

Curriculum

Diploma

(Certificate Level)

Dental Laboratory Technology

(Three Year's Program – Yearly System)



Council for Technical Education and Vocational Training

Curriculum Development Division

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Introduction:

The government of Nepal has called for the provision of basic Dental laboratory service to all by establishing a network of health services in remote and urban areas. In this regard, the Council for Technical Education and Vocational training (CTEVT) has been contributing toward the development of different level of health personnel in the field of Dental laboratory Technology. CTEVT has planned to produce middle level dental laboratory service providers as Dental laboratory technician. The Diploma in Dental laboratory technology graduates will be able to work as dental laboratory technician in the hospital and clinical setting under the supervision of the dental surgeon as well as in the community.

This course is based on the academic requirements to provide Dental laboratory Technology services as a middle level health worker. After completion of the course, the graduate is expected to perform the duty of hospital and clinic assistant as per assigned by Nepal Health Professional council independently in different health institutions in Nepal and abroad. The program is of three academic years' duration. The first year course focuses on basic science and foundational subjects, the second year course focuses on dental science and practical simultaneously and the third year is given to the application of learned skills and knowledge within the comprehensive practical settings, in hospitals or Clinics.

The foundational subjects like English, Nepali, Physics, Chemistry, and Mathematics (offered in diffusion model of curricular programme) are applicable in the medical field. The disciplinary subjects of medical field are included in all three years. This curricular programme also makes the provision of project works as well as real world of work practices in the specific medical areas. The curriculum structure and the subject wise content reflect the details of this curriculum. In brief, this curriculum will guide to its implementers to produce competent and highly employable middle level technical workforces in medical field.

Curriculum Title:

Diploma in Dental Laboratory Technology

Aim:

The program aims to produce middle level technical personnel with sound academic knowledge equipped with perfect technical skills that can be faced in real life situation.

Program Objectives:

After the completion of this program, the graduates will be enabled to:

- Apply the professional knowledge and skills in the respected field.
- Develop the positive attitudes towards the professions with greater initiative and self-confidence
- Apply critical thinking for problem-solving and decision making during the service delivery.
- Follow the quality standards set by the organization for quality assurance of the services offered to the customer.
- Get employment in governmental, semi-governmental and private hospital and dental clinic.
- Start their own enterprise and create employment.

Target Location:

The target location of this program will be all over Nepal.

Group Size:

The group size will be maximum of 40 (forty) in a batch.

Entry Criteria:

- SLC Pass or SLC/SEE with minimum GPA 2.0 and C grade in Compulsory Mathematics, English & Science.
- TSLC in Dental Hygiene with minimum 66.68%.
- Should pass entrance examination as administered by CTEVT.

Duration:

The total duration of this curricular program is three years. The program is based on yearly system. Moreover, one year consists of 40 weeks and one academic week consists up to 40 hours excluding evaluation period.

Medium of Instruction:

The medium of instruction will be in English and/or Nepali.

Pattern of Attendance:

Minimum of 90% attendance in each subject is required to appear in the respective final examination.

Teacher and Student Ratio

The ratio between teachers and students must be:

- Overall ratio of teacher and student must be 1:10 (at the institution level)
- 1:40 for theory and tutorial classes
- 1:10 for practical classes

Qualification of Teachers and Instructors:

- The program coordinator should be a master's degree holder in the related area.
- The disciplinary subject related teacher and demonstrators should be a bachelor's degree holder in the related area.
- The foundational subject related teacher should be master degree holder in the related area.

Instructional Media and Materials:

The following instructional media and materials are suggested for the effective instruction and demonstration.

- *Printed Media Materials* (Assignment sheets, Hand-outs, Information sheets, Individual training packets, Procedure sheets, Performance Check lists, Textbooks etc.).
- *Non-projected Media Materials* (Display, Model, Flip chart, Poster, Writing board etc.).
- *Projected Media Materials* (Opaque projections, Overhead transparencies, Slides etc.).
- *Audio-Visual Materials* (Audiotapes, Films, Slide-tape programs, Videodiscs, Videotapes etc.).
- *Computer-Based Instructional Materials* (Computer-based training, Interactive video etc.)

Teaching Learning Methodologies:

The methods of teachings for this curricular program will be a combination of several approaches such as; illustrated lecture, tutorial, group discussion, demonstration, simulation, guided practice, fieldwork, block study, industrial practice, report writing, term paper presentation, heuristic and other independent learning exercises.

Theory: Lecture, discussion, assignment, interaction, seminar, group work.

Practical: Demonstration, observation, simulation, guided practice, self-practice, industrial practice and project work.

Mode of Education:

There will be inductive and deductive mode of education.

Examination and Marking Scheme:

a. Internal assessment

- There will be a transparent/fair evaluation system for each subject both in theory and practical exposure.
- Each subject will have internal assessment at regular intervals and students will get the feedback about it.
- Weightage of theory and practical marks are mentioned in course structure.
- Continuous assessment format will be developed and applied by the evaluators for evaluating student's performance in the subjects related to the practical experience.

b. Final examination

- Weightage of theory and practical marks are mentioned in structure.
- Students must pass in all subjects both in theory and practical for certification. If a student becomes unable to succeed in any subject s/he will appear in the re-examination administered by CTEVT.
- Students will be allowed to appear in the final examination only after completing the internal assessment requirements.

c. Requirement for final practical examination

- Professional of relevant subject instructor must evaluate final practical examinations.
- One evaluator in one setting can evaluate not more than 20 students.
- Practical examination should be administered in actual situation on relevant subject with the provision of at least one internal evaluator from the concerned or affiliating institute led by external evaluator nominated by CTEVT.
- Provision of re-examination will be as per CTEVT policy.

d. Final practicum evaluation will be based on:

- Institutional practicum attendance - 10%
- Logbook/Practicum book maintenance - 10%
- Spot performance (assigned task/practicum performance/identification/arrangement preparation/measurement) - 40%
- Viva voce :
 - Internal examiner - 20%
 - External examiner - 20%

e. Pass marks:

- The students must secure minimum 40% marks in theory and 50% marks in practical. Moreover, the students must secure minimum pass marks in the internal assessment and in the semester final examination of each subject to pass the subject.

Provision of Back Paper:

There will be the provision of back paper but a student must pass all the subjects of all year within six years from the enrollment date; however there should be provision of chance exam for final year students as per CTEVT rules.

Disciplinary and Ethical Requirements:

- Intoxication, insubordination or rudeness to peers will result in immediate suspension followed by the review of the disciplinary review committee of the institute.
- Dishonesty in academic or practical activities will result in immediate suspension followed by administrative review, with possible expulsion.
- Illicit drug use, bearing arms in institute, threats or assaults to peers, faculty or staff will result in immediate suspension, followed by administrative review with possible expulsion.

Grading System:

The following grading system will be adopted:

- Distinction: 80% and above
- First division: 65% to below 80%
- Second division: 50 % to below 65%
- Pass division: Pass marks to Below 50%

Certification and Degree Awards:

- Students who have passed all the components of all subjects of all 3 years are considered to have successfully completed the course.
- Students who have successfully completed the course will be awarded with a degree of "**Diploma in Laboratory Technology**".

Career Opportunity:

The graduates will be eligible for the position equivalent to Non-gazette 1st class/Level 5 (technical) as prescribed by the Public Service Commission of Nepal and other related agencies. The graduate will be eligible for registration with the related Council in the grade as provisioned in the related Council Act (if any).

Course Structure First Year

S N	Subjects	Mode			Distribution of Marks						Total Marks
					Theory			Practical			
		T	P	Total	Internal	Final	Exam Hour	Internal	Final	Exam Hour	
1	English	3	0	3	20	80	3	-	-	-	100
2	Nepali	3	0	3	20	80	3	-	-	-	100
3	Social Studies	2	0	2	10	40	1.5	-	-	-	50
4	Anatomy & Physiology	4	1	5	20	60	3	10	10	3	100
5	Physics	4	2	6	20	60	3	10	10	3	100
6	Chemistry	4	2	6	20	60	3	10	10	3	100
7	Zoology	3	2	5	20	60	3	10	10	3	100
8	Botany	3	2	5	20	60	3	10	10	3	100
9	Mathematics & Statistics	4	1	5	20	60	3	10	10	3	100
	Total	30	10	40	170	560		60	60		850

Second Year: Diploma in Dental Laboratory Technology

SN	Subjects	Mode			Distribution of Marks						Total Marks
					Theory			Practical			
		T	P	Total	Internal	Final	Exam Hour	Internal	Final	Exam Hour	
1	Oral Anatomy and Physiology	2	4	6	10	40	1.5	40	60	3	150
2	Dental Materials & Lab Equipment	3	6	9	15	60	3	60	90	3	225
3	Microbiology and Pathology	1	1	2	5	20	1.5	10	15	1.5	50
4	Environment and Dental Health Education	2	1	3	10	40	1.5	10	15	1.5	75
5	Removable Prosthesis	3	9	12	15	60	3	90	135	3	300
6	Orthodontics and Pedodontics Appliances	2	6	8	10	40	1.5	60	90	3	200
Total		13	27	40	75	300		260	390		1000

Third Year: Diploma in Dental Laboratory Technology

SN	Subjects	Mode			Distribution of Marks						Total Marks
					Theory			Practical			
		T	P	Total	Internal	Final	Exam Hour	Internal	Final	Exam Hour	
A.	Class (20 weeks*40 hrs. = 800 hrs.)										
1	Fixed Prosthesis	4	15	19	10	40	1.5	80	120		250
2	Cast Partial Denture	2	8	10	5	20	1.5	40	60		125
3	Digital Dentistry	2	2	4	5	20	1.5	10	15	1.5	50
4	Office Health Management	2	0	2	5	20	1.5	0	0		25
5	Entrepreneurship Development	3	2	5	5	20	1.5	10	15	1.5	50
	Total	13	27	40	40	160		20	30		500
B.	Laboratory practice (20 weeks*40 hrs.= 800 hrs.)										
6	Comprehensive Lab practice										500
	Grand Total										1000

First Year

(Please see separate curriculum for General Health Science First Year all)

Second Year

Oral Anatomy and Physiology

Theory: 50 Marks
Practical: 100 Marks

Total: 6 hours /week
Theory: 2 hour/week
Practical: 4 hour/week

Course Description:

The course orients the students to basic knowledge about oral anatomy and physiology. It begins with the introduction of various structures and systems of the head and neck, then focus on oral structures, specifically the teeth. The physiology processes that occur in the oral cavity are also taken into discussion, thus enabling the student to gain knowledge on functioning of the oral structures.

Course Objectives:

After completion of course the student will be able to:

1. Identify the structures of the head and neck specifically the oral structures and its function and implement the knowledge in their clinical application.
2. Review on facial muscles and describe muscle of mastication.
3. Identify and describe in detail the anatomy, growth and development of the tooth including sequence of eruption and tooth numbering.
4. Describe the physiology of the specific oral structures.
5. List the cranial nerves and discuss relevant ones in detail.

Course Contents:

Unit 1: Introduction to dental anatomy [2 hours]

- 1.1. Terminologies and Nomenclature
- 1.2. Division into thirds, line angle, point angle

Unit 2: Development and eruption of teeth [1 hour]

- 2.1. Chronology of primary and permanent dentition

Unit 3: Orofacial complex: Form and function [6 hours]

- 3.1. Form and function
- 3.2. Articulation of teeth
- 3.3. Fundamental curvatures
- 3.4. Contact areas
- 3.5. Interproximal spaces
- 3.6. Embrasures

Unit 4: Dento osseous structures [2 hours]

- Outline structure and parts of maxilla and mandible

Unit 5: Temporo Mandibular Joint (TMJ) [4 hours]

- 5.1. Define T.M.J
- 5.2. Explain structure of T.M.J with diagram

- 5.3. Movement of T.M.J
- 5.4. Clinical consideration of T.M.J

Unit 6: Oral cavity

[3 hours]

- 6.1. Various parts and structure of Oral cavity

Unit 7: Periodontium

[12 hours]

- 7.1. Gingiva
 - Describe gingiva and gingival sulcus
 - Explain structure and type of gingiva
 - Clinical feature of gingiva
- 7.2. Periodontal ligament
 - Describe periodontal ligament
 - Enumerate fibers of periodontal ligament
 - Explain function of periodontal ligament
- 7.3. Cementum
 - Describe cementum
 - Enumerate types and function of cementum
- 7.4. Alveolar Bone
 - Describe alveolar bone
 - Explain properties and functions of alveolar bone.

Unit 8: Muscular system

[12 hours]

- 8.1. Enumerate facial muscles and list the function of facial muscles.
- 8.2. Muscles of mastication
 - Enumerate muscle of mastication
 - Describe origin, insertion and relation of muscles of mastication.
 - Describe function of muscles of mastication.
 - Describe the role of buccinators and orbicularis oris.

Unit 9: Tooth

[25 hours]

- 9.1. Growth and development of tooth
 - Explain dental lamina and dental papilla
 - Describe tooth bud
- 9.2. Anatomy of tooth
 - List and describe the morphological parts of tooth.
 - List the structural parts of tooth.
 - Write down the eruption and exfoliation sequence
 - Differentiate between deciduous and permanent dentition
- 9.3. Occlusion
 - Define occlusion
 - Describe the development of occlusion.
- 9.4. Function of Teeth
- 9.5. Tooth numbering system
 - List the different tooth numbering systems.

- Explain merits and demerits of zigmondy-palmer system, ADA system, FDI system.

Unit 10: Physiology of mastication and deglutition [5 hours]

- 10.1. Define mastication
- 10.2. Define deglutition
- 10.3. Describe physiology of mastication, deglutition
- 10.4. Differentiate between infantile swallow and mature swallow.

Unit 11: Salivary Gland [8 hours]

- 11.1. Parotid, submandibular and sublingual gland
 - Describe structure, position of parotid gland.
 - Describe structure, position of submandibular gland.
 - Describe structure, position of sublingual gland
- 11.2. Saliva
 - Define saliva
 - List type of saliva
 - Describe composition of saliva
 - Explain function of saliva

Practical [160 hrs.]

Perform following tasks/ skills

Unit 1: Review of skeleton of head [7 hours]

- Demonstrate the structure and parts of maxilla
- Demonstrate the structure and parts of mandible

Unit 2: Temporo-mandibular joint [7 hours]

- 2.1. Demonstrate Structure of T.M.J. with diagram
- 2.2. Demonstrate movements of T.M.J. using audio visual aid

Unit 3: Tooth

- 3.1. Tooth Carving of permanent dentition [70 hours]
 - Maxillary teeth

- a. Center Incisor
- b. Lateral incisor
- c. Canine
- d. First premolar
- e. Second Premolar
- f. First Molar
- g. Second Molar

- Mandibular teeth [70 hours]

- a. Center Incisor
- b. Lateral incisor
- c. Canine
- d. First premolar

- e. Second Premolar
- f. First Molar
- g. Second Molar
- Maintain carving log book with well labeled diagram

3.2. Practice different tooth numbering system

[6 hours]

References:

- Ten cate's oral histology
- Wheelers dental anatomy
- Dental Anatomy Coloring Book by Margarer J
- Head, Neck & Dental Anatomy by Morjorie J Short
- Anatomy and physiology Ross and Wilson new edition

Dental Materials & Lab Equipment

Theory: 75 Marks
Practical: 150 Marks

Total: 9 hours /week
Theory: 3 hour/week
Practical: 6 hour/week

Course Description:

The course covers different types of dental materials and lab equipment which is used in the fabrication of prostheses.

Course Objectives:

At the end of the classes, the students should be able to identify, manipulate and know the technical sensitivities associated with the use of different types of dental materials available in the market. These materials are widely used in the fabrication of prostheses and appliances.

Course Contents:

Total: 40 hours

Unit 1: Introduction and Classification of dental materials

[3 hours]

- 1.1. Introduction of dental materials
- 1.2. Classification of dental materials
 - Auxiliary dental materials
 - Direct Restorative dental materials
 - Indirect restorative dental materials

Unit 2: Properties of dental materials

- 2.1. Physical property **[4 hours]**
- 2.2. Chemical property – (corrosion, hygroscopy, solubility, pH sensitivity, reactivity, surface energy, surface tension) **[4 hours]**
- 2.3. Mechanical property – (brittleness, compressive strength, ductility, elastic modulus, fatigue strength, fracture, toughness, hardness, micro tensile strength, poisson's ratio, proportional limit, shear strength, tensile strength, work strain hardening, yield strength.) **[4 hours]**
- 2.4. Optical property- (absorptivity, color, fluorescence, luminescence, opacity, photosensitivity, reflectivity, refractivity, refractive index, translucency, transmittance) **[4 hours]**
- 2.5. Thermal properties- (co-efficient of thermal expansion or contraction, fusion temperature, glass transition temperature, heat of vaporization, heat of fusion, liquids temperature, melting point, softening point, solidus temperature, specific heat, thermal conductivity, vapor pressure, viscosity) **[6 hours]**
- 2.6. Electrochemical property: tarnish & corrosion **[2 hours]**
- 2.7. Properties important for manufacturing and finishing process- (cast ability, brittleness, creep resistance, hardness, melting temperature or melting temperature range, flow ability under hot-isostatic-pressing (HIP) temperature and pressure conditions, machinability, polish ability.) **[6 hours]**

- 2.8. Structure of matter **[4 hours]**
- Bonds
 - Atomic arrangement- crystalline, non- crystalline
 - Diffusion
 - Adhesion and bonding
- 2.9. Biocompatibility **[3 hours]**

Unit 3: Auxiliary Dental Materials **[25 hours]**

- 3.1. Impression materials: classification, composition and properties of elastomeric and inelastic impression materials **[4 hours]**
- Cleaning and disinfecting the diagnostic impression
 - Bite registration materials
 - Type of impression trays
- 3.2. Gypsum product: cast, care of cast, types **[4 hours]**
- Ideal requirement, uses of cast
 - Pouring the cast (diagnostic, Primary and Master cast)
 - Finishing and polishing the cast
 - Care of the cast
 - Infection control
 - Chemistry of setting, setting reaction
 - Setting time & working time
 - Strength : wet strength & dry strength
 - Manipulation including recent methods
- 3.3. Definition & types of die, ideal requirements of a die system **[4 hours]**
- 3.4. Dental waxes
- Classification of waxes
 - Inlay wax , casting wax , base plate wax ,processing wax, boxing wax, utility wax, sticky wax
 - Manipulation of inlay wax **[4 hours]**
- 3.5. Casting investment
- Classification
 - Setting mechanism, setting time & controlling factors
 - Cases procedure
 - Defects in casting
 - Casting machines, source of heat for melting alloy **[5 hours]**
- 3.6. Abrasives- application, finishing and polishing **[4 hours]**

Unit 4: Indirect restorative materials **[35 hours]**

- 4.1. Dental casting alloys and metal joining **[10 hours]**
- Classification, composition and properties
 - Alloys for all-metal prosthesis, alloys for metal ceramic prostheses, alloys for RPD
 - Alternative technique for fabricating prosthesis
 - Joining of dental alloys (Soldering & welding)

- 4.2. Wrought metal alloys **[5 hours]**
- Stainless steel alloys, Co-Cr-Ni alloys, Ni-Ti alloys, β -Titanium alloys, additional wrought alloys, gold
- 4.3. Dental ceramics **[10 hours]**
- History, classification
 - metal-ceramic system- composition, fabrication, cast metal for metal ceramic prosthesis technical aspects, methods of strengthening ceramics
 - all ceramics system
 - CAD-CAM
 - Clinical performance- porcelain teeth, color & appearance factors affecting ceramic veneers, inlays, onlays
 - Selection of ceramics
- 4.4. Prosthetic polymers & resins **[10 hours]**
- Denture base resin: heat activated, compression molding technique, chemically activated resin, light activated resin
 - Repair resin
 - Relining resin denture base
 - Rebasing resin denture
 - Denture cleansers
 - Resin teeth
 - Mode of polymerization
 - Method of manipulation

Unit 5: Maxillofacial prosthetic materials **[3 hours]**

- Types, manipulation, advantages and limitations

Unit 6: Implant materials **[3 hours]**

- Types, advantages and disadvantages

Unit 7: Lab equipment and Instruments **[12 hours]**

- 7.1. Identification, uses and parts of equipment/instruments used in
- Model Section
 - Wax –up Section
 - Acrylic Section
 - Metal Section
 - Casting Section
 - Ceramic Section
- 7.2. Maintenance of dental equipment and instruments

Practical

Perform following tasks/ skills

[240 hours]

1. Identification of different types of dental materials **[4 hours]**
2. Disinfection of impression **[2 hours]**
3. Manipulation of gypsum product **[20 hours]**
 - a. Identification of gypsum products
 - b. Manipulation of dental plaster
 - c. Making of primary cast
 - d. Trimming, shaping and polishing of cast
 - e. Manipulation of dental stone
 - f. Making of master cast
 - g. Manipulation of dental plaster , dental stone & die stone
 - h. Making Primary cast
 - i. Beading and boxing
 - j. Trimming, shaping & finishing of cast& removal dies
 - k. Working casts & dies
 - Preparation of working cast & removal dies
 - Die pinning technique, die ditching, die lock tray
 - l. Making of cast and die
 - i. Pouring a diagnostic cast **[4 hours]**
 - ii. Pouring a primary cast **[4 hours]**
 - iii. Beading and boxing **[4 hours]**
 - iv. Pouring a master cast **[4 hours]**
 - v. Finishing and polishing of casts **[4 hours]**
4. Identification of waxes **[6 hours]**
 - a. Manipulation of wax : beading and boxing an impression using wax
 - b. Manipulation of different wax
 - c. Functional occlusal wax-up
5. Casting alloys and casting techniques **[18 hours]**
6. Fabrication of different retentive clasps **[8 hours]**
7. Manipulation of acrylic resins **[8 hours]**
8. Ceramics manipulation **[18 hours]**
 - Porcelain teeth, color & appearance factors affecting ceramic veneers, inlays, onlays
9. Finishing and polishing materials and techniques **[8 hours]**
10. Dental lab equipment and instruments identification
11. Maintenance of Dental lab equipment and instruments **[8 hours]**

Dental Laboratory equipment and instruments: identification and use of the following **[140 hours]**

1. Ergo acrylic instrument
2. Caliper for wax, caliper for metal, analogic caliper, stainless steel boleyguaze
3. Flexi tips and metal tips composite instruments
4. Crown holder: tweezer type and scissor type, crown plier

5. Glass spatula
6. Knife: gritman knife, plaster knife
7. Alginate mixing spatula
8. Ceramic carving instrument
9. Wire cutting scissors
10. Plaster nippler
11. Wax instruments: Pk Thomas wax instrument, modeling carver instrument, fahnenstock carver knife, wax spatula,
12. Cement spatula
13. glass dappen dish
14. Flexible mixing bowl
15. Hanging motor, air lab turbine
16. Hanging motor hand piece
17. Micromotor system with hand piece
18. Model trimmer
19. Model lathe
20. Articulators: apex (denture) articulator, non-adjustable articulator, face bow, semi-adjustable, fully-adjustable articulator.
21. Alcohol lamp (spirit lamp), alcohol torch-plastic, electric (no flame) Bunsen burner, Gas Bunsen burner, micro torch.
22. Casting units: centrifugal casting machine, induction casting machine, casting well/guard.
23. Porcelain furnaces.
24. Casting accessories: crucible, crucible former ,casting ring, ring liner, ring less crucible former, sprue formers, casting tongue scissor type, mold ring, mold former, mold tongue
25. Discs-cutting disc, separating disc, rouging disc, joey dandy disc, polishing disc, diamond disc: single sided, double-sided, plaster diamond disc, sintered diamond disc, diam disc., discs for model trimmer.
26. Dowel pin: brass dowel pin, reverse dowel pin, double dowel pin, dowel pin locator, di-lock full arch tray, pindrill.
27. Sawblade and frame, pinned sawblade.
28. Duplicating dispenser
29. One station dust collector, two-station dust collector, multistation dust collector, CAD CAM dust collector, splash hood, plaster trap, steamer cleaner.
30. Electro polishing unit
31. Felt- felt cone, felt cylinders, felt wheels
32. Flasks and compresses: denture flasks, bridge flask, duplicating flask, microwaveable flask, pour and cure flask, flask compress, flexible flask
33. Hydraulic press, manual press, bench clamps
34. Grinder polisher unit, automatic spindle, red mounted fine grain grinding stone.
35. Heat sealer
36. Automatic injection system thermo
37. Crossref centered bite record.
38. Digital water bath
39. Lab work pans
40. Bifocal glass, loupes, laser safety glasses.
41. Mandrels e.g.; arbor band mandrel. Corkscrew mandrel,
42. Basemould, model former.

43. polishing and finishing: arbor bands, bristle brushes, chamois buff, flannel buff, rubber wheels, diamond rubber polisher, interproximal rubber wheel, rubber point, silicone point and wheel., zirconia polishing grinders, wheels and points
44. porcelain accessories- wet mixing tray, firing tray, shade guide, mesh tray
45. Sandblaster- automatic, one-tank, two-tank
46. Surveyor
47. Vacuum forming machine
48. Vacuum mixing machine
49. Heavy duty bench vibrator
50. Digital wax unit, digital wax carving pencils
51. Zircon milling machine,
52. Burs :
 - a. Cutter carbide burs: ½ shank cutter bur, ¼ shank cutter bur, 3/32 crosscut robot carbide hp bur, 3/32 diamond cut bur, 3/32 spiral cut, 3/8 shank cutter bur, bur cleaning brush.
 - b. Diamond cutting bur e.g.; robot point diamond
 - c. Sintered diamond bur-coarse, very coarse
 - d. Special burs e.g. twist drill, pin bur and drill.
53. Impression Tray
54. Pliers (universal pliers, Adam's pliers, 3 pronge pliers,)
55. Wire cutters
56. Cast cutters

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2. Carmen Scheller-Sheridan. The Basic Guide to Dental Instruments 2nd Edition
3. Carmen Scheller-Sheridan. The Basic Guide to Dental Materials. 2013
4. Craig, Robert G., Powers, John M., Wataha, John C., Dental Materials Properties and Manipulation process Eight Edition.
5. Linda Bartolomucci Boyd, Dental Instruments: A Pocket Guide, 5th Edition
6. Manappallil, John J., Basic Dental Materials 2nd Edition
7. Phillip's science of Dental materials. 12th edition Anusavice, Elsevier.
8. Phillips' science of dental materials., Elsevier, India
9. Textbook of prosthodontics, Nallaswamy, Jaypee, New Delhi

Microbiology and pathology

Theory: 25 Marks
Practical: 25 Marks

Total: 2 hours /week
Theory: 1 hour/week
Practical: 1 hour/week

Course description:

Microbiology for dental lab technician covers basics of culture, identification of bacteria and microorganisms with humans and also the diseases they cause. They understand disease-causing representatives of different groups of microorganisms and how these are transmitted and how to avoid the spread of these infectious microorganisms from lab to clinic as well as hospital places.

Course objectives:

After completion of this course students will be able to:

1. To demonstrate the ubiquity and diversity of microorganisms in the human body and the environment to cause disease.
2. The methods for sterilization and disinfectants of equipment in the context of the patient and the environment.
3. To explore the routes of transmission of infection and used to control the spread of infection.
4. To show the antimicrobial activity of disinfectants in the context of the patient and the environment.
5. Microbiology also gives knowledge to lab technician *how to handle a patient and his samples* infected with communicable diseases.

Course Contents:

[40 hours]

Unit 1: Introduction to Microbiology

[3 hours]

- 1.1 Historical perspective in microbiology
- 1.2 Prokaryote vs. Eukaryote, Normal flora

Unit 2: Bacteriology

[3 hours]

- 2.1. Bacterial Morphology
- 2.2. Bacterial Growth

Unit 3: Virology:

[1 hour]

- 3.1. Introduction, General Characteristic, Classification & lab Diagnosis

Unit 4: Parasitology

[2 hours]

- 4.1. Introduction; classification & lab diagnosis

Unit 5: Mycology:

[1 hour]

- 5.1. Introduction; General Characteristic; Classification & Lab Diagnosis

Unit 6: Infection Prevention

[3 hours]

6.1 Infection Prevention

- Terms and definition
- Disease transmission cycle
- Medical asepsis
- Definition and principles
- Hand washing techniques
- Universal Precautions
- Surgical asepsis

- Instrument processing (decontamination of articles)
- Cleaning
- High level disinfection
- Sterilization: purpose, principles, method

6.2 Lab waste management

Unit 7: Antimicrobial agent+ Mechanism of Action (MOA) of Antimicrobials [1 hour]

Unit 8: Healthcare associated infection: definition; types, control and prevention.

[4 hours]

Unit 9: Hematopoietic system, Reticuloepithelial system [1 hour]

9.1. Immunity: Basic concept (innate+ acquired) (active +passive) (local+ herd)

[1 hour]

9.2. Antigen

[1 hour]

9.3. Antibody

[1 hour]

9.4. Bacteremia, Septicemia, Pyaemia, Viremia, Fungemia

[1 hour]

Unit 10: Respiratory system: [5 hours]

10.1. Normal flora & pathogens of the respiratory tract and their lab diagnosis

10.2. Streptococcus pyogenes

10.3. Streptococcus pneumoniae

10.4. Mycobacterium Tuberculosis

10.5. Candida

Unit 11: Gastrointestinal system+ Hepatobiliary system+ renal system [6 hours]

11.1. Introduction to GI system: Normal-flora, Gastroenteritis, Diarrhoea, Dysentery

11.2. Hepatitis A+E+G

11.3. Hepatitis B+D

11.4. Hepatitis C

11.5. Urinary tract infection

Unit 12: Introduction to Sexual Transmitted Infection (STI): classification and list of organisms causing STIs [3 hours]

12.1. Herpes Simplex

12.2. HIV/AIDS

Unit 13: Integumentary system+ Musculoskeletal system [2 hours]

13.1. Skin disease: classification : causative organisms

Unit 14: Meningitis [2 hours]

14.1. Tetanus

Unit 15: Central Nervous system and special senses [2 hours]

Practical

Perform following tasks/ skills

[40 hours]

1. Apply Standard Safety Precaution
 - Demonstrate standard precaution and universal precaution
2. Demonstrate and practice hand washing procedure
3. Demonstrate wearing of PPE
4. Demonstrate Sterilization and Disinfections
5. Identification and Application of Instruments Used in Microbiology
6. Identify and demonstrate working of boiler, Hot air oven and autoclave
7. Preparation of Alcohol, gluteraldehyde and chlorine solutions
8. Pus: sample collection, processing

References:

1. Ananthanarayan and Paniker's (2009), Text book of Microbiology, Universities Press.
2. C P Baveja (2003)Textbook of Microbiology for Dental Student, Arya Publication
3. Dr. Chandra Prakash Bhatt, (2011) Practical Medical Microbiology, A.K books & Education Enterprises.
4. P. Chakraborty (2005), Text book of Microbiology, New central book agency (P) Ltd.
5. R.C. Dubey (2002), Practical Microbiology, S. Chand & Company Ltd.

Environment and Dental Health Education.

Theory: 50 Marks
Practical: 25 Marks

Total: 3 hours/week
Theory: 2 hours/week
Practical: 1 hour/week

Course description:

This course introduces the student to the specialized skill and knowledge needed to provide environmental health services. The course includes information about the relationship between environmental and health.

The later part of the course which includes health education will deal with the concepts and theory of health behaviors and the procedure for planning, implementation and overall management of health education program.

Course objectives:

Upon completion of the course the learners will be able to

1. Describe the relationship between the environmental healths and show the impact of environment on health.
2. Explain proper waste management.
3. Identify occupational hazards and strategies to prevent it.
4. Appreciate the significance of health education in preventive, promotive, curative and rehabilitative health care.
5. Identify and apply the theories and principles of health behavioral science in the process of health education,
6. Identify, select and utilize suitable health education methods and media for successful implementation of health service programs.
7. Plan, implement and evaluate health education program

Course Contents:

Total: 40 hours

Part I: Environmental Health

Unit 1: Environmental Health: General Introduction

1.1. Terminology

[5 hours]

- Environment,
- Health,
- Environmental Health,
- Environmental Sanitation,
- Environmental pollution
- Epidemiology,
- Epidemiological triad

- 1.2. Relationship between environment and health [8 hours]
- Relationship between environment and health
 - Agent, host and environment
 - Environmental hazards and risks
 - Types of hazards,
 - Carrier and vectors,
 - Interrelationship between environment and dental health

Unit 2: Environmental Pollution and Climate Change [8 hours]

- 2.1. Air, Water, Land, Noise and Radioactive pollution,
- 2.2. Solid waste management,
- 2.3. Hospital Waste Management,
- 2.4. Water, Sanitation and Hygiene,
- 2.5. Green House Effect & Climate Change

Unit 3: Research Methodology [10 hours]

- 3.1. Rational of the selection of the study area
- 3.2. Research design
- 3.3. Nature and source of data
- 3.4. Sampling data
- 3.5. Data collection techniques
- 3.6. Reliability and validity of the data
- 3.7. Data processing and analysis
- 3.8. Report writing
- 3.9. Presentation

Unit 4: Occupational Health and Safety [4 hours]

- 4.1. Occupational Environment, Occupational Health, Occupational Safety

Unit 5: Legislation [2 hours]

- 5.1. Current laws, guidelines related to environment and Health, Government/

Unit 6: Project Work [3 hours]

- 6.1. Case study
- 6.2. Report Writing
- 6.3. Presentation

Part II: Health education

[40 hours]

Unit 1: Introduction to health education

[8 hours]

- 1.1. Health Education
 - Definition of health
 - Factors influencing health
 - Health disease spectrum
- 1.2. Health education
 - Definition
 - Key points from definition
 - Knowledge
 - Attitude
 - Skills
- 1.3. Purpose of health education
- 1.4. Principles of health education
- 1.5. Scope of health education
- 1.6. Significance of health education

Unit 2: Fundamental factors of health education

[8 hours]

- 2.1. Perception
- 2.2. Motivation
- 2.3. Learning
- 2.4. Communication
- 2.5. Group dynamic
- 2.6. Leadership
- 2.7. Change process

Unit 3: Methods of health education

[10 hours]

- 3.1. Introduction
- 3.2. Different methods of Health education
 - Individual method
 - Interview
 - Counseling
 - Group Methods
 - Demonstration
 - Role play
 - Case study
 - Workshop
 - Group discussion
 - Mass methods of Health education
 - Lecture
 - Exhibition
 - Campaign

- Unit 4: Media of health education** [4 hours]
- 4.1. Types
- Audio aids
 - Visual aids (Posters, pamphlets, flip chart, model, magazines, photographs etc.)
 - Audio-Visual aids (Film, television, video , LCD projectors)
- 4.2. Criteria for selecting appropriate methods and media

- Unit 5: Planning of health education program** [2 hours]
- 5.1. Steps of planning

- Unit 6: Implementation of Health education program** [5 hours]
- 6.1. Introduction
- 6.2. Strategies
- Training
 - Supervision
 - Monitoring

- Unit 7: Evaluation of health education program** [3 hours]

Practical

Perform following tasks/ skills

[Total 40 Hours]

1. Demonstration of each methods
2. Preparation of different media (Poster, flipchart, pamphlets) in group activities.
3. Plan a health education program
4. Implement and evaluate the above prepared plan
5. Prepare the different medias/audiovisual aids
6. Prepare a planning health education program using steps
7. Prepare a lesson plan
8. Demonstrate the methods of health education x

References:

- Park’s textbooks of Preventive and Social Medicine by K park published by M/S Banarasidas Bhonot,Tabalpur India current edition
- Essential preventive Medicine by OP Gahyui Piyush Gupta Published by Vikas Publishing house India Current edition

Removable Prosthesis

Theory: 75 Marks
Practical: 225 Marks

Total: 12 hours /week
Theory: 3 hours/week
Practical: 9 hours/week

Course description:

The topics covered in this subject will train the students to do the laboratory procedures involved during the making of a denture and maxillofacial prosthesis.

Course objectives:

After completion of this course students will be able to:

- 1 Fabricate an acrylic removable partial denture
- 2 Fabricate an acrylic complete denture
- 3 Reline and rebase a denture
- 4 Repair a broken denture
- 5 Fabricate different types of maxillofacial prosthesis

Course Contents:

Theory

Unit 1: Acrylic RPD/Temporary Partial Denture

[40 hours]

- 1.1. Terminology used in RPD
- 1.2. Classification of partially edentulous arches
- 1.3. Kennedy's and Applegate classification
- 1.4. Types of temporary partial denture: transitional, interim and treatment partial denture
- 1.5. Steps in fabrication of RPD
- 1.6. Preparing the diagnostic cast
 - Pouring the diagnostic cast
 - Trimming the diagnostic cast
 - Mounting the diagnostic cast
 - Block-out of cast.
- 1.7. Making the primary cast
- 1.8. Surveying the primary cast
- 1.9. Fabrication of retentive clasp, temporary denture base and occlusal rim
- 1.10. Mounting the cast
- 1.11. Implementation of Dentist lab prescription
- 1.12. Teeth selection
- 1.13. Arrangement of artificial teeth
- 1.14. Wax-up, flasking, dewaxing, packing and processing
- 1.15. Finishing and polishing of denture
- 1.16. Addition of teeth to existing denture
- 1.17. Variation of RPD.: immediate partial denture, spoon denture, every denture, two-part denture, classless denture
- 1.18. Relining, rebasing of RPD
- 1.19. Repair of RPD

Unit 2: Complete Denture**[50 hours]**

- 2.1 Steps in fabrication of complete denture
- 2.2 Pouring the diagnostic cast
- 2.3 Pouring the primary cast
- 2.4 providing relief and adapting a spacer
- 2.5 Fabricating a special tray
- 2.6 Beading, boxing and pouring the master cast
- 2.7 Fabricating the temporary denture base
- 2.8 Fabricating occlusal rim
- 2.9 Articulator- definition, types, uses, advantage, disadvantage
- 2.10 3-point articulator
- 2.11 Indexing the cast
- 2.12 Mounting the cast
- 2.13 Implementation of Dentist lab prescription
- 2.14 Artificial teeth selection
- 2.15 Teeth arrangement
- 2.16 Wax-up
- 2.17 Processing the denture
- 2.18 Lab remounting
- 2.19 Finishing the denture
- 2.20 Relining and rebasing in complete denture
- 2.21 Repair of a fractured denture
- 2.22 Special complete denture
 - Single complete denture
 - Immediate denture
 - Tooth supported over denture
 - Implant supported over denture

Unit 3: Maxillofacial prosthesis**[30 hours]**

- 3.1. Introduction of maxillofacial prosthesis
- 3.2. Materials used in maxillofacial prosthesis silicone (chemistry, manipulation coloration)
- 3.3. Complete & partial denture for cleft lip and palate patient
- 3.4. Removable partial denture for cleft lip and palate patient
- 3.5. Removable prosthesis for total maxillectomy defect
- 3.6. Obturators-introduction and types
 - a. Immediate surgical obturator
 - b. Delayed surgical obturator
 - c. Interim Obturator
 - d. Definitive obturator
 - Hollow bulb obturator
 - Open lid obturator
- 3.7. Palatal lift prosthesis
- 3.8. Feeding appliance
- 3.9. Auricular prosthesis
- 3.10. Nasal prosthesis
- 3.11. Ocular prosthesis

- 3.12. Mandibular guiding flange
- 3.13. Positioning stent appliance for radiation therapy

Practical

Perform following tasks/ skills

[360 hours]

- 1 Pouring the cast
- 2 Blackout of the cast
- 3 Surveying of cast
- 4 Adapting relief and spacer wax
- 5 Fabrication of special tray
- 6 Beading, boxing
- 7 Pouring a master cast
- 8 Adapting a temporary denture base (for RPD, CD)
- 9 Fabrication of retentive clasp for RPD
- 10 Making of occlusal rim for RPD,CD
- 11 Indexing the cast
- 12 Mounting the cast on an articulator
- 13 Selection of artificial teeth and teeth arrangement in class I, II and III occlusion
- 14 Wax up and processing of RPD and CD
- 15 Lab remounting
- 16 Finishing and polishing of RPD, CD
- 17 Relining
- 18 Rebasing
- 19 Repair of fractured denture
- 20 Fabrication of single complete denture
- 21 Fabrication of over denture
- 22 Fabrication of feeding appliance
- 23 Fabrication of surgical obturator
- 24 Fabrication of hollow bulb obturator
- 25 Fabrication of auricular prosthesis
- 26 Fabrication of ocular prosthesis
- 27 Fabrication of positioning stent appliance

References:

- Preclinical manual of prosthodontics, S. Laxmi, Elsevier, Haryana, India
- Textbook of prosthodontics, Deepak Nallaswamy, Jaypee, New Delhi
- Prosthodontics treatment for edentulous patient, Zarb, Elsevier, India

Orthodontic and Pedodontics Appliances

Theory: 50 Marks
Practical: 150 Marks

Total: 8 hours /week
Theory: 2 hours/week
Practical: 6 hours/week

Course description:

In this course students are taught basic and advanced techniques of appliances fabrication in the areas of orthodontics

Course objectives:

After completion of this course students will be able to:

1. Do different wire bendings
2. Construct different clasps
3. Fabricate different retainers
4. Construct appliances in acrylic

Course Contents:

[Total 80 hours]

Theory

Unit 1: Introduction to orthodontics and pedodontics [10 hours]

- 1.1 Definition
- 1.2 Aim and Objectives
 - Scope
 - Brief history
 - Services offered

Unit 2: Materials [10 hours]

- 2.1. Gypsum products : Types II & III
- 2.2. Fabrication, Duplication of study models and cast
- 2.3. Acrylic powder, liquid composition, its manipulation
- 2.4. Stainless steel wires, its properties and uses
- 2.5. Soldering, welding, flux and anti-flux

Unit 3: Appliances [60 hours]

- 3.1. Removal appliances **[20 hours]**
 - Introduction and general principle
 - Action of removable appliances, components of removable appliances
 - Different clasps with mode of action(circumferential clasp, jaction's clasp, Adams clasps and its modifications, south end clasp, Triangular clasp, Ball end clasp, Schwarz clasp, short labial bow ,long labial bow, split labial bow, reverse labial bow, Robert's retractor ,mills retractor, high labial bow with apron spring, fitted labial bow,
 - Retainers (Principles and mode of action)
 - Different springs with mode of actions(finger spring, zspring, cranked single cantilever spring, T spring, Coffin spring, different canine retractors

- Different removable arch expansion screws with its mode of action
- Different types of removable space maintainer
- Thumb guard
- Palatal crib
- Anterior and Posterior bite plane
- Night guard
- Occlusal splint
- Bleaching tray
- Mouth guard

3.2. **Fixed appliances** **[20 hours]**

- Introduction and general principle
- Space maintainer
 - a. Lingual Holding arch
 - b. Distal shoe
 - c. Band and Loop
 - d. Hyrax
 - e. Herbst appliance
 - f. Transpalatal arch

3.3. **Myofunctional appliances** **[20 hours]**

- Introduction and general principle
 - a. Lip bumper
 - b. Vestibular screen
 - c. Activator
 - d. Bionator
 - e. Twin block appliance
 - f. Frankel appliances

Practical

Perform following tasks/ skills

[240 hours]

1. Fabrication, duplication of study models and cast
2. Exercise of Basic wire bendings
3. Construction of different clasps
4. Construction of different springs
5. Construction of canine retractors
6. Fabricate Anterior and posterior bite plates
7. Fabricate Hawley's appliance
8. Fabricate wrap around removable retainers
9. Fabricate
 - a. Thumb guard
 - b. Palatal crib,
 - c. Lip bumper,
 - d. Vestibular Screen,
 - e. mouth guard
 - f. removable Space maintainer,
10. Fabricate Vacuum formed appliances (Night guard, Occlusal guard, Bleaching tray)
11. Fabricate removable upper expansion appliance with expansion screw
12. Construct Trans palatal arch
13. Fabricate
 - a. twin block,
 - b. activator
 - c. bionator
 - d. frankle's appliance
14. Perform soldering and welding in lab
15. Construct fixed expansion appliance (Hyrax)
16. Construction of fixed space maintainer

References:

1. Dr. Bhalajhi, Orthodontics: The Art and Science, Arya Publishing House, New Delhi
2. K.G. Issacson, J.D. Muir, R.T. Reed, Removable Orthodontic Appliances,
3. Kenneth j. Anusavice, Philips Science of Dental Materials, Saunders Elsevier, st Louis Missouri
4. Samir. E Bishara, Text book of Orthodontics, W.B Saunders Company
5. William R.Proffit, Contemporary Orthodontics

Third Year

Fixed Prosthesis

Theory: 50 Marks
Practical: 200 Marks

Total: 19 hours /week (20 week)
Theory: 4 hours/week
Practical: 15 hours/week

Course description:

The program provides theoretical and practical training for the construction of fixed dental restorations including metal and ceramic crowns and bridges. The curriculum also includes dental terminology, dental anatomy, occlusion and computer aided design (CAD) processes. Students will acquire knowledge and skills through lectures, discussions, hands-on experience in a lecture hall and well-equipped dental laboratory.

Course objectives:

After completion of this course students will be able to:

1. Apply general laboratory techniques to prepare and evaluate impressions and casts
2. Practice within the legal and ethical framework of the profession.
3. Collect diagnostic treatment data.
4. Fabricate fixed Crown & Bridge prostheses to advanced competency standards.
5. Fabricate fixed porcelain-to-metal prostheses to advanced competency standards.
6. Demonstrate business practices and procedures appropriate to managing or owning a dental laboratory business.

Course Contents:

[80 hours]

Unit 1: Introduction to FPD

[40 hours]

- 1.1 Introduction, parts and types of FPD
- 1.2 Principle of occlusion
- 1.3 Principle of tooth preparation
 - Complete cast crown
 - Metal ceramic crown
 - All ceramic crown
 - Partial Veneer crown, inlay and onlay
- 1.4 Implant supported fixed prosthesis.

Unit 2: Laboratory Procedure of FPD**[40 hours]**

- 2.1. Communicating with the dentist.
- 2.2. Preparation and duplication of cast
- 2.3. Dies
 - Identification of different types of dies [1 hour]
 - Making of working cast with different die system [12 hours]
- 2.4. Wax patterns
- 2.5. Framework design and metal selection for metal ceramic restoration
- 2.6. Pontic design
- 2.7. Connectors for partial fixed dental prosthesis
- 2.8. Investing and casting.
- 2.9. Finishing the cast restoration
- 2.10. Metal ceramic restoration
- 2.11. Description of color, color replication process and esthetics
- 2.12. All ceramic restoration
- 2.13. Resin bonded fixed dental prosthesis.
- 2.14. Fiber reinforced composite fixed prosthesis
- 2.15. Evaluation, characterization and glazing

Practical**Perform following tasks/ skills****[300 hours]**

- 1 Definitive cast and dies
- 2 Wax patterns
- 3 Framework design
- 4 Pontic design
- 5 Investing
- 6 Casting.
- 7 Description of color, color replication process
- 8 Metal ceramic restoration
- 9 All ceramic restoration
- 10 Resin bonded fixed dental prosthesis.
- 11 Fiber reinforced composite fixed prosthesis
- 12 Finishing the cast restoration
- 13 Evaluation, characterization and glazing

References:

- Contemporary Fixed Prosthodontics, Rosenstiel, Mosby
- Fundamentals of fixed Prosthodontics, Shillingburg, Quintessence Publishing Co. Inc.

Cast Partial Denture

Theory: 25 Marks
Practical: 100 Marks

Total: 10 hours/Week (20 weeks)
Theory: 2 hours/Week
Practical: 8 hours/Week

Course description:

The program provides theoretical and technical training for the construction of removable cast partial dental restorations including metal and acrylic. The curriculum also includes dental terminology, dental anatomy, and occlusion. Students will acquire knowledge and skills through lectures, discussions, hands-on experience in a lecture hall and well-equipped dental laboratory.

Course objectives:

After completion of this course students will be able to:

- 1 Apply general laboratory techniques to prepare and evaluate impressions and casts
- 2 Practice within the legal and ethical framework of the profession.
- 3 Collect diagnostic treatment data.
- 4 Fabricate cast partial prostheses to advanced competency standards.
- 5 Fabricate metal prostheses using different types of alloys/materials to advanced competency standards.
- 6 Demonstrate business practices and procedures appropriate to managing or owning a dental laboratory business.

Course Contents:

[40 hours]

Unit 1: Introduction to CPD

[20 Hours]

- 1.1. Introduction and classification
 - Common terminologies used in removable partial denture
 - Classification of partially edentulous arches
 - Step in fabrication of removable partial denture
 - Parts of removable partial denture
- 1.2. Removable partial denture design
 - Surveying
 - Determining the path of insertion and guiding planes
- 1.3. Enlist the steps of fabrication of Cast partial denture
 - Major connectors
 - Minor connectors
 - Rest and rest seats
 - Direct retainers
 - Indirect retainers
 - Denture base and tooth replacements
 - Principle and philosophy of removable partial denture
 - Essential of design
 - Laboratory design procedure

Unit 2: Steps of Fabrication of CPD

[20 Hours]

- 2.1. Preparing the diagnostic cast
 - Pouring the cast
 - Trimming the cast
- 2.2. Surveying
 - Surveyor, parts and uses
 - measuring the depth of the undercut using surveyor
 - Determining the path of insertion and guiding planes
- 2.3. Preparing the master cast
- 2.4. Communicating with the dentist for designing for CPD
- 2.5. Principles and philosophy of Design
 - Conventional rigid design
 - Stress equalization or stress breaker concept
 - Physiological basing
 - Broad stress distribution
- 2.6. Framework design and fabrication
 - Wax up procedure
 - Dublication and preparation of refractory casts
 - Component parts of CPD
 - Waxing
 - Investing
 - Burn out
 - Casting
 - Finishing and polishing
 - Teeth selection
 - Arranging the artificial teeth
- 2.7. Fabrication of temporary denture base and occlusal rims
- 2.8. Metal selection for framework
 - Different types of materials such as acrylic, metal and metal acrylic resin base
- 2.9. Correction of removable partial denture
 - Relining
 - Rebasing
 - Reconstruction of removable partial denture
 - Repair of removable partial denture
- 2.10. Introduction to jaw relation
- 2.11. Mounting the casts
- 2.12. Metal selection for framework
- 2.13. Denture base and teeth selection
- 2.14. Arranging the artificial teeth
- 2.15. Processing of CPD
 - Investing and casting
 - Finishing the cast restoration
- 2.16. Correction of cast partial denture

Practical

Perform following tasks/ skills

(160 hours)

- 1 Making the primary cast
 - Primary cast using plaster of paris
- 2 Assist in Surveying the casts
 - Types of surveyor
 - Parts of surveyor
 - Surveying the primary cast (teeth and soft tissue)
 - Surveying the master cast
 - Determining the path of insertion and guiding planes
- 3 Preparing the master cast
 - Pouring the master cast
 - Correcting the master cast
 - Altering the master cast
 - Trimming the master cast
- 4 Practice in designing the components parts of CPD
 - Major connector
 - Minor connector
 - Rest and rest seats
 - Direct retainers
 - Indirect retainers
 - Denture base
 - Tooth replacement
 - Laboratory design step by step sequence and armamentarium required
- 5 Framework fabrication
 - Wax –up
 - Duplication and preparation of refractory casts
 - Waxing
 - Burn out
 - Finishing and polishing
- 6 Investing
- 7 Casting
- 8 Finishing the cast restoration
- 9 Fabrication of temporary denture base and occlusal rim
- 10 Mounting the cast
- 11 Teeth selection and arranging the artificial teeth
- 12 Processing the denture
- 13 Correction of removable partial dentures
 - Relining
 - Rebasling
 - Reconstruction of removable partial denture
 - Repair of removable partial denture
- 14 Fabrication of cast partial denture
 - preparation of diagnostics cast

- Surveying of diagnostics cast
- Partial denture designing
- preparation of master cast
- surveying of master cast & design transfer
- block out of master cast
- cast duplication in agar –agar
- Refratong cast
- preparation of wax pattern for C P D
- Casting & framework Finishing
- preparation of occlusal rim, tooth arrangement, wax up, flasling, dewaxing, packing processing
- Finishing & polishing of denture

References:

1. Deepak Nallaswamy, Textbook of prosthodontics, Jaypee Brothers Medical publishers (P) Ltd.
2. John D. Jones, Lily T. Garcia, Removable Partial Dentures: A Clinician's Guide, John wiley and sons, Inc., Publication.
3. Mc Cracken's Removable Partial Prosthodontics, Alan B. Carr, Elsevier Mosby.
4. Russell J. Stratton, An Atlas of Removable Partial Denture Design, Quintessence books.
5. Stewart's clinical Removable Partial Prosthodontics, Rodney D. Phoenix, Quintessence Publishing Co. Inc.

Digital Dentistry

Theory: 25 Marks
Practical: 25 Marks

Total: 4 hours /week (20 weeks)
Theory : 2 hours/week
Practical: 2 hours/week

Course description:

This course is about the innovations that use computer technology, digital design and manufacturing and digital data for diagnosis, treatment planning and treatment.

Course objectives:

- Know about the available digital impression technique and CAD/CAM technologies.
- Understand how preparation design affects the fabrication of milled restorations
- Plan and design CAD/CAM aided tooth restorations
- Understand the materials available for chair side milled restorations

Course Contents:

[40 hours]

Unit 1: Digital Dentistry

[12 hours]

- 1.1. Overview of CAD/CAM in dentistry
- 1.2. Introduction to CEREC system.
- 1.3. Introduction to E4D system
- 1.4. Digital impression system
- 1.5. Digital application in dental implant therapy

Unit 2: Dental Photography

[28 hours]

Sub Unit 1: Importance/ application of dental Photography

[4 hours]

1. Describe the importance/ application of dental photographs

Sub Unit 2: Cameras and it Parts

[6 hours]

- 2.1. Describe SLR Camera and its advantages
- 2.2. Discuss Digital Camera and its advantages
- 2.3. Explain Camera's basic parts like Body, Lenses, and Flash.

Sub Unit 3: Principles of Photography

[18 hours]

1. Define Shutter and explain its importance/ application
2. Define Aperture and explain its importance/ application
3. Define Exposure and explain its importance/ application
4. Discuss Light Source in dental photography
5. Define Depth of Field and explain its importance/ application
6. Discuss Magnification
7. Discuss Focus and various methods
8. Discuss Composition in photography
9. List Basic Armamentarium in photography and its uses
10. Photography for record keeping and marketing

Practical

Perform following tasks/ skills

[40 hours]

Unit 1: Digital Dentistry

[14 hours]

1. Observe Digital Impression system:
2. Observe Digital design of restoration
3. Observe Milling of dental restoration

Unit 2: Dental Photography

4. Demonstration of various types of camera - [2 hours]
5. Identify and list major functions of Photographic Materials used in dentistry [6 hours]
6. Demonstrate SLR camera and its various parts [6 hours]
7. Demonstrate Digital Camera and its major parts [6 hours]
8. Prepare SLR camera for photography [6 hours]

References:

1. Deepak Nallaswamy, Textbook of prosthodontics, Jaypee Brothers Medical publishers (P) Ltd.
2. John D. Jones, Lily T. Garcia, Removable Partial Dentures A Clinician's Guide, John wiley and sons, Inc., Publication.
3. McCracken's Removable Partial Prosthodontics, Alan B. Carr, Elsevier Mosby.
4. Stewart's clinical Removable Partial Prosthodontics, Rodney D. Phoenix, Quintessence Publishing Co. Delhi
5. K.G. Issacson, J.D. Muir, R.T. Reed, Removable Orthodontic Appliances,
6. Kenneth j. Anusavice, Philips Science of Dental Materials, Saunder
7. William R. Proffit, Contemporary Orthodontics

Office Health Management

Theory: 25 Marks
Practical: 0 Marks

Total: 2 hours /week (20 weeks)
Theory: 2 hours/week
Practical: 0 hour/week

Course Description:

The topic covered in this subject orient the health care system in Nepal. Students will acquire knowledge about Health Management Leadership, different health issues and professionalism.

Course Objectives:

After completion of this course, the students will be able to:

1. Know about health care system in Nepal
2. Developed personal leadership
3. Understand professional practice in Nepal

Course Contents:

[40 hours]

Unit: 1 Health care system in Nepal

[5 hours]

1.1. Health care system

- Dental Health care system in Nepal.
- History of the development of dental health services in Nepal.
- Current National Health policy
- Current National Oral Health policy
- Current Nepal's Long term health plan
- Current health plan.

Unit: 2 Fundamentals of Health management

[10 hours]

2.1. Introduction to health management

- Define management, Health management
- Describe the function of management

2.2. Planning in health service

- Process and purpose of planning
- Different types of planning
- Steps of planning
- Health planning system in Nepal

2.3. Principles of leadership

- Characteristics and advantages and disadvantages of each type of leadership styles
 - Autocratic
 - Democratic
 - Laissez faire

2.4. Staffing

- Purpose of Job description
- Elements of job description

2.5. Directing

- Meaning and purpose of delegation of authority
 - Limitation of delegation
- 2.6. Supervision
- Objectives and methods of supervision
 - Types of tools used in supervision
 - Process of supervision
 - Methods and steps of Monitoring
- 2.7. Coordination
- Define coordination
 - Different types of coordination
 - Techniques and process of coordination.
- 2.8. Reporting
- Purpose of unit reporting
 - Qualities of effective office report
 - Process of reporting in Nepal

Unit 3: Dental office management

[17 hours]

- 3.1. Training
- State the definition and purpose of training
 - Describe the types of training.
 - Advantages and disadvantages of training
 - Process of accessing the need for training
 - Describe how to plan, conduct & evaluate the training program of subordinate & volunteers
- 3.2. Leave Management
- Identify different types of employee leaves.
 - Describe the procedure for making a request for leave.
 - Demonstrate how to maintain records of staff leave.
 - Discuss the reasoning used before giving approval of staff leave.
- 3.3. Inventory Management
- Describe the purpose and process of physical inventory.
 - Differentiate between expendable and non-expendable goods.
 - Define storage and store standard.
 - Describe the procedure for storage of dental lab supplies.
 - Discuss the essential data of logistics information.
 - Describe the process of calculating and demanding items, for both regular and emergency needs.
 - Describe the process of distributing commodities.
- 3.4. Quality Assurance
- Compare different definitions of quality health care.
 - Identify reasons for using the quality assurance (QA) program.
 - Identify the chief characteristics of a quality assurance program.
 - Define the term “standards” and give examples of health care standards.
 - List the ways that standards help to close the gap between actual performance and desired outcomes.

- Give examples of ways to reduce the costs caused by poor quality health care.
 - Give examples of ways to improve patient satisfaction with services.
 - List the 4 “focus areas” of quality assurance principles.
 - Explain why the process of quality assurance is viewed as a cycle.
 - Use the methods and principles of QA to identify and plan a solution to a real health care problem.
- 3.5. Performance Evaluation of Staff
- Discuss the purposes and benefits of regular staff performance evaluations.
 - Explain the importance of writing a clear and complete staff job description.
 - Develop staff job descriptions for a simulated example.
 - Develop a staff performance evaluation checklist based on the job description.
 - Describe how to effectively give a job assignment.
 - Identify indicators of a good job performance.
 - Role-play ways to counsel the staff, who has poor job performance.
- 3.6. Space Management
- Discuss how to assess workspace required for various Dental lab activities.
 - Demonstrate how to arrange a flow chart of each activity.
 - Demonstrate how to make a map of a catchment area.
- 3.7. Time Management
- Describe how to compute staff workload.
 - Demonstrate how to prepare a timetable of Dental lab activities.
 - Weekly
 - Monthly
 - Quarterly
 - Yearly
- 3.8. Problem Solving
- Define problem and problem solving.
 - Identify steps of problem solving.
 - Apply the steps of problem solving to a real or simulated case.
 - Describe common mistakes of using the problem solving method.
- 3.9. Human Resource Management (HRM)
- Explain the purpose of the HRM.
 - Identify the important benefits of this system.
 - Describe process of HRM
- 2.9. Budgeting & Financial Management
- Discuss the purpose for using a budget in health management
 - Discuss the purpose and procedures for financial management.
 - Prepare an annual budget from a simulated example.
 - Demonstrate how to maintain records of income and expenditure.
 - Demonstrate how to prepare monthly / quarterly and annual financial statements

Unit 4: Health issues and Professional practice

[8 hours]

4.1. Professional practice

- Define and describe the code of conduct
- Explain the purpose of code of conduct
- Formation, activities and functioning of
- Nepal Health professional council
- Nepal Medical Council
- Nepal Dental Association
- Nepal Dental Science Hygienist Association

References

- Macmohan R et al on Being in Charge A guide to management in Primary Health care WHO current edition
- Pradhanange Y., (2055 BS), Health Management, Council for Technical Education and Vocational Training (CTEVT), Bhaktapur,
- Kamala T and Bishnu R. (1990), Leadership and Management for Health Learning Materials Centre, Tribhuvan University Katmandu,

Entrepreneurship Development

Theory: 25 Marks
Practical: 25 Marks

Total: 5 hours /week (20 weeks)
Theory: 3 hours/week
Practical: 2 hours/week

Course description:

This course is designed to provide the knowledge and skills on formulating business plan and managing small business. The entire course deals with assessing, acquiring, and developing entrepreneurial attitude; skills and tools that are necessary to start and run a small enterprise.

Course objectives:

After completion of this course students will be able to:

1. Understand the concept of business and entrepreneurship
2. Explore entrepreneurial competencies
3. Analyze business ideas and viability
4. Learn to formulate business plan with its integral components
5. Manage small business

Course content:

THEORY

Theory: 60 hours

Unit 1: Introduction to business & entrepreneurship [9 hours]

- 1.1 Overview of entrepreneur and entrepreneurship
- 1.2 Wage employment, self-employment and business
- 1.3 Synopsis of types and forms of enterprises
- 1.4 Attitudes, characteristics & skills required to be an entrepreneur
- 1.5 Myths about entrepreneurs
- 1.6 Overview of SME in Nepal

Unit 2: Exploring and developing entrepreneurial competencies [10 hours]

- 2.1. Assessing individual entrepreneurial inclination
- 2.2. Assessment of decision making attitudes
- 2.3. Risk taking behavior and risk minimization
- 2.4. Creativity and innovation in business
- 2.5. Enterprise management competencies

Unit 3: Business identification and selection [4 hours]

- 3.1. Sources and method of finding business idea(s)
- 3.2. Selection of viable business ideas
- 3.3. Legal provisions for SMEs in Nepal

Unit 4: Business plan formulation

[17 hours]

- 4.1. Needs and importance of business plan
- 4.2. Marketing plan
 - Description of product or service
 - Targeted market and customers
 - Location of business establishment
 - Estimation of market demand
 - Competitors analysis
 - Estimation of market share
 - Measures for business promotion
- 4.3. Business operation plan
 - Process of product or service creation
 - Required fix assets
 - Level of capacity utilization
 - Depreciation & amortization
 - Estimation office overhead and utilities
- 4.4. Organizational and human resource plan
 - Legal status of business
 - Management structure
 - Required human resource and cost
 - Roles and responsibility of staff
- 4.5. Financial plan
 - Working capital estimation
 - Pre-operating expenses
 - Source of investment and financial costs
 - Per unit cost of service or product
 - Unit price and profit/loss estimation of first year
- 4.6. Business plan appraisal
 - Return on investment
 - Breakeven analysis
 - Risk factors

- Unit 5: Small business management** [5 hours]
- 5.1 Concept of small business management
 - 5.2 Market and marketing mix
 - 5.3 Basic account keeping
- Practical:** [40 hours]
- Unit 1: Overview of business & entrepreneurship** [2 hours]
- 1.1. Collect business information through interaction with successful entrepreneur
- Unit 2: Exploring and developing entrepreneurial competencies** [2 hours]
- 2.1. Generate innovative business ideas
- Unit 3: Product or service identification and selection** [2 hours]
- 3.1. Analyze business ideas using SWOT method
- Unit 4: Business plan formulation** [22 hours]
1. Prepare marketing plan
 2. Prepare operation plan
 3. Prepare organizational and human resource plan
 4. Prepare financial plan
 5. Appraise business plan
 6. Prepare action plan for business startup
- Unit 5: Small business management** [2 hours]
1. Prepare receipt and payment account
 2. Perform costing and pricing of product and service

Text books:

- क) प्रशिक्षकहरूका लागि निर्मित निर्देशिका तथा प्रशिक्षण सामग्री, प्राविधिक शिक्षा तथा व्यावसायिक तालीम परिषद्, २०६९
- ख) प्रशिक्षार्थीहरूका लागि निर्मित पाठ्यसामग्री तथा कार्यपुस्तिका, प्राविधिक शिक्षा तथा व्यावसायिक तालीम परिषद् (अप्रकाशित), २०६९

References:

1. Entrepreneur's Handbook, Technonet Asia, 1981.
2. Khanna S.S., Entrepreneurship Development, S. Chand & Co. New Delhi
3. David H. Holt, Entrepreneurship: New Venture Creation, Prentice Hall India
4. Mohanty Sangram Keshari, Fundamentals of Entrepreneurship, Prentice Hall India

Comprehensive Lab Practices (In Dental Laboratory Setting)

Practical: 40 hrs./week (20 weeks)

Full Marks: 500

Pass mark: 300

Course Description:

This course is designed to help students to apply the knowledge and skills in the actual professional lab Practice of Dental Laboratory setting.

Course Objectives:

After completion of this comprehensive field practice, students will be able to:

1. Understand the concept of dental laboratory setting
2. Prepare all type of dental lab work
3. Apply the knowledge and skills in their field.

Task List

1. Perform Sterilization and Maintenance of dental laboratory instrument and materials
2. Prepare Removal Partial Denture (15 nos.)
3. Prepare Complete Denture (5 nos.)
4. Prepare Acrylic Crown (10 nos.)
5. Prepare Acrylic Bridge (5 nos.)
6. Prepare Orthodontic appliances (5 nos.)
7. Prepare space maintainer (2 nos.)
8. Prepare Bleaching tray (3 nos.)
9. Prepare metal Crown (5 nos.)
10. Prepare metal bridge (1 nos.)
11. Prepare metal ceramic crown (5 nos.)
12. Prepare metal ceramic bridge (3 nos.)
13. Prepare veneer (Indirect composite and ceramic) (1 each)
14. Prepare E-max crown (anterior and posterior (1 no. each)
15. Prepare Zirconia crown (anterior and posterior (1 no. each)
16. Prepare Cast Partial denture (Upper and Lower) (1 no. each)
17. Prepare maxillofacial prosthesis (2 nos.)
18. Prepare and presentation of internship report

A) Complete comprehensive field practice Plan

SN	Activities	Duration	Remarks
1	Orientation	2 days	Before placement
2	Report to the site	1 days	Before placement
3	Actual work at the site	20 weeks/800 hours	Within field practice period
4	First evaluation	one week (for all sites)	After 6 week of field practice start
5	Second evaluation	one week (for all sites)	After 8 week of first evaluation
6	Report to the parental organization	1 days	After placement
7	Final report preparation	5 days	After completion
	Seminar/ evaluation from CTEVT or its nominee (external)	3 days	After 10 days of completion of comprehensive lab practice

- After 6 weeks of placement first evaluation should be made by the institute or jointly with CTEVT.
- After 8 weeks of first evaluation, second evaluation should be made by the institute or jointly with CTEVT.
- After completion of 20 weeks of comprehensive field practice period, students will be provided with one week period to review all the works and prepare a comprehensive final report.
- Final seminar date and time will be fixed by the institute after one week of the completion of field practice by making consent with the CTEVT.
- Final evaluation will be made according to the marks at the following evaluation scheme but first and second term evaluation record will also be considered.

B) Evaluation scheme:

Evaluation and mark distribution is as follows:

S.N	Who does evaluate?	Marks
1	Supervisor of the organization in which the student is placed for field practice	300
2	The Training Institute	100
3	CTEVT or its nominee (external)*	100
	Total	300

*** Students are required to secure 50 percent marks in the all evaluation separately to pass the course.**