributors, New Delhi , 5<sup>th</sup> edition .

### Paper II Workshop practice, machines and tools & materials

- Knowledge of operating and maintenance of different machines required in limb fitting centres such as Sewing machines, Ortho- Vac , Grinders, Drill machines etc.
- Hand tools like screw drivers files clamps etc.
- Special purpose tools
- Materials used in Orthotics and Prosthetics such as plastic, wood, aluminium , iron , rubber , foam , leather etc.
- Workshop safety and first aid.
- Handling and transportation of patients , persons with disabilities.

## REFERENCES

- The functional foot orthosis, New York, Churchill Living stone Philips J W (1995).
- Lower Limb amputations : A guide to rehabilitation F A Davis
- Three dimensional analysis of human movement , human kinetics —Allard P Stokes I Blanchi .

### Paper III Orthotics ( lower, upper and spinal )

#### a. Orthotics ( lower)

- Orthotics lower extremity, deformities, disorders and pains in lower extremity .
- Nomenclature and knowledge of different type of orthosis their purpose of giving and check up
- Measurement casting —impressions.
- Selection of components , assembly , alignment , check ups of different type of orthotics

#### b.Orthotics ( upper)

- Orthotics upper extremity



- Deformities , disorders and pains in upper extremity
- Nomenclature and knowledge of different types of orthosis their purpose of giving and check up .
- Measurement — casting — impressions.
- Selection of components , assembly, alignment , check up of different type of orthosis

#### c. Spinal Orthotics

- Spinal orthotics
- Deformities, disorders and pain
- Nomenclature and knowledge of different types of orthosis their purpose of giving and check up
- Measurement — casting — impressions.
- Selection of components , assembly, alignment , check up of different type of orthosis

#### REFERENCES

- Orthotics: Clinical practice and rehabilitation technology — Churchill Living stone Reford, J B (1993)
- Scientific basis of human movement — Gowitzke, Williams and Wilkins , Blatimore ,1988.
- Hand splinting : Principles and methods ( 2<sup>nd</sup> edition ) , St. Louis, C V Mosby

### **Paper IV Prosthetics( upper and lower )**

#### **a. Prosthetics upper**

- Prosthetics upper
- Measurement- casting- impressions
- Nomenclature and knowledge of different type of prosthesis their purpose of giving and check up
- Selection of components , assembly, alignment , check up of different type of prosthesis

#### **b. Prosthetics lower**

- Prosthetics lower
- Measurement- casting- impressions
- Nomenclature and knowledge of different type of prosthesis their purpose of giving and check up
- Selection of components , assembly, alignment , check up of different type of prosthesis

### **c. Mobility aids and other appliances**

- Wheel chairs and tricycle : types, design, strength and special purpose wheel chair/ tricycle dimensions.
- Crutches, canes and sticks : measurements strength, types etc.
- Walkers / other mobility aids : measurements types design strength.

### **REFERENCES**

- Hand rehabilitation Christine , Churchill , Living stone , London.
- Bio feedback — a practitioners guide Kerb D , Guiford press.
- Gait Analysis — Perry J , Black Thorofare , New Jersey, 1992.

## **Paper V**

### **BASIC RESEARCH METHODOLOGY AND STATISTICS**

**Course Objective:** This course intended to provide basic knowledge in different types of research, methodology and various research methods and develop abilities to apply various measures of descriptive and inferential statistics. This course will help to improve the skills of the students to write the research/ project reports

#### **Unit I:**

Basic principles of research, Meaning and importance of Research, Theory building, Creativity, innovation,

#### **Unit II:**

Preparation of proposal, Selection and formulation of research problem, Review of literature, Literature search procedures, Sources of Literature  
Formation and types of hypothesis and testing of the hypothesis, Organization of project Report — Types, Structure and Components — Contents, Bibliography, Appendices

#### **Unit III:**

Research methods: Qualitative and quantitative methods, Descriptive, Experimental and Epidemiological methods

#### **Unit IV:**

Review of descriptive statistics: Scales of measurement, Measures of central tendency and dispersion, Measures of Variability, Measures of relationships, Measures of correlation, Probability, normal distribution and other theoretical distributions

### **References**

- 1 Best, J.W., and Kahn, J.V. (1992). *Research in Education*. Prentice Hall of India Pvt. Ltd., New Delhi.
- 2 Borg, W.R., and Gall, M.D. (1989). *Educational Research (5<sup>th</sup> edn.)*. Longman, New York.
- 3 Christenson, L.B. (1988). *Experimental Methodology (4<sup>th</sup> edn.)*. Boston: Allyn and Bacon Inc.,
- 4 Kerlinger, F.N. (1983). *Foundations of Behavioural Research (2<sup>nd</sup> edn.)*. Surjeet Publications, Delhi.
- 5 Kothari, C.R. (2006). *Research Methodology, Methods and Techniques (2<sup>nd</sup> edn.)*. New Age International Pvt. Ltd., New Delhi.
- 6 Panneerselvam, R. (2005). *Research Methodology*. Prentice-Hall of India Pvt. Ltd., New Delhi.

## **PAPER VI. PROJECT WORK AND VIVA VOCE**

The students need to conduct a project and submit the report in the field of early intervention. Students need to attend the viva voce also.

## **PAPER VII. OBSERVATION VISIT TO AN AGENCY**

To visit atleast one of the well established rehabilitation centres in the country , other than the place of work.

Note:

1. Practices will be provided for each lecture.
2. practical work ( orthosis ) Each student will be given on the job training and will have to bend, assemble and fit 2 B K. Orthosis, 2.A.K Orthosis, and various types of splints ( bracing of feet deformities — shoe modifications , fabrication of shoes below knee orthosis — above knee orthosis , knee cage , bilateral orthosis — orthosis of upper limbs, orthosis spina.
3. Practical work ( prosthetics )
  - a. Prosthetics : Each student will be given on the job training in the fabrication of socket, assembly, alignment and fitting on patients.
  - b. Lower limb prosthetics : each student will be required to independently take cast of stump, modify cast, fabrication of socket , shaping of socket , assembly of components , static and dynamic alignment and gait analysis . At least two B K Prosthesis and one A.K Prosthesis is to be fitted.
  - c. Upper limb prosthesis : at least two upper limb prosthesis are to be fitted after taking cast of stump, modification, fabrication of socket and assembly of all components with harness and control.

## **PAPER VIII. PSYCHOLOGY AND SOCIOLOGY**

**A. Psychology & Social work:**

Introduction to Psychology, Outline of Psychology and behavior, Intelligence and abilities, Learning and Remembering, Psychological Development, Cognitive Processes, Personality, Moral Development, Psychological aspect of disability. The Role of the Family, Child with the disability, parents of the disabled child. Acceptance of Severely disabled persons. Social-Sexual Relationships. Independent Living.

Introduction to Sociology and outline of Society, definitions, Outline of Social works, Nature of Social organization, types of organizations. Non-governmental organisations and its role in prosthetics & orthotics. Structure and functions of Social Institutions.

Village as a community. Social Changes, Social Problems, Social Welfare, Vocational Rehabilitation, Employment, Self-Employment Job analysis, Job placement.

### **Disability & Development:**

Background to social, political and economic issues in India and other Low Income countries. Affect on poor who live in rural and urban areas. Disability and women  
57.

Introduction to community based rehabilitation as compared to the existing medical model and its function.

Local resources available and referral. Income generation schemes, Purpose of Sangha/group of PWDs. Access, adaptations and change of environment where people live or work.

Removing Environmental Barriers, Recreation for the Disabled Community Welfare organizations, Social welfare programmes. Professional and social work in medical & rehabilitation set up. Practical and environmental difficulties of patients in use of appliances. Outline of Educational aspects, PWD act.

### **References**

- 1 James N. Butcher ,Susan Mineka ,Jill M.Hooley, Abnormal Psychology, Fifteenth Education published by Pearson Education Inc.2013.
- 2 Robert A. Baron ,Nyla R. Branscombe,Social Psychology,2015 ,Pearson Education Inc.
- 3 Carr, J.H. andShepherd, R.B, Butterworth, Oxford, Neurological Rehabilitation.
- 4 Kottke, F.J. and Lehman J.F.W B Saunders, London, Handbook of Physical Medicine and Rehabilitation.
4. Bromley, Ida Churchill-Livingston, London, Tetraplegia and Paraplegia

### **1. Department of Physiotherapy**

<b>SeN 0.</b>	<b>Name of the Equipment</b>	<b>Quantit y</b>
1.	Shortwave Diathermy-Continuous - Both	1
2.	Motorized intermittent cervical & Lumber traction unit	1
3.	Weight machine	1
4.	Static Cycle-Upper 86 Lower both	1
5.	1. Paraffin Wax Unit - Baine Marie Concept (304-Capacity) <b>with</b> 30kg Paraffin Wax	1
6.	Moist heat unit (Hydroculator)-With 8 Imported Packs	1
7.	Electrical Stimulator - LCD/Duel Channel	1
8.	Interferential Therapy Unit - LCD	1
9.	Laser Therapy - 200mw /2 Probes	1
10	Shoulder Wheel - Magnetic /LCD	1
11	Cold Pack Unit - 12 Variable Cold Gel Packs	1
12	Contrast Bath	1
13	Ultrasound Unit - 1 86 3 MHz/LCD	1
14	Overhead Pulley	1
15	Ankle Exerciser	1
16	Pronator Supinator Unit	1

## **2.Dio Occupational Therapy Equipments**

<b>&amp;Di 0.</b>	<b>Name of the Equipment</b>	<b>Quantity</b>
1.	Shoulder wheel	1
2.	Inclined sanding unit	1
3.	Horizontal Sanding Unit	1
4.	Vertical Sanding Unit	1
5.	Therapy ball / Physio ball (with pump) (45 cm diameter)	I
6.	Therapy ball i Physio ball (75 cm diameter)	
7.	Wedge	1
8.	CP chair	1
9.	Comer chair	1
10.	Bolster (Diameter 40cm x 120em long)	1
11.	Multi-activity workstation	1
12.	ADL board (Buttoning-Unbuttoning board)	1
13.	ADL board (latch, lock and key board)	I
14.	Rowing machine	1
15.	Quadriceps exercise table	1
16.	Gym lit box	1

17.	Mushroom peg board	1
18.	Weighted peg board	1
19.	Grip exerciser	1

20.	<b>Supinator-pronator board</b>	<b>1</b>
21.	<b>Pyramids</b>	<b>1</b>
22.	<b>Pronator-supinator device (wall mounted)</b>	<b>1</b>
23.	<b>Weighted cuffs</b>	<b>2 pairs</b>
24.	Rope and pulley	1
25.	Ankle exercise (unilateral)	1
26.	Medicine ball	1
27.	Postural training mirror (with frame)	1
28.	Foot rocker board	1
29.	Wrist roller	1

### 3.D/o Prosthetics & Orthotics

S. No.	List of Equipments for O.H.	Quantity
1.	Drill Machine	1
2.	Bench Grinder with all accessories complete	1
3.	Electric oven	1
4.	Super carver kit	1
5.	Jig Saw (Bosh)	1
6.	Apparatus Sewing Machine (Electric Driver)	1
7.	<b>Leather Sewing Machine (Electric Driver)</b>	<b>1</b>
8.	<b>Bench Vice 6" and 4"</b>	<b>4</b>
9.	Anvil (50 Kg 8620 Kg)	2
10.	Misc. Hand tools for orthotic section	2
11.	Misc. Hand tools for Prosthetic section	2
12.	<b>Misc. Hand tools for leather padding and shoe</b>	<b>2</b>
13.	<b>Work tables 6 x 3 x 32"</b>	<b>2</b>
14.	Measurement table 7 x 2-1/2x32"	1
15.	Fabrication	1
	<b>Total</b>	

### 4.Equipments for Cerebral Palsy/Chronic Neurological Conditions

S. No	Name of the equipment	Quantity
1	<b>Treatment of the equipment</b>	<b>1</b>
2	<b>Prone Wedge</b>	<b>2</b>
3	<b>Bolster</b>	<b>1</b>
4	<b>Standing Frame</b>	<b>1</b>
5	<b>Prone Crawler</b>	<b>1</b>
6	<b>Reciprocal Walker</b>	<b>1</b>
7	<b>Parallel bar (Small Size)</b>	<b>1</b>

8	Elbow Crutches (Large)	4
9	Elbow Crutches (Small)	4
10	Bean Bag	1
11	ADL Training Board Dummy Electric	1
12	ADL Training Board Diff. Doors	1
13	Dressing Frames (Set)	3
14	Door Latch Frame Set	1
15	ADL Training: Board - Mech. Activities	1
16	Cloth Clips	1
17	Dummies for Dressing Skills, Combing activities	1 Set
18	Garment with different size buttons	3
19	Toys to train shoe lacing	2
20	Rocker bottom knife	2
21	Swivel spoon, adapted handles with utensils (Detachable)	2
22	Pen holder	2
23	Teachers	2
24	Plate Guard	2
25	Adaptive & Assistive Devices kit	2
26	Peg Boards	1
27	Pop Beads	1
28	Clay Dough	1 box
29	Little Bigger Blocks	1
30	Coin Box (Hundi)	2
31	Soft Ball	5
32	Hand Exerciser	1
33	Coordination Electronic Board	1
34	Magnetic Peg Board	1
35	Little Bigger Blocks (For Improving Mass Grasp For Stroke Patient)	1
36	Continuous Passive Movement 1.5 E (CPM)	1
37	Checker Board-Arm & Shoulder	1
38	Finger Extension Remedial Board	1
39	Sand And Water Table	1
40	Balls (Basket 85 Volle Ball)	4
41	Theraband	1 set
42	Wooden board with 50 holes and 20 rust free galvanized rods	01
43	Durable foam-board No. cards and symbols cards	01
44	Specially designed beads in 6 colours (in large size and small size)	1 set
45	Educational water 29 color chart of surroundings. Etc	-
46	Flash card holder (New Design) 91	01
47	Education Pictures card and work card kits (7 water proof pictures cards 86 foam board matching world card in each kit) like for transport playtime round me	1 set.
48	Clock face stamps on teakwood base small, medium, large oval	1 set.
49	Stamps on vegetables on specially designed colored base	1 set
50	Stamps of fruits on special base	1 set.
51	Stamps on wild animals on special	1 set.



52	Stamps on domestic animals on special base	1 set.
53	Stamps on transport on special base	1 s e t .
54	Wooden number strip (1-100) and display folder	10
55	Education wooden numbercards for numbers (1-100), symbols etc	10
56	Day birdie (A puzzle to learn the days of the week)	01
57	Grown plant (to learn parts of the plant and how they grow)	01
58	Handprints (to learn Nos. 1-5)	01
59	Footprints (to learn Nos. 11-20)	01
60	Odd and even duck (to introduce odd and even nos. 1-10)	01
61	Lacing kit (3 shapes with eyelets and laces for motor control)	01
62	Footsteps (20 shapes with eyelets and laces for motor control)	01
63	Festivals a story sequence puzzle (Christmas) Festivals A story sequence puzzle (Diwali), Festival A Story sequence/Puzzle	01 01
64	Seasons (round the year) Kit 1.1 colored chart of summer, 1 holders, 15 work cards, kit 2.1 colored chart of winter	
65	What we wear - 25 Picture cards of clothes, 25 word cards of clothers, 25 word cards of helping words.	1 set.
66	Daily living adaptation kit (Samples of 22 items of daily living adapted to suit the requirements of the mentally challenged)	1

#### 5.D/o Autism Spectrum Disorder/Intellectual Disabilities

S.NO	Equipment's	Quantity
1	Wooden Board with 59 holes and 20 rust. free galvanized rods	.
2	Durable foam-board No. Cards and Symbols Cards	01
3	Specially designed beads in 6 colour (In large size and and small size)	1 set
4	Educational water proof color chart of surroundings. Etc	-
5	1 Flash card holder (new design)	01
6	Educational picture card and work card kits (7 water proof picture card 86 foam board matching world card in each kit) like for transport, playtime, round me	1 set
7	Clock face stamps on teakwood base-small, medium, large, oval	1 set
8	Stamps on vegetable on specially designed colored base	1 set
9	Stamps on fruits on special base	1 set
10	Stamps on wild animals on special base	1
11	Stamps on domestic animals on special base	1
12	Stamps on transport on special base	1
13	Wooden number strips (1-100) and display folder	10
14	Educational wooden numbercards for numbers (1-100), symbols etc	10
15	Day birdie (A puzzle to learn the days of the week)	
16	Grown plant (to learn parts of the plant and how they grow)	01
17	Handprints (to learn Nos. 1-5)	01
18	Footprints (to learn Nos. 11-20)	01
19	Odd and even duck (to introduce odd and nos. 1-10)	1

20	<b>Lacing Kit (3 shapes with eyelets and laces for motor control)</b>	01
21	<b>Footsteps (20 with shapes with eyelets and laces for motor control)</b>	01
22	<b>Festivals a story sequence puzzle (Christmas)</b>	01
23	<b>Seasons (round the year ) kit 1.1 colored chart of summer, 1 holder, 15 word card, kit 2.1 colored chart of winter, 1 holder, 15 word card, kit 3.1 colored card of rainy season, 1 holder, 15</b>	1 set
24	What we wear	1 set
25	Daily living adaptation kit (Samples of 22 items of daily living adapted to suit the requirements of the mentally challenged)	1
26	Toys (used for visual, auditory and tactile)	10
27	Therapy ball	1
28	Bolsters	1
29	Balance Board	1
30	Corner seat	1
31	Modified chairs (Positive and negative)	1
32	Flip charts, Vehicles, Numbers, Vegetables, Animals	-
33	Word book vegetables, fruits, Numbers, Animals	
34	Manual for preparation of stimulation material rural for infants and toddlers	-
35	Dancing Lights	5 set
36	Radium Stickers	5
37	UV Lights	5 set
38	Wall Mounted Colour Light	5
39	Flexible serial Tube Lights	2 set
40	Stickers	5
41	Ball Pool (With Small Plastic Balls)	
42	Tunnel	
43	Vibrator Bod Massager	
44	Rope Ladder	

Stickers		
41	Ball Pool (With Small Plastic Balls)	1
42	Tunnel	1
43	Vibrator Bod Massager	
44	Rope Ladder	1
45	, Balance Beam	1
46	Trampoline	1
47		
48	Geometric Shapes Crawling Forms	1
49	Teaching Learning Material (TLM)-KIT-1	1
50	Teaching Learning Material (TLM)-KIT-2	1
51	Teaching Learning Material (TL	
52		

53	Computer Assisted Instruction (CM) Package-7 CD's-Each CD Rs, 50/-	
54	Grade level Assessment Device	
55	Vocation Assessment Device (GLAD)1	
56	Functional Assessment checklist for Programing (FA P)1	
57	Behavioural Assessment Scale For Indian Children with Mental1 Retardation (BASIC-MR) 0) English (ii) Hindi	
58	Malin's Intelligence Scale For Indian Children (MISIC)	
59	Developmental Screening T	
60	Vineland Social Maturity Scale (VSMS)	
61	Binet-kamat Test (BKT)	
62	Indian Scale For Assessment of Autism (	on Nationa 1 Trust Website
63	Childhood Autism Rating Scale (CARS)1	

TOTAL LIST OF TOOLS AND EQUIPMENT (AS ABOVE)

1	Shortwave Diathermy-Continuous - Both	1
2	Motorized intermittent cervical & Lumber traction unit	1
3	Weight machine	1
4	Static Cycle-Upper 86 Lower both	1
5	1. Paraffin Wax Unit - Baine Marie Concept (304-Capacity) with 30kg Paraffin Wax	1
6	Moist heat unit (Hydroculator)-With 8 Imported Packs	1
7	Electrical Stimulator - LCD/Duel Channel	1
8	Interferential Therapy Unit - LCD	1
9	Laser Therapy - 200mw /2 Probes	1
10	Shoulder Wheel - Magnetic /LCD	1
11	Cold Pack Unit - 12 Variable Cold Gel Packs	1
12	Contrast Bath	1
13	Ultrasound Unit - 1 86 3 MHz/LCD	1
14	Overhead Pulley	1
15	Ankle Exerciser	1
16	Pronator Supinator Unit	1
17	Shoulder wheel	1
18	Inclined sanding unit	1
19	Horizontal Sanding Unit	1

20	Vertical Sanding Unit	1
21	Therapy ball / Physio ball (with pump) (45 cm diameter)	I
22	Therapy ball i Physio ball (75 cm diameter)	
23	Wedge	1
24	CP chair	1
25	Comer chair	1
26	Bolster (Diameter 40cm x 120em long)	1
27	Multi-activity workstation	1
28	ADL board (Buttoning-Unbuttoning board)	1
29	ADL board (latch, lock and key board)	I
30	Rowing machine	1
31	Quadriceps exercise table	1
32	Gym lit box	1
33	Mushroom peg board	1
34	Weighted peg board	1
35	Grip exerciser	1
36	Supinator-pronator board 1	
37	Pyramids	1
38	Pronator-supinator device (wall mounted)	1
39	Weighted cuffs	2 pairs
40	Rope and pulley	1
41	Ankle exercise (unilateral)	1
42	Medicine ball	1
43	Postural training mirror (with frame)	1
44	Foot rocker board	1
45	Wrist roller	1
46	Drill Machine	1
47	Bench Grinder with all accessories complete	1
48	Electric oven	1
49	Super carver kit	1
50	Jig Saw (Bosh) <sup>1</sup>	1
51	Apparatus Sewing Machine (Electric Driver)	1
52	Leather Sewing Machine (Electric Driver)	1
53	Bench Vice 6" and 4"	4
54	Anvil (50 Kg 8620 Kg)	2
55	Misc. Hand tools for orthotic section	2
56	Misc. Hand tools for Prosthetic section	2
57	Misc. Hand tools for leather padding and shoe	2
58	Work tables 6 x 3 x 32"	2
59	Measurement table 7 x 2-1/2x32"	1
60	Fabrication	1

61	Treatment of the equipment	1
62	Prone Wedge	2
63	Bolster	1
64	Standing Frame	1
65	Prone Crawler	1
66	Reciprocal Walker	I
67	Parallel bar (Small Size)	I
68	Elbow Crutches jLarge)	4
69	Elbow Crutches (Small	4
70	Bean Bag	1
71	ADL Training Board Dummy Electric	I_
72	ADL Training Board Diff. Doors	1
73	Dressing Frames (Set)	3
74	Door Latch Frame Set	1
75	ADL Training: Board - Mech. Activities	1
76	Cloth Clips	1
77	Dummies for Dressing Skills, Combing activities	1 Set
78	Garment with different size buttons	3
79	Toys to train shoe lacing	2
80	Rocker bottom knife	2
81	Swivel spoon, adapted handles with utensils (Detachable)	2
82	Pen holder	2
83	leachers	2
84	Plate Guard	2
85	Adaptive & Assistive Devices kit	2
86	Peg Boards	1
87	Pop Beads	1
88	Clay Dough	1 box
89	Little Bigger Blocks	1
90	Coin Box (Hundi)	2
91	Soft Ball	5
92	Hand Exerciser	1
93	Coordination Electronic Board	1
94	Magnetic Peg Board	1
95	Little Bigger Blocks (For Improving Mass Grasp For Stroke Patient)	1
96	Continuous Passive Movement 1.J E (CPM)	1
97	<sup>w</sup> Checker Board-Arm &Shoulder	1
98	Finger Extension Remedial Board Sand And Water Table	1
99	sound and water table	1
100	Balls (Basket 85Volle Ball	1 Set
101	Theraband	4

102	Wooden board with 50 holes and 20 rust free galvanized rods	1
103	Durable foam-board No. cards and symbols cards	1
104	Specially designed beads in 6 colours (in large size and small size)	1 set
105	Educational water proof color chart of surroundings. Etc	-
106	Flash card holder (New Design) 91	1
107	Education Pictures card and work card kits (7 water proof pictures cards 86 foam board matching world card in each kit) like for transport, playtime, round me	1 set.
108	Clock face stamps on teakwood base small, medium, large oval	1 set.
109	Stamps on vegetables on specially designed colored base	1 set _
110	Stamps of fruits on special base	1 set.
111	Stamps on wild animals on special	1 set.
112	Stamps on domestic animals on special base	1 set.
113	Stamps on transport on special base	1 set.
114	Wooden number strip (1-100) and display folder	10
115	Education wooden number cards for numbers (1-100), symbols etc	10
116	Day birdie (A puzzle to learn the days of the week)	1
117	Grown plant (to learn parts of the plant and how they grow)	1
118	Hand prints (to learn Nos. 1-5)	1
119	Footprints (to learn Nos. 11-20)	1
120	Odd and even duck (to introduce odd and even nos. 1-10)	1
121	Lacing kit (3 shapes with eyelets and laces for motor control)	1
122	Footsteps (20 shapes with eyelets and laces for motor control)	1
123	Festivals a story sequence puzzle (Christmas) Festivals A story sequence puzzle (Diwali), Festival A Story sequence/Puzzle	1
124	Seasons (round the year) Kit 1.1 colored chart of summer, 1 holders, 15 work cards, kit 2.1 colored chart of winter	1
125	What we wear - 25 Picture cards of clothes, 25 word cards of clothes, 25 word cards of helping words.	1 set.
126	Daily living adaptation kit (Samples of 22 items of daily living adapted to suit the requirements of the mentally challenged)	1
127	Wooden Board with 59 holes and 20 rust. free galvanized rods	1
128	Durable foam-board No. Cards and Symbols Cards	1
129	Specially designed beads in 6 colour (In large size and and small size)	1 set
130	Educational water proof color chart of surroundings. Etc	-
131	1 Flash card holder (new design)	1
132	Educational picture card and work card kits (7 water proof picture card 86 foam board matching world card in each kit) like for transport, playtime, round me	1 set
133	Clock face stamps on teakwood base-small, medium, large, oval	1 set
134	Stamps on vegetable on specially designed colored base	1 set
135	Stamp is on fruits on special base	1 set
136	Stamps on wild animals on special base	1 set

137	Stamps on domestic animals on special base	1 set
138	Stamps on transport on special base	1 set
139	Wooden number strips (1-100) and display folder	10
140	Educational wooden numbercards for numbers (1-100), symbols etc.	10
141	Day birdie (A puzzle to learn the days of the week)	1
142	Grown plant (to learn parts of the plant and how they grow)	1
143	Handprints (to learn Nos. 1-5)	1
144	Footprints (to learn Nos. 11-20)	1
145	Odd and even duck (to introduce odd and nos. 1-10)	1
146	Lacing Kit (3 shapes with eyelets and laces for motor control)	1
147	Footsteps (20 with shapes with eyelets and laces for motor control)	1
148	Festivals a story sequence puzzle (Christmas)	1
149	Seasons (round the year ) kit 1.1 colored chart of summer, 1 holder, 15 word card, kit 2.1 colored chart of winter, 1 holder, 15 word card, kit 3.1 colored card of rainy season, 1 holder, 15 word card, seasons kit with all 3 seasons plus holder and 45 word card	1 set
150	What we wear	1 set
151	Daily living adaptation kit (Samples of 22 items of daily living adapted to suit the requirements of the mentally challenged)	1
152	Toys (used for visual, auditory and tactile)	10
153	Therapy ball	1
154	Bolsters	1
155	Balance Board	1
156	Corner seat	1
157	Modified chairs (Positive and negative)	1
158	Flip charts, Vehicles, Numbers, Vegetables, Animals	-
159	Word book vegetables, fruits, Numbers, Animals	
160	Manual for preparation of stimulation material rural for infants and toddlers	-
161	Dancing Lights	5 set
162	Radium Stickers	5
163	UV Lights	5 set
164	Wall Mounted Colour Light	5
165	Flexible serial Tube Lights	2 set
166	Stickers	5
167	Ball Pool (With Small Plastic Balls) 1	1
168	Tunnel 1	1
169	Vibrator Body Massager 5	5
170	Rope Ladder 1	1
171	Balance Beam 1	1
172	Trampoline 1	1
173	Graded Tables with graded stools 1 I.	1
174	Geometric Shapes Crawling Forms 1	1

175	Teaching Learning Material (TLM)-KIT-1	1
176	Teaching Learning Material (TLM)-KIT-2	1
177	Teaching Learning Material (TLM)-KIT-3	1
178	Teaching Learning Material UM -KIT-4	1
179	Computer Assisted Instruction (CAI) Package-7 , 1 set CD's-Each CD Rs, 50/-	1 set
180	Grade level Assessment Device (GLAD) 1	1
181	Vocation Assessment Device (GLAD) 1	1
182	Functional Assessment checklist for Programming (FA P) 1	1
183	Behavioural Assessment Scale For Indian Children with Mental Retardation (BASIC-MR) english, hindi	1
184	Malin's Intelligence Scale For Indian Children (MISIC) 1	1
185	Developmental Screening Test (BKT) 1	1
186	Vineland Social Maturity Scale (VSMS) 1	1
187	Binet-kamat Test (BKT) 1	1
188	Indian Scale For Assessment of Autism (ISSA) Available	Available on national trust website
189	Childhood Autism rating scale (CARS)	1

**Programme Project Report (PPR) for  
Distance Learning Programme under School of Distance Education**

**Diploma in Prosthetics and Orthotics (DPO)**

**Course Co-ordinator: Dr. P T Baburaj**



*Academic support by*

**International and Inter University center for Disability Studies (IUCDS)  
Mahatma Gandhi University  
Kottayam, Kerala**

**DIPLOMA IN PROSTHETICS AND ORTHOTICS (DPO)**  
**(Distance Learning Programme - Diploma Programme)**

**PROGRAMME PROJECT REPORT**

Mahatma Gandhi University started the School of Distance Education in 1989 with the vision of providing the opportunity for quality education to all realms of society. Since the beginning, thousands of students have availed themselves of this opportunity for higher education to a great extent throughout Kerala. Many students outside the State had also benefited from this. But after the new directions of the UGC in 2014, the University had stopped all its Off-Campus Centres of the School of Distance Education both inside and outside the State.

Now it is the new endeavour of the School to revamp its functioning by offering different types of Diploma and Certificate programmes very relevant to contemporary society, in addition to the conventional Graduate and Post Graduate programmes. This is being done with the academic and infrastructural support of the eminent Schools and Interdisciplinary Interuniversity Centres of the University. All these Schools/ Centres have already conducted similar Programmes or Post Graduate Programmes in the same area. This Diploma Programme has been designed by the International and Inter University center for Disability Studies and to be conducted by the School of Distance Education with the academic support of the Centre.

**B) Programmers vision, mission & objectives**

This programme is envisaged to provide knowledge and practical exposure in orthotics and prosthetics education. The programme is designed to prepare individuals to be experts in the field of prosthetics and orthotics technology as a frame work for problem solving. The one year diploma programme in applied science curriculum combines clinical orientation programme such as rehabilitation medicine, allied health sciences, prosthetics and orthotics engineering. This programme failure to meet the needs of business, technology and health case. The curriculum formed aim to impart knowledge and to train category 3 personnel (bench workers) for assembly and filling of orthopedic appliances, artificial limbs and other rehabilitation aids under the supervision of prosthetics and orthotics. (category 1, profession)

**C) Relevance of the programme with HEI's mission goals.**

The need to provide better prosthetic and orthotic care in the treatment of physically challenged in the rehabilitation setting is very high. To meet the requirement of these personnel this course will provide the students with clinical problem solving skill for lifelong learning combined with bio-mechanical education. This course will also help the society and the institute in the field of prosthetics and orthotics with growing technological advancement and human resource development.

**D) Nature of prospective target group learners.**

Students from science streams and ITI trades such as fitter, carpenter, leather and certificate course in prosthetics and orthotics, special educators, professionals in the field of nursing and paramedicals, undergraduates, NGO's volunteers working in the field of disability and rehabilitation.

**E) Appropriateness of the programme to be conducted in open and distance learning mode to acquire specific skills and competency:**

Importance of prosthetics and orthotics is crucial part in the rehabilitation of differently abled persons. Timely intervention and management can reduce the degree of disablement and empower the individual to the maximum. Hence the information on prosthetics and orthotics will provide adequate knowledge and training to significant section of learners through the open and distance learning programme.

**F) Instructional Design**

The programme is of one year duration comprising six courses with a total of 32 credits. There are adequate contact classes, practical session and the assessment involve both internal as well as external components.

Course Co-ordinator: Dr. P.T. Baburaj

Duration :12 months

Course Code	Course Type	Course Name	Contact Sessions (hours)	Credits	*Internal Marks	External Marks	Total Marks
Semester I							
DE-PO -1	Core course	Basic Clinical Science ( a. Anatomy b. Physiology c. Physical medicine and rehabilitation d. Surgery/	12	4	20	80	100

		orthopaedics.)					
DE-PO -2	Core course	Workshop practice, machines and tools & materials	12	4	20	80	100
DE-PO -3	Core course	Orthotics (lower, upper and spinal )	12	4	20	80	100
DE-PO-4	Practical	Prosthetics ( upper and lower )	90	4	20	80	100
Semester II							
DE-PO-5	Core course	Basics of research methodology and statistics	12	4	20	80	100
DE-PO 6	Project	Project work and viva voce	12	4	20	80	100
DE-PO 7	Agency Visit	Observation visit to an agency and Case Study Analysis		4	20	80	100
DE-PO 8	Core Course	Psychology & Sociology	12	4	20	80	100
Total			162	32	160	640	800

#### **G) Procedure for admission, curriculum transaction and evaluation:**

Candidates (undergraduates, graduates, and postgraduates in science stream, ITI and diploma in Technology, certificate course in Prosthetics and orthotics etc.. ) are eligible for admission irrespective of age. The study materials will be delivered through online and print forms. Assignments and reports can be submitted online. The candidate will be graded based on the grading pattern after assessment.

Admission to the programme will be done by the University through a common procedure for all the programmes under the School of Distance Education. Fee structure will be decided by the University. The School will prepare an academic calendar/activity planner and will be circulated among all the learners at the time of admission itself. The academic calendar will include all the significant activities, important dates, schedule of submission of assignments, schedule of contact classes, schedule of examinations, etc.

Evaluation of the courses shall be done by the faculty themselves on the basis of internal assessment and end semester examinations. 20% of the marks will be decided by the internal evaluations and the remaining 80% by the end semester examinations which will be done by the University. The performance of a student in each course is evaluated in terms of percentage of marks with a provision for conversion to grade points.

Each student shall be required to do one Assignment/Book Review/Debate/Seminar/ Presentation of case study for each course. Assignments/Book Review after valuation shall be returned to the students. The teacher shall define the expected quality of the above in terms of structure, content, presentation and the like, and inform the same to the students.

**Grading System** will be followed for the evaluation on a ten point scale. The details of the grading system are given in the following Table.

**Percentage Equivalence of Grade:**

Range of % of Marks	Grade Letter	Performance	Grade Point
95 - ≤ 100	O	Outstanding	10
85 - < 95	A plus	Excellent	9
75 - < 85	A only	Very Good	8
65 - < 75	B plus	Good	7
55 - < 65	B only	Above Average	6
45 - < 55	C	Average	5
40 - < 45	P	Pass	4
< 40	F	Fail	0
Absent	Ab	Absent	0

'P' grade is required for a minimum pass in a course. The minimum GPA required for a pass in the Certificate programme is 4. **Minimum Credit requirement for the Post Graduate Diploma in Prosthetics and Orthotics is 32.**

**Calculation of Grade Point Average (GPA) :**

**Credit Points for the Course** = (No. of Credits assigned for the course x Grade Point secured for that course).

**GPA** indicates the performance of a student in the programme. GPA is based on the total **credit points** earned by a student in all the courses divided by the total number of credits assigned to the courses required in the programme.

Note: GPA is computed only if the candidate passes in all the required courses (gets a minimum required grade for a pass in all the required courses as per the curriculum).

**GPA =**

**Total credit points earned by the student from all the required courses of the programme** **Total credits of all courses required in the programme**

This formula shall be printed on the Grade Card issued to the student with a note that it could be used to convert the grades into mark-percentages. (The details of the grading system as indicated above shall also be printed on the Grade Card).

**Conversion of GPA to Grade**

GPA	Grade
10	O
9.0 - < 10	A plus
8.0 - < 9	A only
7.0 - < 8	B plus
6.0 - < 7	B only
5.0 - < 6	C
4.0 - < 5	P

< 4	F
Absent	Ab

### **Conversion of GPA to percentage**

$$\text{Equivalent Percentage} = (\text{GPA obtained}) \times 10$$

### **H) Requirement of the laboratory support and library resources:**

The library and infrastructure support of the Centre and the University will be extended to the learners as per the requirement.

Mahatma Gandhi University Library and Information System consists of University Library, libraries of the Schools and 4 study centre Libraries. The University Library was established in 1989. The University Library which is situated in the main campus occupies purpose-built accommodation, and provides a variety of facilities and has a user-friendly environment. These include individual work spaces, room for group study and teaching, audio-visual access and online information retrieval system. The building of the University Library is 2000 sq.m in area consisting of the cellar, the ground floor and the first floor.

Academic as well as public users are given the facility to use the library. Special category membership is provided to journalists. The library is providing service from 8 am to 8 pm in three shift timings for its staff. The library functions on an average of 345 days in a year. The libraries of teaching departments are open during working hours of the Schools. Reading space is provided in all the three floors housing the various sections of the library. The library provides reading facility to the visually impaired users too. For this, an electronic lab custom made for visually and physically challenged users has been set up during 2016.

The University Library has a Library Advisory Committee. It is an 18 member committee with Vice-Chancellor as Chairman and University Librarian as Convener.

The library has a collection of 59,000 books, 232 journals, 2,135 Ph.D. theses and has access to 15000+ e-journals under E-Shodh Sindhu. The activities of the Library are comprehensively automated using open source library management software KOHA. OPAC, Journal Article Index, By monthly Bibliography compilation and Literature Search Service are also available

The library is a member of the INFLIBNET Centre, Ahmedabad as well as DELNET (Developing Library Network). As a member of these networks, the library provides access to the resources of other major libraries in the country. In addition to the access to UGC INFONET consortium, it has access to major online databases, such as EBSCO, ProQuest dissertations and theses, Oxford Scholarship Online, IEEE All Society Periodicals Package etc. Mahatma Gandhi University had won the State IT Award during the year 2009 in the e- learning category for its university online theses digital library. The various department libraries have a good collection of subject specific books and journals.

<b>A. MAHATMA GANDHI UNIVERSITY LIBRARY</b>	
<b>Category</b>	<b>No.</b>
Books	59000
Journals	232
Bound Journals	7500
Ph.D Theses	2135
E-Journals (in UGC-Infonet, renamed as E-ShodhSindhu)	15000
Online databases (in UGC Infonet)	11
Online Archives subscribed	185 Titles
Online databases subscribed	4
E-books	7338
DVDs: Educational Videos	293

**D) Cost estimate of the programme and the provisions:**

<b>B</b>	<b>Name of School/Centre</b>	<b>Total No. of books</b>	<b>Books added during the last three years</b>
	Inter University Centre for Disability Studies	250	123

Budget estimate (for 100 students)

S.No.	Item	Amount (Rs. in Lakhs)
1.	Manpower	2.5
2.	Study material	1.5
3.	Laboratory/ Library	2
4.	Internal assessment	.5
5.	End semester examination	1.5
	<b>Total</b>	<b>8.</b>

**Total programme fee: Rs.8000/-**

**J) Quality assurance mechanism and expected programme outcomes:**

The quality of the programme will be ensured through strict monitoring by an executive committee including the Co-ordinator of the programme, the subject experts, Director, School of Distance Education and Head of the International and Inter University center for Disability Studies .The Co-ordinator of the programme shall ensure the regular student feedback of courses, teachers and programme in the prescribed format towards the end of the semester and the same shall be analyzed to draw conclusions for effecting improvement. Periodical review meetings on the programme efficacy will be held in which

the remarks of teachers on curriculum, syllabi and methods of teaching and evaluation will be given due importance. Moreover, the progress and the quality of the programme will be monitored by the



Internal Quality Assurance Cell of the University from the outcome and feedback of the learners as well as the proper documentation maintained in the Centre.

The students trained from this programme could have worked as an expert Orthotist and Prosthetist in the Physical Medicine and rehabilitation fields.

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