



GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

DENTAL LABORATORY EQUIPMENT TECHNICIAN

(Duration: Two Years)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 5



SECTOR – HEALTHCARE



Industrial Training Institute

Dental Laboratory Equipment Technician

DENTAL LABORATORY EQUIPMENT TECHNICIAN

(Non-Engineering Trade)



CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 5

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Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the two-year duration of “Dental Laboratory Equipment Technician” trade a candidate is trained on professional skill, professional knowledge and Employability skill. In addition to this a candidate is entrusted to undertake project work, extracurricular activities and on job training to build up confidence. The broad components covered under Professional skill subject are as below: -

First Year - the trainee will learn about safety and occupational health process. Differentiate between the responsibilities of the dental team providing dental treatment and weigh various metals and alloys used in dental laboratory. Trainee will measure temperature and monitor its effects in dental laboratory and also apply accurate voltage systems required to operate various machines with electrical safety. Establishes relevance of melting points of different alloys used in dental laboratory and also selects various alloys as per requirement for fabrication of dental prosthesis. Identifies various forms of gypsum products, special trays, occlusal runs and articulates casts, retractive components of orthodontic appliances, active components of orthodontic appliances and also prosthesis orthodontic appliances. Trainee will perform teeth setting and also plan and process the denture. Trainee will repair broken denture and relines the denture. Identify and select wires and fabricates retentive components of orthodontic appliances.

The trainee will be able to carve maxillary anterior teeth, mandibular anterior teeth, maxillary premolars, mandibular premolars, maxillary molars, mandibular molars. Trainee will be able to assemble the equipments to be used for duplication of cast. Trainee will be also able to identify and apply various concept of occlusion in all dental casts and also can classify partial denture. Trainee will construct immediate dentures, removable partial dentures and also perform survey and will be able to identify the fixed components of orthodontics appliances. Trainee will fabricate oral screen and activator and also weld appliances.

Second Year - The trainee will learn how to fabricate temporary acrylic jacket crowns. Trainee will be able to prepare cast and die for fixed partial denture, full metal crown and also full metal bridge.

The trainee will familiarize with equipment used in fixed prosthodontics. Trainee will mock up of anterior crowns, fabricate copings, prepare die and also fabricate porcelain fused to metal crown.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the aegis of National Council of Vocational Training (NCVT). Craftsman Training Scheme (CTS) and Apprenticeship Training Scheme (ATS) are two pioneer programmes of NCVT for propagating vocational training.

‘Dental Laboratory Equipment Technician’ trade under CTS is one of the popular courses delivered nationwide through network of ITIs. The course is of Two years duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) impart professional skills and knowledge, while Core area (Employability Skills) imparts requisite core skill & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Trade Certificate (NTC) by NCVT having worldwide recognition.

Candidates need broadly to demonstrate that they are able to:

- Read and interpret technical parameters/ documents, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge & employability skills while performing jobs.
- Check the job/ assembly as per drawing for functioning identify and rectify errors in job/ assembly.
- Document the technical parameters related to the task undertaken.

2.2 CAREER PROGRESSION PATHWAYS

- Can appear in 10+2 examination through National Institute of Open Schooling (NIOS) for acquiring higher secondary certificate and can go further for General/ Technical education.
- Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming instructor in ITIs.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of two years: -

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	2640
2	Professional Knowledge (Trade Theory)	528
3	Employability Skills	110
5	Library & Extracurricular activities	242
6	Project work	320
7	Revision	160
9	Examination	160
	Total	4160

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course and at the end of the training programme as notified by the Govt. of India from time to time. The employability skills will be tested in first year only.

a) The **Internal Assessment** during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute have to maintain individual *trainee portfolio* as detailed in assessment guideline. The marks of internal assessment will be as per the template (Annexure – II).

b) The final assessment will be in the form of summative assessment method. The All India Trade Test for awarding NTC will be conducted by NCVT as per the guideline of Govt. of India. The pattern and marking structure is being notified by Govt. of India from time to time. **The learning outcome and assessment criteria will be basis for setting question papers for final assessment. The examiner during final examination will also check** individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Practical is 60% & minimum pass percent for Theory subjects is 33%.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/wastage as per procedure, behavioral attitude, sensitivity to environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based, comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences of internal assessments are to be preserved until forthcoming examination for audit and verification by examination body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60 -75% to be allotted during assessment	
For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices.	<ul style="list-style-type: none"> • Demonstration of good skills and accuracy in the field of work/ assignments. • A fairly good level of neatness and consistency to accomplish job activities. • Occasional support in completing the task/ job.
(b)Weightage in the range of above75% - 90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices.	<ul style="list-style-type: none"> • Good skill levels and accuracy in the field of work/ assignments. • A good level of neatness and consistency to accomplish job activities. • Little support in completing the task/ job.
(c) Weightage in the range of above 90% to be allotted during assessment	

For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.

- High skill levels and accuracy in the field of work/ assignments.
- A high level of neatness and consistency to accomplish job activities.
- Minimal or no support in completing the task/ job.



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Dental Prosthetic Technicians; Medical and Dental Prosthetic Technicians design, fit, service and repair medical and dental devices and appliances following prescriptions or instructions established by a health professional. They may service a wide range of support instruments to correct physical medical or dental problems such as neck braces, orthopedic splints, artificial limbs, hearing aids, arch supports, dentures, and dental crowns and bridges.

Dental Mechanic

Mechanic, Dental; Dental Technician makes full or partial dentures, inlay, bridges, and crowns of metal, vulcanite or other composition plates from wax or plaster plate impressions taken by DENTIST and repairs dental aids as prescribed by him. Makes special impression trays as designed by DENTIST and prepares plaster casts of upper and lower jaws from wax impression taken by him to provide pattern for work to be done. Shapes metal vulcanite or plastic plates for dentures and sets artificial teeth in plates. Processes denture in acrylic resin or metal and makes fixed metal restorations such as crowns, bridges etc. according to impression taken by Dentist. Forms porcelain teeth and crowns and repairs or makes additions on existing dentures as directed. May assist Dentist in general dental practice and undertake chair side clinical work on patients.

Reference NCO-2015:

- (i) 3214.9900 - Medical and Dental Prosthetic Technicians
- (ii) 3214.0100 - Dental Mechanic



4. GENERAL INFORMATION

Name of the Trade	DENTAL LABORATORY EQUIPMENT TECHNICIAN			
NCO - 2015	3214.9900, 3214.0100			
NSQF Level	Level-5			
Duration of Craftsmen Training	Two Year			
Entry Qualification	Passed 10 th class examination under 10+2 System of education			
Unit Strength (No. of Student)	24			
Space Norms	120 Sq. metres			
Power Norms	12 KW			
Instructors Qualification for:				
(i) Dental laboratory Equipment Technician	One Qualified Dental Surgeon and Qualified Dental & Laboratory Technician <u>Essential Qualification:</u> Craft Instructor Certificate in relevant trade under NCVT.			
(ii) Employability Skill	MBA OR BBA with two years experience OR Graduate in Sociology/ Social Welfare/ Economics with Two years experience OR Graduate/ Diploma with Two years experience and trained in Employability Skills from DGET institutes. AND Must have studied English/ Communication Skills and Basic Computer at 12 th / Diploma level and above. OR Existing Social Studies Instructors duly trained in Employability Skills from DGT institutes.			
List of Tools and Equipment	As per Annexure – I			
Distribution of training on Hourly basis: (Indicative only)				
Total Hrs /week	Trade Practical	Trade Theory	Employability Skills	Extra-Curricular Activity
40 Hours	30 Hours	6 Hours	2 Hours	2 Hours

5. NSQF LEVEL COMPLIANCE

NSQF level for '**Dental Laboratory Equipment Technician**' trade under CTS: **Level 5**

As per notification issued by Govt. of India dated- 27.12.2013 on National Skill Qualification Framework total 10 (Ten) Levels are defined.

Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Each level of the NSQF is described by a statement of learning outcomes in five domains, known as level descriptors. These five domains are:

- a. Process
- b. professional knowledge
- c. professional skill
- d. core skill
- e. Responsibility

The broad learning outcome of '**Dental Laboratory Equipment Technician**' trade under CTS mostly matches with the Level descriptor at Level- 5.

The NSQF level-5 descriptor is given below:

Level	Process Required	Professional Knowledge	Professional Skill	Core Skill	Responsibility
Level 5	Job that requires well developed skill, with clear choice of procedures in familiar context	knowledge of facts, principles, processes and general concepts, in a field of work or study.	a range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	Desired mathematical skill, understanding of social, political and some skill of collecting and organising information, communication.	Responsibility for own work and learning and some responsibility for other's works and learning

6. LEARNING OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

6.1 GENERIC LEARNING OUTCOME

1. Apply safe working practices.
2. Comply with environment regulation and housekeeping.
3. Interpret & use company and medical communication.
4. Understand and apply the concept in productivity, quality tools, and labour welfare legislation in day to day work to improve productivity & quality.
5. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.
6. Explain personal finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.
7. Utilize basic computer applications and internet to take benefit of IT developments in the industry.

6.2 SPECIFIC LEARNING OUTCOME

First Year

8. Identify the basic safety of occupational health process and differentiate between the various responsibilities of the dental team in providing dental treatment.
9. Weigh various metals and alloys used in dental laboratory and also measure temperature and monitor its effects in dental laboratory.
10. Establishes relevance of melting point of different alloys used in dental laboratories.
11. Apply accurate voltage system required to operate various machines with electrical safety.
12. Select various alloys as per requirement for fabrication of dental prosthesis.
13. Manipulate and use gypsum products efficiently and dental cement effectively.
14. Manipulates and uses dental waxes and impression materials and uses dental based materials effectively.
15. Make diagnostic and master casts, special trays and occlusal runs and articulates casts.
16. Perform teeth setting.
17. Plan and process the denture and also repair broken denture and relines the denture.

18. Identify and select wires and fabricates retentive components of orthodontic appliances and make retractive components of orthodontic appliances.
19. Make active components of orthodontic appliances and prosthesis orthodontic appliances.
20. Carve various maxillary anterior teeth, mandibular anterior teeth, maxillary premolar, mandibular premolar, maxillary molars and mandibular molars.
21. Duplication of casts.
22. Identify and apply various concepts of occlusion in all dental casts
23. Identify partial denture classification, construct immediate dentures and construct removable partial dentures and also survey the removable partial denture.
24. Prepare appropriate retention features in removable partial dentures.
25. Identify the fixed components of orthodontic appliances and fabricate oral screen, activator and weld appliances.

Second Year

26. Fabricate temporary acrylic jacket crowns.
27. Prepare various cast, die for fixed partial denture, full metal crown and full metal bridges.
28. Familiarize with equipment used in fixed prosthodontics and mock up of anterior crowns.
29. Fabricate copings and prepare die.
30. Fabricate porcelain fused to metal crown.

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7. LEARNING OUTCOME WITH ASSESSMENT CRITERIA

GENERIC LEARNING OUTCOME	
LEARNING OUTCOME	ASSESSMENT CRITERIA
1. Apply safe working practices	1.1 Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to site policy.
	1.2 Recognize and report all unsafe situations according to site policy.
	1.3 Identify and take necessary precautions on fire and safety hazards and report according to site policy and procedures.
	1.4 Identify, handle and store / dispose off dangerous goods and substances according to site policy and procedures following safety regulations and requirements.
	1.5 Identify and observe site policies and procedures in regard to illness or accident.
	1.6 Identify safety alarms accurately.
	1.7 Report supervisor/ Competent of authority in the event of accident or sickness of any staff and record accident details correctly according to site accident/injury procedures.
	1.8 Identify and observe site evacuation procedures according to site policy.
	1.9 Identify Personal Protective Equipment (PPE) and use the same as per related working environment.
	1.10 Identify basic first aid and use them under different circumstances.
	1.11 Identify different fire extinguisher and use the same as per requirement.
2. Comply environment regulation and housekeeping	2.1 Identify environmental pollution & contribute to the avoidance of instances of environmental pollution.
	2.2 Deploy environmental protection legislation & regulations
	2.3 Take opportunities to use energy and materials in an environmentally friendly manner
	2.4 Avoid waste and dispose waste as per procedure
	2.5 Recognize different components of 5S and apply the same in the working environment.
3. Interpret & use company and technical	3.1 Obtain sources of information and recognize information.
	3.2 Use and draw up technical drawings and documents.
	3.3 Use documents and technical regulations and occupationally related provisions.

communication	3.4	Conduct appropriate and target oriented discussions with higher authority and within the team.
	3.5	Present facts and circumstances, possible solutions & use English special terminology.
	3.6	Resolve disputes within the team
	3.7	Conduct written communication.
4. Understand and apply the concept in productivity, quality tools, and labour welfare legislation in day to day work to improve productivity & quality.	4.1	Explain the concept of productivity and quality tools and apply during execution of job.
	4.2	Explain basic concept of labour welfare legislation, adhere to responsibilities and remain sensitive towards such laws.
	4.3	Knows benefits guaranteed under various acts.
5. Explain energy conservation, global warming and pollution and contribute in day to day work by optimally using available resources.	5.1	Explain the concept of energy conservation, global warming, pollution and utilize the available resources optimally & remain sensitive to avoid environment pollution.
	5.2	Explain standard procedure for disposal of waste.
6. Explain personnel finance, entrepreneurship and manage/organize related task in day to day work for personal & societal growth.	6.1	Explain personnel finance and entrepreneurship.
	6.2	Explain role of various schemes and institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the policies/ programmes, procedure & the available scheme.
	6.3	Prepare a report to become an entrepreneur for submission to financial institutions.
7. Utilize basic computer applications and internet to take benefit of IT developments in the industry.	7.1	Explain the basic hardware of personal computer.
	7.2	Use common application software viz., word, excel, power point etc., in day to day work.
	7.3	Awareness about useful internet websites, search relevant information pertaining to the assigned tasks.

SPECIFIC LEARNING OUTCOME	
LEARNING OUTCOME	ASSESSMENT CRITERIA
FIRST YEAR	
8. Identify the basic safety of occupational health process and differentiate between the various responsibilities of the dental team in providing dental treatment.	8.1 Practice individual responsibility in relation to maintaining workplace health safety and security requirements.
	8.2 Comply with health, safety and security procedures for the work place.
	8.3 Report any identify breaches in health, safety and security procedures to the designated persons.
	8.4 Identify potential hazards at work place.
	8.5 Complete any health and safety records accurately.
	8.6 Maintain personal hygiene and contribute effectively and actively to the health check ecosystem.
	8.7 Identify different team members working in a dental set up.
	8.8 Establish appropriate communication with the different persons designated to perform different tasks in a dental set up.
	8.9 Seek supervision for the work to be performed from suitable and designated professional of the dental team.
	8.10 Maintain competence within the role and field of practice.
9. Weigh various metals and alloys used in dental laboratory and also measure temperature and monitor its effects in dental laboratory.	9.1 Identify appropriate metal and alloys used in dental laboratories.
	9.2 Prepare and calibrate equipment for weighting.
	9.3 Properly measures desired amount of metal or alloy required to make or prosthesis.
	9.4 Avoid wastage of metal and alloys.
	9.5 Records the weighed alloy legibly and correctly.
	9.6 Reads temperature efficiently and records it legibly in the book.
	9.7 Understands the effects of change in temperature in dental laboratory towards the processing of prosthesis.
	9.8 Identifies temperature of environment and modifies the techniques as per requirement.
10. Establishes relevance of melting points of different alloys used in dental laboratory.	10.1 Knows the significance of melting point of alloys which are used in dental laboratory.
	10.2 Chooses the alloy used for casting various prosthesis in dental laboratory.
	10.3 Matches the coefficient of thermal expansion of alloys with the ceramic system.

11. Apply accurate voltage system required to operate various machines with electrical safety.	11.1	Knows the power consumption of every equipment.
	11.2	Proficiently reads the power output to the machines.
	11.3	Recognize appropriate voltage stabilizers installed with the equipment.
	11.4	Switch off the machines during interrupted power supplies.
	11.5	Reports the power setbacks to the concerned authority.
	11.6	Knows about electrical hazards which can occur in a dental laboratory.
	11.7	Safely operates all electrical equipments.
	11.8	Can manage electrical fires or short circuits.
	11.9	Can administer first aid for electrical burns and shock
12. Selects various alloys as per requirement for fabrication of dental prosthesis.	12.1	Identifies different alloy systems used in dentistry.
	12.2	Understand physical and mechanical properties of various alloy used in dentistry.
	12.3	Selects the appropriate alloy for a specific prosthesis to be fabricated.
	12.4	Can read and apply specific manipulating instruction supplied along with the alloy from the manufactures.
13. Manipulate and use gypsum products efficiently and dental cement effectively.	13.1	Identifies various forms of gypsum products used in dentistry.
	13.2	Follows instructions for manipulation for gypsum products.
	13.3	Selects appropriate gypsum product to be used for a specific purpose in dental laboratory.
	13.4	Applies mixing ratio of powder and liquid, mixing time, working time and setting time appropriately.
	13.5	Alters the properties of gypsum products by adding accelerators and retarders.
	13.6	Can identify dental cements used in dentistry.
	13.7	Arranges all materials to be used while mixing.
	13.8	Knows about the properties of dental cements.
	13.9	Knows the application of individuals cement.
	13.10	Manipulates the cements according to manufacturer's instructions.
	13.11	Loads the material efficiently and carefully for transfer.
14. Manipulates and uses dental waxes and impression materials and uses dental based materials effectively.	14.1	Identifies various types of waxes used in dental laboratory.
	14.2	Knows the properties of dental waxes used in dentistry.
	14.3	Uses appropriate armamentarium used to manipulate waxes.
	14.4	Manipulates the waxes efficiently.
	14.5	Maintains uniform heating of waxes.
	14.6	Stores the work done with wax at appropriate temperature.
	14.7	Identifies the impression materials used in dentistry.

	14.8	Arranges appropriate armamentarium used to manipulate impression materials.
	14.9	Knows the properties of dental impression materials.
	14.10	Effectively loads the impression materials.
	14.11	Handle impressions carefully to avoid distortion.
	14.12	Disinfects impressions carefully.
	14.13	Stores impressions as recommended.
	14.14	Knows the use of denture base materials.
	14.15	Knows the properties of denture base materials.
	14.16	Read manufacturer's instructions carefully.
	14.17	Manipulates the denture base materials as per recommended instructions to avoid bubbles.
	14.18	Stores the denture base materials at appropriate temperatures.
	14.19	Carefully avoids contamination of denture base materials while manipulating.
15. Make diagnostic and master casts, special trays and occlusal runs and articulates casts.	15.1	Disinfects the impression while observing not to distort the impression thoroughly understands all the instruction provided by dentistry.
	15.2	Identify the materials and equipment required for preparing the cast.
	15.3	Prepare equipment and materials required to fabricate cast.
	15.4	Prepare master cast using approved die stone free of bubble void or damage.
	15.5	Produce opposing cast using approved base foree with approved stone, free of bubble, void or damage.
	15.6	Trims the cast to produce finished cast
	15.7	Examines the cast carefully to notice any defect in the cast.
	15.8	Knows the purpose of special trays.
	15.9	Assembles all equipment and armamentarium used to make special tray.
	15.10	Applies separating medium properly on cast.
	15.11	Adapts spacer on the cast efficiently.
	15.12	Uses raw material if indicioucly avoiding wastage.
	15.13	Fabricate special tray on the cast both upper and lower.
	15.14	Knows anatomical landmarks of the cast both maxillary and mandibular.
	15.15	Terms and finishes the specials tray smoothly.
	15.16	Avoid incorporation of any defects while fabricating special tray.
	15.17	Knows the significance of making occlusal rims.
	15.18	To familiar with the concept of jaw relation.
	15.19	Knows the dimensions of maxillary and mandibular rims.

	15.20 Articulates the casts with the rims on the desired articulator.
	15.21 Can check the articulator accuracy before mounting the casts.
	15.22 Follows planes of occlusion while articulating the casts.
16. Perform teeth setting.	16.1 Selects teeth according to the requirements of the dentist.
	16.2 Seeks communication with the dentist to confirm the teeth selected.
	16.3 Knows the principles of anterior teeth setting.
	16.4 Knows the principles of posterior teeth setting.
	16.5 Knows the concepts of occlusion and its various types.
	16.6 Does teeth setting on the occlusal rims and incorporates functional principles of teeth setting.
	16.7 To able to produce gum patterns in wax.
	16.8 Produces a neat finish in teeth setting and wax up.
17. Plan and process the denture and also repair broken denture and reline the denture.	17. 1 Carefully selects the appropriate size of flasks for the denture to be processed.
	17. 2 Assembles all equipment and raw material required for denture processing.
	17. 3 Flasks the denture carefully in flasks
	17. 4 Applies separating medium carefully
	17. 5 Dewaxes the denture maintaining intact position of the teeth in the flask.
	17. 6 Mixes heat cure powder and liquid in appropriate ratio.
	17. 7 Packs heat cure dough into the flask.
	17. 8 Removes all flash while packing.
	17. 9 Acrylizes the denture at the desired temperature and at the chosen cycle.
	17. 10 Carefully de-flasks denture after bench working.
	17. 11 Returns the dentures from the flask efficiently.
	17. 12 Trims the denture as desired to produced finished surface.
	17. 13 Polishes the denture to make a polished denture fine of all defects.
	17. 14 Can assess whether the broken denture can be repaired or not.
	17. 15 Assembles and seats all parts of broken denture on the cast.
	17. 16 Informs the dentist about the success probabilities to repair
	17. 17 Carries out procedure of repair the denture as desired.
	17. 18 Carefully selects the raw material required to repair the denture as to closely match the material with the previous material used.
	17. 19 Produces a finished and polished repaired denture.
	17. 20 Knows the concept of relining of denture.
	17. 21 Carefully seats denture to be relined on new cast.

18. Identify and select wires and fabricates retentive components of orthodontic appliances and make retractive components of orthodontic appliances.	18. 1	Can select the appropriate gauge of wire for making desired components of clasp.
	18. 2	Can make pin bead clasp.
	18. 3	Can adapt C clasp.
	18. 4	Can make Adam's clasp.
	18. 5	Can hold the armamentarium properly
	18. 6	Can seat the components on the cast
	18. 7	Can differentiate between retentive and retractive components of appliances.
	18. 8	Understands the concept of retractive components and can activate their working.
	18. 9	Can make labial bows of both long and short types.
	18. 10	Can adapt lateral bows well on the surface of the cast.
	18. 11	Can use appropriate wire for their fabrication.
19. Make active components of orthodontic appliances and prosthesis orthodontic appliances.	19.1	Knows the concept of active components and can activate their working.
	19.2	Can identify wires and use them for their fabrication.
	19.3	Can make all types of springs.
	19.4	Can adapt all types of springs on the surface of the cast.
	19.5	Fabricates all the components of the desired appliances.
	19.6	Assembles all the components of the appliance on the surface of the cast.
	19.7	Fabricates simple retention plate (Hawley's retention appliances).
	19.8	Fabricates tongue thrusting appliances.
	19.9	Fabricates expansion screw appliances.
	19.10	Acrylics the appliance free of defects.
	19.11	Finishes and polishes the appliances.
20. Carve various maxillary anterior teeth, mandibular anterior teeth, maxillary premolar, mandibular premolar, maxillary molars and mandibular molars.	20.1	Knows the placement of maxillary anterior teeth in the mouth.
	20.2	Knows the detailed anatomy of central incisor, lateral incisor and canine.
	20.3	Knows the dimensions of central incisor, lateral incisor and canine.
	20.4	Carves maxillary central incisor on wax block and reproduce all anatomical landmarks on the wax block.
	20.5	Carves maxillary lateral incisor on wax block and reproduces all anatomical landmarks on the wax block.
	20.6	Carves canine on the block and reproduces all anatomical landmarks on the wax block.
	20.7	Knows the placement of all mandibular anterior teeth

	20.8	Knows the detailed anatomy of all mandibular anterior teeth.
	20.9	Knows the dimensions of all mandibular anterior teeth.
	20.10	Carves mandibular central mandibular and reproduce all anatomical landmarks on the wax block.
	20.11	Carves mandibular canine and reproduces all anatomical landmarks on the wax blocks.
	20.12	Knows the placement of maxillary premolar in the mouth.
	20.13	Knows the detailed anatomy of maxillary first and second premolar.
	20.14	Knows the dimension of maxillary premolar.
	20.15	Carves maxillary first premolar and reproduces all anatomical landmarks on the wax block.
	20.16	Carves maxillary second premolar and reproduces all anatomical landmarks on the wax block.
	20.17	Knows the placement of mandibular premolars in the mouth.
	20.18	Knows the detailed anatomy of mandibular premolar first and second.
	20.19	Knows the dimensions of mandibular premolars.
	20.20	Carves mandibular first premolar and reproduces all anatomical landmarks on the wax block.
	20.21	Carves mandibular second premolar and reproduces all anatomical landmarks on the wax block.
	20.22	Knows the placement of all maxillary molars in the mouth.
	20.23	Knows the detailed anatomy of all maxillary molars.
	20.24	Carves maxillary first molar and reproduces all anatomical details on the wax block.
	20.25	Carves maxillary second molar and reproduces all anatomical details on the wax block.
	20.26	Knows the placement of all maxillary molars in the mouth.
	20.27	Knows the detailed anatomy of all mandibular molars.
	20.28	Knows the dimensions of all mandibular molars.
	20.29	Carves mandibular first molar and reproduces all anatomical details on the wax block.
	20.30	Carves mandibular second molar and reproduces all anatomical details on the wax block.
21. Duplication of casts.	21.1	Knowledge of material agar-agar.
	21.2	Assembles the equipments to be used for duplication of cast.
	21.3	Examines the master cast to be duplicated.
	21.4	Trims and finishes the cast.
22. Identify and apply various concepts of occlusion in all dental	22.1	Understands the term occlusion.
	22.2	Knows the classification of occlusion can classify casts based on occlusion.

casts.	22.3	Understand various curves of occlusion.
	22.4	Can reproduce desired occlusion patterns in the casts.
23. Identify partial denture classification, construct immediate dentures and construct removable partial dentures and also survey the removable partial denture.	23. 1	Knows the difference between partial dentures and complete dentistry.
	23. 2	Can classify partial denture.
	23. 3	Use Kennedy's classification system.
	23. 4	Is well versed with applegate's rules of application to kennedy system of classification.
	23. 5	Knows the concept and indications of immediate dentures.
	23. 6	Knows the complete process of immediate dentures on partial dentures.
	23. 7	Assembles all armamentarium required to make immediate dentures.
	23. 8	Fabricates immediate denture.
	23. 9	Finishes and polishes immediate denture.
	23. 10	Knows the principles involved in the fabrication of partial denture.
	23. 11	Can design partial denture to be fabricated to meet aesthetic and functional needs.
	23. 12	Examines the master cast on which removable partial denture would be fabricated.
	23. 13	Duplicates removable partial denture following all metal steps sequentially.
	23. 14	Finishes and polishes fabricated removal partial denture.
	23. 15	Can identify surveyor and all its parts.
	23. 16	Surveys the master cast with all the lines and wakes there properly on the media cast.
24. Prepare appropriate retention features in removable partial dentures.	24.1	Knows about the structure features and components to be incorporated in the removable partial denture.
	24.2	Can design sleek and appropriate relative features as per required cut of the prosthesis.
	24.3	Can incorporate these features in the cast.
25. Identify the fixed components of orthodontic appliances and fabricate oral screen, activator and weld appliances.	25.1	Knows about removable and fixed orthodontics and difference between them.
	25.2	Can identify the fixed components of fixed orthodontics like bands, arches, brackets etc.
	25.3	Knows the construction of bands, tubes arches and brackets etc.
	25.4	Knows about myofunctional appliances.
	25.5	Assembles armamentarium necessary for making oral screen and activator.

	25.6	Examines casts and occludes them in accurate position for both the arches.
	25.7	Adapts wire bending required.
	25.8	Acrylize the prosthesis.
	25.9	Finishes and polishes the prosthesis.
	25.10	Understands welding and spot welding and the difference between them.
	25.11	Assembles the equipments and raw material required to do welding.
	25.12	Assembles the parts to be welded.
	25.13	Performs welding.
	25.14	Finishes and polishes the appliances.
SECOND YEAR		
26. Fabricate temporary acrylic jacket crowns.	26.1	Is familiar with the term temporary a jacket crowns.
	26.2	Examines the cast for accuracy for making jacket crowns
	26.3	Waxes up the tooth with modelling wax to full anatomic contour.
	26.4	Flasks the crown appropriately dewaxes the crown.
	26.5	Selects appropriate shade for packing.
	26.6	Acrylizes the crown.
	26.7	Finishes the crown.
27. Prepare various cast, die for fixed partial denture, full metal crown and full metal bridges.	27. 1	Pours the cast in die stone.
	27. 2	Trims the cast and marks the pinning points on the cast.
	27. 3	Pin the cast.
	27. 4	Die cuts the cast.
	27. 5	Ditches the die.
	27. 6	Applies die hardener spacer and separator.
	27. 7	Knows the complete process of making metal crowns.
	27. 8	Examines the cast for accuracy.
	27. 9	Waxes up the crown to full anatomic crown.
	27. 10	Sprues the crown at the desired surface.
	27. 11	Invests the crown in the investing ring.
	27. 12	Selects the appropriate investment material.
	27. 13	Casts the units with appropriate alloy.
	27. 14	Divests the investing ring.
	27. 15	Trims and finishes the crowns polish the crown.
	27. 16	Knows the difference between full unit metal and three Unit Bridge.
	27. 17	Examines the cast for accuracy.
	27. 18	Waxes up the cast for three Unit Bridge to full anatomic contour.
	27. 19	Designs suitable pontics.

	27. 20	Selects appropriate connector design.
	27. 21	Sprues the bridge at the desired surface.
	27. 22	Invests the bridge in the investing ring.
	27. 23	Selects the appropriate investment material.
	27. 24	Casts the units with appropriate alloy.
	27. 25	Divests the investing ring.
	27. 26	Trims and finishes the bridge.
	27. 27	Polishes the bridge.
28. Familiarize with equipment used in fixed prosthodontics and mock up of anterior crowns.	28.1	Identifies the equipment utilized in fixed prosthodontics.
	28.2	Handles the equipment according to manufacturer instructions.
	28.3	Operates the equipment smoothly.
	28.4	Records the breakdowns of the apparatus and informs the authorized authorities.
	28.5	Understands the term mock up and its relevance.
	28.6	Knows the anatomy of the tooth/ teeth to be mocked up.
	28.7	Analyzes the cast for accurateness and free of defects before starting mock up.
	28.8	Assembles all equipment, tools and raw materials for mock up.
	28.9	Performs mock up of desired teeth.
29. Fabricate copings and prepare die.	29.1	Understands the term metal substructure or copings.
	29.2	Knows where copings are desired.
	29.3	Designs the copings according to the requirement of the cast.
	29.4	Check the cast of accuracy assembles desired armamentarium.
	29.5	Manipulates blue inlay wax with the urgent techniques and adapts it well to make wax copings.
	29.6	Makes proper collar in wax and seals the cervical outline efficiently.
	29.7	Spaces the copings at the prescribed area.
	29.8	Invests the copings in the investing ring of right size chooses appropriate investment material.
	29.9	Casts the copings with suitable alloy.
	29.10	Trims and finishes the copings by sequentially using the desired Equipments.
	29.11	Knows the purpose of cutting the cast into die.
	29.12	Assembles armamentarium required for die cutting the die.
	29.13	Trims the cast, indexes the cast.
	29.14	Pins the cast.
	29.15	Cuts the die, ditches the die.

	29.16 Seals the defects of the cast if any after communicating with the dentist.
	29.17 Applies die hardener, spacer and separator in the layers.
30. Fabricate porcelain fused to metal crown.	30.1 Knows the types of fixed crowns that are made.
	30.2 Knows the steps and process to fabricate different types of crowns.
	30.3 Selects appropriate ceramic systems & shades, oxidises the copings.
	30.4 Applies opaque and wash opaque smoothly and fires at right temperature in the porcelain furnace.
	30.5 Applies dentin on the opaque layer fired.
	30.6 Holds the crown properly while firing
	30.7 Assesses if 2nd denture build up and firing is required
	30.8 Applies enamel and finishes the crown with ceramic finishing burs.
	30.9 Glazes the crown.

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SYLLABUS–DENTAL LABORATORY EQUIPMENT TECHNICIAN			
FIRST YEAR			
Week No.	Reference Learning outcome	Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)
1	<ul style="list-style-type: none"> Identify the basic safety of occupational health process and differentiate between the various responsibilities of the dental team in providing dental treatment. 	<ol style="list-style-type: none"> Make a flowchart of various professionals working in dental hospitals, clinics and laboratories indicating their hierarchy. (7 Hrs.) Tabulate various branches of Dentistry indicating places where they are commonly found working and the kind of work they do. (7 Hrs.) Draw a neat sketch of Department in your institute and label various sections. (5 Hrs.) Tabulate various departments and paste the photographs of various machines and equipments used in different sections of laboratories and label them. Write safety precautions while handling each equipment below it. (6 Hrs.) Identify and demonstrate use of various safety precaution devices. Paste their photographs in your workbook. (5 Hrs.) 	<ul style="list-style-type: none"> Introduction to various courses/branches of Dentistry. Role and responsibilities of Dental Technicians. Familiarisation of the institute. Safety precautions to be observed during handling of chemicals, laboratory equipment and machines.
2	<ul style="list-style-type: none"> Weigh various metals and alloys used in dental laboratory and also 	<ol style="list-style-type: none"> Familiarization and demonstration of the use of weighing machines and weights. Practice on 	Study of density, specific gravity, properties of matter, cohesion, viscosity, elasticity, diffusion and osmosis.

	measure temperature and monitor its effects in dental laboratory.	<p>weighing correct to milligram. (12Hrs.)</p> <p>7. Prepare a chart of various scales and their conversions used for measuring temperature. (6 Hrs.)</p> <p>8. Identify and paste photographs of various temperature measuring devices. (12 Hrs.)</p>	Study of Temperature, temperature measurements, temperature measuring instruments & thermostats.
3	<ul style="list-style-type: none"> Establish relevance of melting points of different alloys used in dental laboratory. 	<p>9. Tabulate melting point of various alloys used in dental laboratories. (12 Hrs.)</p> <p>10. Simple practicals on heat transfer and conduction & convection. (18 Hrs.)</p>	<p>Boyle's Law and Charles Law, unit of heat, latent heat, melting point, expansion of solids, liquids and gases by heat.</p> <p>Study of Gas pressure and properties of vapours, conduction, convection and radiation.</p>
4	<ul style="list-style-type: none"> Apply accurate voltage system required to operate various machines with electrical safety. 	<p>11. Practice on measuring voltage & current (Both AC & DC). (24 Hrs.)</p> <p>12. Demonstrate and Prepare chart on electrical safety reflecting important instructions (6 Hrs.)</p>	<p>Study of Ohm's Law, Electrical Measurement and measuring instruments i.e. Voltmeter, Ammeters etc.</p> <p>Electrical safety, Low voltage systems, Necessity of Earthing.</p>
5	<ul style="list-style-type: none"> Select various alloys as per requirement for fabrication of dental prosthesis. 	<p>13. Tabulate physical properties of elements, mixtures and compounds. (12 Hrs.)</p> <p>14. Draw a well labelled diagram of electrolysis theory. (12 Hrs.)</p> <p>15. Tabulate various physical properties of metals used in dentistry. (6 Hrs.)</p>	<p>Study of work, power and energy, power, friction, momentum, centre of gravity, types of lever, stress, strain, shearing strain, torsion, mechanical properties of metals.</p> <p>Physical and chemical changes of elements, mixtures and compounds. Oxides, burning, rusting. Electrolysis, ionic theory of solution, electro potential, Electroplating General characteristics of common metal used in the dental work and their compounds.</p>

6-7	<ul style="list-style-type: none"> Manipulate and use gypsum products efficiently and dental cement effectively. 	16. Identify various gypsum products. (8 Hrs.) 17. Manipulate various gypsum products. (14 Hrs.) 18. Tabulate various gypsum products, their mixing time, working and setting time. (8 Hrs.) 19. Manipulate dental cements. (30 Hrs.)	Study of dental materials- Gypsum products. Study of dental material:-Dental cements
8	<ul style="list-style-type: none"> Manipulates and uses dental waxes and impression materials and uses dental based materials effectively. 	20. Identify various dental waxes. (6 Hrs.) 21. Manipulate sticky, modeling and blue sulay wax. (12 Hrs.) 22. Manipulate impression. (6 Hrs.) 23. Manipulation of alginate. (6 Hrs.) 24. Manipulate usage of self cure acrylic resins. (12 Hrs.) 25. Manipulate and use heat cure acrylic resins. (12 Hrs.) 26. Tabulate differences between self cure and heat cure acrylic resins. (6 Hrs.)	Study of dental waxes. Study of impression materials. Study of denture base materials.
10 - 13	<ul style="list-style-type: none"> Make diagnostic and master casts, special trays and occlusal runs and articulates casts. 	27. Fabricate diagnostic and master casts. (12 Hrs.) 28. Practice Boxing of impression. (12 Hrs.) 29. Practice Trimming of casts. (6 Hrs.) 30. Make special trays with spacers. (30 Hrs.) 31. Prepare Base Adapting plates. (12 Hrs.) 32. Make upper occlusal rims. (18 Hrs.) 33. Make lower occlusal rims. (18 Hrs.) Articulate upper and lower casts. (12 Hrs.)	Explain fabrication and preservation of casts, Boxing in and trimming of casts. Explain denture bases like base plates. Theory of occlusal rims and articulation.

14-15	<ul style="list-style-type: none"> Perform teeth setting. 	34. Prepare and set upper teeth. (24 Hrs.) 35. Prepare and set lower teeth. (24 Hrs.) 36. Perform Wax up for try in. (12 Hrs.)	Selection of teeth and principles of teeth setting.
16-18	<ul style="list-style-type: none"> Plan and process the denture and also repair broken denture and reline the denture. 	37. Perform flasking of denture. (6Hrs.) 38. Carry out Dewaxing of denture. (6Hrs.) 39. Perform Acrylization of denture. (12 Hrs.) 40. Perform Deflasking of denture. (6 Hrs.) 41. Carry out trimming of denture. (12 Hrs.) 42. Carry out finishing of denture (6 Hrs.) 43. Perform polishing of denture. (12 Hrs.) 44. Repair the broken denture. (18 Hrs.) 45. Perform the relining of the denture. (12 Hrs.)	Explain and discuss Acrylization of denture. Explain and discuss repair & relining of denture.
19-20	<ul style="list-style-type: none"> Identify and select wires and fabricates retentive components of orthodontic appliances and make retractive components of orthodontic appliances. 	46. Carry out straightening of wire. (6 Hrs.) 47. Fabricate clasps. (24 Hrs.) 48. Fabricate labial bows short and long. (30 Hrs.)	Explain orthodontics, Principles of wire bending and retention components. Explain Retraction components.
21-22	<ul style="list-style-type: none"> Make active components of orthodontic appliances and prosthesis orthodontic appliances. 	49. Fabricate various springs. (30 Hrs.) 50. Fabricate sample retention appliance. (6 Hrs.) 51. Fabricate retraction appliance. (6 Hrs.) 52. Fabricate tongue thrusting appliance. (6 Hrs.) 53. Fabricate expansion screw appliance. (6 Hrs.) 54. Perform Finishing and	Explain various springs –active components. Explain Acrylization of various orthodontic appliances.

		polishing of appliance. (6 Hrs.)	
23-24	Project work / Hospital visit Broad Areas: <ol style="list-style-type: none"> Make a flow chart of various professionals working in dental hospitals, clinics and laboratories indicating their hierarchy. Prepare a chart of various scales and their conversions used for measuring temperature. Identify and paste photographs of various temperature measuring devices. Tabulate melting point of various alloys used in dental laboratories. Repair broken denture and reline the denture. Practice on measuring voltage and current (both A/C & D/C) with operate various machines. 		
25-26	Revision		
27-38	<ul style="list-style-type: none"> Carve various maxillary anterior teeth, mandibular anterior teeth, maxillary premolar, mandibular premolar, maxillary molars and mandibular molars. 	55. Carving of teeth in wax maxillary anterior teeth. (60 Hrs.) 56. Carve mandibular anterior teeth. (60 Hrs.) 57. Carve maxillary premolars. (60 Hrs.) 58. Carve mandibular premolars. (60 Hrs.) 59. Carve maxillary molars. (60Hrs.) 60. Carving of mandibular molars. (60 Hrs.)	Human dentition. Nomenclature of teeth. Tooth morphology basic terminology. Tooth morphology maxillary anterior teeth. Morphology lower anterior teeth. Morphology Maxillary premolars Muscles of mastication. Morphology Mandibular Premolars Morphology Maxillary molars Muscles of deglutination. Muscles of facial expression. <ul style="list-style-type: none"> Morphology mandibular molars Phonetics TMJ
39	<ul style="list-style-type: none"> Duplication of casts. 	61. Cast duplication and	Explain Cast duplication

		trimming and finishing of casts. (30 Hrs.)	material.
40	<ul style="list-style-type: none"> Identify and apply various concepts of occlusion in all dental casts. 	62. Demonstrate various concepts of occlusion. (12 Hrs.) 63. Demonstrate curve of monsoon and curve of spee. (12 Hrs.) 64. Make table on concept of Balanced Occlusion. (6 Hrs.)	Explain on Occlusion Theory.
41-44	<ul style="list-style-type: none"> Identify partial denture classification, construct immediate dentures and construct removable partial dentures and also survey the removable partial denture. 	65. Practice by drawing and labelling all forms of Kennedy's classification. (6Hrs.) 66. Construct immediate Denture. (32 Hrs.) 67. Fabricate Partial Denture. (52 Hrs.) 68. Practice by drawing and labelling various parts of surveyor. (5 Hrs.) 69. Survey the Cast. (25 Hrs.)	Kennedy's classification of Partial Denture. Immediate Denture. Principles of Partial Denture Design. Explain Surveyor and principles of Surveying.
45	<ul style="list-style-type: none"> Prepare appropriate retention features in Removable partial dentures. 	70. Prepare and incorporate clasps in Removable Partial Denture. (30 Hrs.)	Preparation of Clasps for Removable Partial Denture.
46-48	<ul style="list-style-type: none"> Identify the fixed components of orthodontic appliances and fabricate oral screen, activator and weld appliances. 	71. Demonstrate construction of Bands, Tubes and Arches lingual Bars. (30 Hrs.) 72. Construct Activator. (18 Hrs.) 73. Construct Oral Screen. (12 Hrs.) 74. Practice on welding and spot welding. (30 Hrs.)	Introduction to fixed orthodontic Bands, Arches and Tubes. Oral Screen and Activator Orthodontic appliances. Welding and Spot welding. Tarnish and Corrosion.
49-50	Project work / Hospital visit Broad Areas: <ol style="list-style-type: none"> Carving of teeth in wax maxillary anterior teeth. Practice by drawing and labelling various parts of surveyor. Fabricate partial denture. Prepare and incorporate clasps in Removable Partial Denture. 		

	e) Practice on welding and spot welding. f) Make table on concept of Balanced Occlusion.
51	Revision
52	Examination

Note: -

1. Some of the sample project works (indicative only) are given at the mid and end of each year.
2. Instructor may design their own projects and also inputs from local industry may be taken for designing such new projects.
3. The project should broadly cover maximum skills in the particular trade and must involve some problem solving skill. Emphasis should be on Teamwork: Knowing the power of synergy/ collaboration, work to be assigned in a group (Group of at least 4 trainees). The group should demonstrate Planning, Execution, Contribution and Application of Learning. They need to submit a Project report after completion.
4. If the instructor feels that for execution of specific project more time is required then he may plan accordingly in appropriate time during the execution of normal trade practical.

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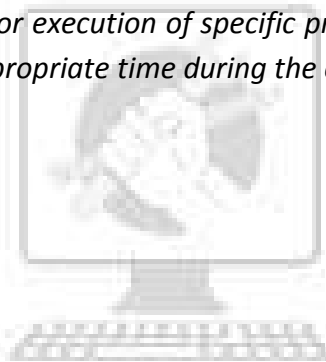
SYLLABUS – DENTAL LABORATORY EQUIPMENT TECHNICIAN			
SECOND YEAR			
Week No.	Reference Learning outcome	Professional Skills (Trade Practical) With indicative hours	Professional Knowledge (Trade Theory)
53-55	<ul style="list-style-type: none"> Fabricate temporary acrylic Jacket crowns. 	75. Fabricate temporary Acrylic Crown Anterior. (30 Hrs.) 76. Fabricate temporary Acrylic Crown Posterior. (30 Hrs.) 77. Fabricate temporary Acrylic 3 Unit Bridges. (30 Hrs.)	Temporary Acrylic Crowns.
56-74	<ul style="list-style-type: none"> Prepare various cast, die for fixed partial denture, full metal crown and full metal bridges. 	78. Manipulate Blue Inlay Wax. (18 Hrs.) 79. Perform Cast Pouring and Trimming for Fixed Partial Denture. (30 Hrs.) 80. Prepare Die for Fixed Partial Denture. (30 Hrs.) 81. Application of Spacer and Hardener. (12 Hrs.) 82. Plan and execute full metal wax up of Maxillary Premolars. (60 Hrs.) 83. Plan and execute full metal wax up of mandibular premolar. (60 Hrs.) 84. Plan and execute full metal wax up of molars (110 Hrs.) 85. Carry out spruing full metal restorations (13 Hrs.) 86. Carry out Investing of full metal restorations. (12 Hrs.) 87. Prepare and cast full metal restorations. (20 Hrs.)	Blue Inlay wax. Casts preparation for fixed partial Dentures. Die and die preparation. Spacer and Hardener. Wax up Full Metal Crowns. Spruing, Investing Full Metal restorations. Introduction to casting machine and principles of casting.

		<p>88. Perform divesting full of metal restorations. (25 Hrs.)</p> <p>89. Carryout trimming of full metal restorations. (15 Hrs.)</p> <p>90. Carryout Polishing full metal restorations. (15 Hrs.)</p> <p>91. Plan and Prepare cast and die for bridge. (30 Hrs.)</p> <p>92. Carry out Wax up full Metal three Unit Bridge. (60 Hrs.)</p> <p>93. Perform Spruing, Investing, Casting and Divesting Bridge. (30 Hrs.)</p> <p>94. Carry out Trimming, Finishing and Polishing of three units full Metal Restoration. (30 Hrs.)</p>	
75-76	<p>Project work / Hospital visit</p> <p>Broad Areas:</p> <ul style="list-style-type: none"> a) Fabricate temporary Acrylic Crown Anterior. b) Perform Cast Pouring and Trimming for Fixed Partial Denture. c) Prepare Die for Fixed Partial Denture. d) Prepare and cast full metal restorations. e) Plan and Prepare cast and die for bridge. f) Perform Spruing, Investing, Casting and Divesting Bridge. 		
77-78	<p style="text-align: center;">Revision</p>		
79-83	<ul style="list-style-type: none"> • Familiarize with equipment used in fixed prosthodontics and mock up of anterior crowns. 	<p>95. Operates all equipment used in fixed prosthodontics. (10 Hrs.)</p> <p>96. Handle all equipment according to manufacturer's instructions. (20Hrs..)</p> <p>97. Mock up of anterior crowns for porcelain fused to metal and metal free crowns. (90Hrs..)</p>	<p>Identification application and operation of equipment necessary in the fabrication of prosthesis</p> <p>Differences b/w fixed and removable prosthodontics</p> <p>Mock up and its importance.</p>

84-93	<ul style="list-style-type: none"> Fabricate copings and prepare die. 	98. Wax up for copings (25 Hrs.) 99. Wax up copings for ceramic facings. (25 Hrs.) 100. Spruing for copings (25 Hrs.) 101. Casting copings (30 Hrs.) 102. Devesting copings (45 Hrs.) 103. Trimming, finishing and polishing of copings.(60 Hrs.) 105. Trims the cast (20Hrs.) 106. Indexes the cast (20 Hrs.) 107. Die pinning the cast (10Hrs.) 108. Die cutting the cast (15Hrs.) 109. Die ditching (15 Hrs.) 110. Articulating the models (10Hrs.)	Metal sub-structure types properties and uses. Spruing investing finishing and polishing metal restorations. Die preparation and its relevance.
94-100	<ul style="list-style-type: none"> Fabricate porcelain fused to metal crown. 	104. Oxidizes the crown.(30 Hrs.) 105. Ceramic layering anterior crown. (40 Hrs.) 106. Ceramic layering posterior maxillary. (35 Hrs.) 107. Ceramic layering maxillary first molar. (45 Hrs.) 108. Ceramic layering mandibular molar glazing.(60Hrs.)	Ceramic as a material, shade selection, oxidation, opaque, layering dentin layers, enamel layering. Introduction to various ceramic systems ceramic systems, available in market, economic interpretation of the ceramic systems. Choosing right systems Advances in dental ceramics communicating with the dentist.
101-102	Project work / Hospital visit Broad Areas: <ol style="list-style-type: none"> Operates all equipment used in fixed prosthodontics. Handle all equipment according to manufacturer's instructions. Mock up of anterior crowns for porcelain fused to metal and metal free crowns. Trimming, finishing and polishing of copings. Ceramic layering anterior crown. Articulating the models 		
103	Revision		
104	Examination		

Note: -

1. *Some of the sample project works (indicative only) are given at the mid and end of each year.*
2. *Instructor may design their own project and also inputs from local industry may be taken for designing such new project.*
3. *The project should broadly cover maximum skills in the particular trade and must involve some problem solving skill. Emphasis should be on Teamwork: Knowing the power of synergy/ collaboration, work to be assigned in a group (Group of at least 4 trainees). The group should demonstrate Planning, Execution, Contribution and Application of Learning. They need to submit Project report.*
4. *If the instructor feels that for execution of specific project more time is required then he may plan accordingly in appropriate time during the execution of normal trade practical*



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9. SYLLABUS - CORE SKILLS

CORE SKILL – EMPLOYABILITY SKILL		
Duration: 110 Hours		
1. English Literacy		Duration : 20 Hrs. Marks : 09
Pronunciation	Accentuation (mode of pronunciation) on simple words, Diction (use of word and speech)	
Functional Grammar	Transformation of sentences, voice change, change of tense, spellings.	
Reading	Reading and understanding simple sentences about self, work and environment	
Writing	Construction of simple sentences Writing simple English	
Speaking/ Spoken English	Speaking with preparation on self, on family, on friends/ classmates, on known people, picture reading, gain confidence through role-playing and discussions on current happening job description, asking about someone's job, habitual actions. Cardinal (fundamental) numbers ordinal numbers. Taking messages, passing on messages and filling in message forms, greeting and introductions, office hospitality, resumes or curriculum vitae essential parts, letters of application reference to previous communication.	
2. IT Literacy		Duration : 20 Hrs. Marks : 09
Basics of Computer	Introduction, computer and its applications, Hardware and peripherals, Switching on-Starting and shutting down computer.	
Computer Operating System	Basics of Operating System, WINDOWS, User interface of Windows OS, Create, Copy, Move and delete Files and Folders, Use of External memory like pen drive, CD, DVD etc., Use of common applications.	
Word Processing and Worksheet	Basic operating of Word Processing, Creating, opening and closing documents, Use of shortcuts, Creating and Editing Text, Formatting the text, Insertion & creation of tables. Printing document. Basics of Excel worksheet, understanding basic commands, creating simple worksheets, understanding sample worksheets, use of simple formulas and functions, Printing of simple excel sheets.	
Computer Networking	Basic of computer Networks (using real life examples), Definitions of	

and Internet	Local Area Network (LAN), Wide Area Network (WAN), Internet, Concept of Internet (Network of Networks), Meaning of World Wide Web (WWW), Web browser, Website, Web page and Search Engines. Accessing the Internet using web browser, Downloading and printing web pages, Opening an email account and use of email. Social media sites and its implication. Information Security and antivirus tools, Do's and Don'ts in Information Security, Awareness of IT - ACT, types of cyber crimes.
3. Communication Skills	
Duration : 15 Hrs.	
Marks : 07	
Introduction to Communication Skills	Communication and its importance Principles of Effective communication Types of communication - verbal, non verbal, written, email, talking on phone. Non-verbal communication-characteristics, components-Para-language Body language Barriers to communication and dealing with barriers. Handling nervousness/ discomfort.
Listening Skills	Listening-hearing and listening, effective listening, barriers to effective listening, guidelines for effective listening. Triple- A Listening - Attitude, Attention & Adjustment. Active Listening Skills.
Motivational Training	Characteristics essential to achieving success. The power of positive attitude. Self awareness Importance of commitment Ethics and values Ways to motivate oneself. Personal goal setting and employability planning.
Facing Interviews	Manners, etiquettes, dress code for an interview. Do's & Don'ts for an interview.
Behavioral Skills	Problem solving, confidence building, attitude.
4. Entrepreneurship Skills	
Duration : 15 Hrs.	
Marks : 06	
Concept of Entrepreneurship	Entrepreneur - Entrepreneurship - Enterprises: Conceptual issue Entrepreneurship vs. management, Entrepreneurial motivation. Performance & Record, Role & Function of entrepreneurs in relation to the enterprise & relation to the economy, Source of business

	ideas, Entrepreneurial opportunities, and the process of setting up a business.
Project Preparation & Marketing Analysis	Qualities of a good Entrepreneur, SWOT and Risk Analysis. Concept & application of PLC, Sales & distribution management. Difference between small scale & large scale business, Market survey, Method of marketing, Publicity and advertisement, Marketing mix.
Institution's Support	Preparation of project. Role of various schemes and Institutes for self-employment i.e. DIC, SIDA, SISI, NSIC, SIDO, Idea for financing/ non-financing support agencies to familiarize with the Policies/Programmes & procedure & the available scheme.
Investment Procurement	Project formation, feasibility, Legal formalities i.e., Shop Act, Estimation & costing, Investment procedure - Loan procurement - Banking processes.
5. Productivity	
Duration : 10 Hrs..	
Marks : 05	
Benefits	Personal/ Workman - Incentive, Production linked Bonus, Improvement in living standard.
Affecting Factors	Skills, Working Aids, Automation, Environment, Motivation- How it improves or slows down productivity.
Comparison with Developed Countries	Comparative productivity in developed countries (viz. Germany, Japan and Australia) in selected industries e.g. Manufacturing, Steel, Mining, Construction etc. Living standards of those countries, wages.
Personal Finance Management	Banking processes, Handling ATM, KYC registration, Safe cash handling, Personal risk and insurance.
6. Occupational Safety, Health and Environment Education	
Duration : 15 Hrs.	
Marks : 06	
Safety & Health	Introduction to occupational safety and health importance of safety and health at workplace.
Occupational Hazards	Basic Hazards, Chemical Hazards, Vibroacoustic Hazards, Mechanical Hazards, Electrical Hazards, Thermal Hazards. Occupational health, Occupational hygiene, Occupational Diseases/ Disorders & its prevention.
Accident & Safety	Basic principles for protective equipment. Accident prevention techniques - control of accidents and safety measures.
First-Aid	Care of injured & sick at the workplaces, First-Aid & Transportation of

	sick person.
Basic Provisions	Idea of basic provision legislation of India. Safety, health, welfare under legislative of India.
Ecosystem	Introduction to Environment. Relationship between society and environment, Ecosystem and factors causing imbalance.
Pollution	Pollution and pollutants including liquid, gaseous, solid and hazardous waste.
Energy Conservation	Conservation of energy, re-use and recycle.
Global Warming	Global warming, climate change and Ozone layer depletion.
Ground Water	Hydrological cycle, Ground and surface water, Conservation and Harvesting of water.
Environment	Right attitude towards environment, Maintenance of in-house environment.
7. Labour Welfare Legislation	
Duration : 05 Hrs. Marks : 03	
Welfare Acts	Benefits guaranteed under various acts- Factories Act, Apprenticeship Act, Employees State Insurance Act (ESI), Payment Wages Act, Employees Provident Fund Act, The Workmen's Compensation Act.
8. Quality Tools	
Duration : 10 hrs. Marks : 05	
Quality Consciousness	Meaning of quality, Quality characteristic.
Quality Circles	Definition, Advantage of small group activity, Objectives of quality circle, Roles and function of quality circles in organization, Operation of quality circle. Approaches to starting quality circles, Steps for continuation quality circles.
Quality Management System	Idea of ISO 9000 and BIS systems and its importance in maintaining qualities.
House Keeping	Purpose of House-keeping, Practice of good housekeeping.
Quality Tools	Basic quality tools with a few examples.

LIST OF TOOLS & EQUIPMENT			
DENTAL LABORATORY EQUIPMENT TECHNICIAN			
S No.	Name of the Tools and Equipment	Specification	Quantity
TRAINEES TOOL KIT (For each additional unit trainees tool kit Sl. 1-9 is required additionally)			
1.	Works knife		*24 Nos.
2.	Works spatula		*24 Nos.
3.	Plaster knife		*24 Nos.
4.	Plaster spatula		*24 Nos.
5.	Rubber bowl		*24 Nos.
6.	Some trimming burs for Acrylic, Metal, & ceramic		*24 Nos.
7.	Flask (Different Size)		As required
8.	PKT- Set		*24 set
9.	Needle Holder		*24 Nos.
SHOP TOOLS, INSTRUMENTS – For 2 (1+1) units no additional items are required			
Lists of Tools:			
A. For Denture Section			
10.	Hanging Motor		2 Nos.
11.	Hand Piece		2 Nos.
12.	Polishing Machine		4 Nos.
13.	Cable Arm		2 Nos.
B. For Metal Section			
14.	Micro Motor Inc. Hand Piece		1 set
15.	Vacuum Mixer Cum Vibrator Mc.		1 No.
16.	Metal Finishing Cabinet		2 Nos.
C. For Wax -up Section			
17.	Electro Waxer M/c. with hand piece		1 set.
18.	Hand Wax curver		2 Nos.
19.	Exhaust Fan	heavy duty	As required
D. For Ceramic Section			
20.	Porcelain Furnace		1 No.
21.	Micro Motor with Hand Piece		2 Nos.
22.	Ultra Sonic Cleaner		1 No.
23.	Ceramic Systems		1 Box
24.	Air conditioner	1.5 Ton	1 No.

E. For casting Section			
25.	Induction casting Mc.		1 No.
26.	Sand Blasting Mc.		1 No.
27.	Muffle Furnace		1 No.
28.	Manual Casting Machine		1 No.
29.	Air compressor		1 No.
F. For Model Section			
30.	Trimmer		1 No.
31.	Finishing lathe		1 No.
32.	Heating Oven		1 No.
G. COMMON FOR ALL THE SECTIONS			
33.	Tongs		1 No.
34.	Portable weighing machine		1 No.
35.	Hammer		1 No.
36.	Plier		1 No.
37.	Cutter		1 No.
38.	Die saw		
H. Audio Visual Aid			
39.	LCD Projector		1 No.
40.	Computer with the configuration:		1 No.
41.	Model of Oral Anatomy		2 Nos.
42.	Charts related to Dentistry		As required
List of Chemicals, store and Raw Materials (As required)			
A. For Denture Section			
43.	Sand Paper		1 No.
44.	Modeling Wax		1 No.
45.	RR Powder		1 No.
46.	RR Liquid		1 No.
47.	Articulator 3 Pin		1 No.
48.	Shellac Base Plate-Upper		1 No.
49.	Shellac Base Plate-Upper		1 No.
50.	Chip Blower		1 No.
51.	Teeth Set		1 No.
52.	Flask		1 No.
53.	Clamp		1 No.
54.	Container (Vessel)		1 No.
55.	Gas Cylinder		1 No.
56.	Denture Polishing Buff-Cotton		1 No.
57.	Denture Polishing Cake		1 No.
58.	Acrylic trimming Burs		1 No.
59.	Sand Paper		1 No.

60.	Stainless Steel Wire		1 No.
61.	Heat Cure Powder		1 No.
62.	Heat Cure Liquid		1 No.
63.	Cold Mould Seal		1 No.
64.	Mckintosh sheet		1 No.
65.	Pumice Powder		1 No.
66.	SC-10		1 No.

B. For Metal Section

67.	Crucible		1 No.
68.	Graphite Crucible		1 No.
69.	Alloy Nickel Chromium		1 No.
70.	Japanese gold alloy		1 No.
71.	Cutting disc small		1 No.
72.	Cutting disc large		1 No.
73.	Conical Bur		1 No.
74.	Casbide Bur		1 No.
75.	Metal Gauze		1 No.
76.	Mask		1 No.
77.	Sanitary Bur		1 No.
78.	Sand		1 No.
79.	Polishing Cake -Metal		1 No.
80.	Silicon wheel		1 No.
81.	Rubber Pont		1 No.
82.	Buff –Metal		1 No.
83.	Mandrel		1 No.
84.	Sand Paper-Mandrel		1 No.

C. For Wax -up Section

85.	Blue Inlay wax		1 No.
86.	Margin wax		1 No.
87.	Hard wax		1 No.
88.	Mock up wax		1 No.
89.	Spacer		1 No.
90.	Hardener		1 No.
91.	Brush		1 No.
92.	Sprue		1 No.
93.	Debnbbizer		1 No.
94.	BP Blade		1 No.
95.	BP Handle		1 No.
96.	Investing Ring		1 No.
97.	Vaseline		1 No.
98.	Investment Powder		1 No.
99.	Investment Liquid		1 No.

100.	Ring Liniss		1 No.
101.	Articulator		1 No.
102.	Articulating Paper		1 No.

D. For Ceramic Section

103.	Opaque-Powder		1 No.
104.	Opaque Paste		1 No.
105.	Ceramic Brushes		1 No.
106.	Ceramic Blade		1 No.
107.	Dentin Powder		1 No.
108.	Enamel Powder		1 No.
109.	Modelling fluid		1 No.
110.	Glass slab		1 No.
111.	Glass sterrea		1 No.
112.	Mixing Spatula		1 No.
113.	Filling Tray		1 No.
114.	Diamond Bur		1 No.
115.	Round Bur		1 No.
116.	Glaze Powder-Liquid		1 No.
117.	Ceramic Stone		1 No.
118.	Stains-Yellow		1 No.
119.	Articulator		1 No.
120.	Articulating Paper		1 No.
121.	Tissue Roll		1 No.

E. For casting Section

122.	Investing Ring		1 No.
123.	Investment powder		1 No.
124.	Investment Liquid		1 No.
125.	Crucible		1 No.
126.	Ring Liniss		1 No.
127.	Graphite Crucible		1 No.
128.	Alloy Nickel Chromium		1 No.
129.	Japanese Gold Alloy		1 No.

F. For Model Section

130.	Base Former		1 No.
131.	Dental Stone		1 No.
132.	Die Stone		1 No.
133.	Dental Plaster		1 No.
134.	Die Saw Blade		1 No.
135.	Die Pins		1 No.

Note: -

1. Quantity marked with * has been increased as per the batch size.

2. Internet facility is desired to be provided in the class room.

TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS		
S No.	Name of the Equipment	Quantity
1.	Computer (PC) with latest configurations and Internet connection with standard operating system and standard word processor and worksheet software	*12 Nos.
2.	UPS - 500VA	*12 Nos.
3.	Scanner cum Printer	1 No.
4.	Computer Tables	*12 Nos.
5.	Computer Chairs	*24 Nos.
6.	LCD Projector	1 No.
7.	White Board 1200mm x 900mm	1 No.
Note: - Above Tools & Equipment not required, if Computer LAB is available in the institute.		

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FORMAT FOR INTERNAL ASSESSMENT

Name & Address of the Assessor:			Year of Enrollment:												
Name & Address of ITI (Govt./Pvt.):			Date of Assessment:												
Name & Address of the Industry:			Assessment location: Industry / ITI												
Trade Name:		Examination:		Duration of the Trade/course:											
Learning Outcome:															
S No.	Maximum Marks (Total 100 Marks)		15	5	10	5	10	10	5	10	15	15	Total Internal Assessment Marks	Result (Y/N)	
	Candidate Name	Father's/Mother's Name	Safety Consciousness	Workplace Hygiene & Economical use of materials	Attendance/ Punctuality	Ability to follow Manuals/ Written instructions	Application of Knowledge	Skills to Handle Tools/ Equipment/ Instruments/ Devices	Economical use of Materials	Working Strategy	Quality in Workmanship/ Performance	VIVA			
1															
2															