



SAVEETHA DENTAL COLLEGE AND HOSPITALS
MSc – FORENSIC ODONTOLOGY-1539



1. GOALS:

- To practice Forensic Odontology effectively, backed by scientific knowledge and skill.
- To exercise empathy and caring attitude to maintain high ethical standards in case works and field of forensic odontology.
- To critically analyse and evaluate various concepts in Age Estimation, Sex Determination, Crime Scene Investigation, Reporting of Cases and their views and adopt the most rational approach.

2. OBJECTIVES:

The objective is to train a candidate so as to ensure higher competence in Forensic Odontology and Forensic applied sciences of interest and prepare him/her, for a career in the specialty. A candidate must achieve a high degree of expertise in the

- Age estimation, Gender identification procedures from bone and teeth.
- Expert witness in cases like Child Abuse, Neglect, Sexually assaulted cases and so on.
- Forensic Police training session for investing and solving different types of case works.
- Necessary laboratory procedures such as analysis of type of dentition, tooth morphology.
- Handling of Hard and Soft tissues in effective manner by using proper equipment's.
- Tissue and teeth processing for microscopy and histological analysis.
- Handling Extra and Intra Oral Radiographs for various Judicial investigations.
- Analysis of Bite Marks in various crime scenes and field works.
- Regular court case visits for improving their argumenta and case presentation skills.
- Human Values, ethical practice and communication abilities.

3. OUTCOMES:

- **Forensic odontology** is proving to be extremely valuable in criminal and civil cases through experimenting and learning this specialty.

4. COMPONENTS OF THE COURSE CURRICULUM:

- Theoretical knowledge
- Practical skills
- Research skills.

- Attitudes including communication skills.
- Training in research methodology.

5. DURATION OF THE COURSE

- The course of study shall be for a period of 2 academic years for medical graduates.

6. Who is this program for?

- This program is specifically curated for Medical and dental graduates.

7. MEDIUM OF INSTRUCTION

- The Medium of instruction and examination shall be in English.

8. METHOD OF TRAINING

- Training should include involvement in theory, laboratory & experimental work and research studies
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9. MONITORING OF PROGRESS IN STUDIES

The exams will be in module wise and may include written papers, practicals and viva voce. Records and marks obtained in such tests will be maintained by the Head of the Department and sent to the SDC, SIMATS when called for. A mock exam will be held one month before the final exam to see if students are eligible to attend the final exams. The candidates who have failed in final examination shall be given an internal assessment improvement test and the best marks shall be submitted to SDC, SIMATS when called for.

10. DISSERTATION

Every candidate pursuing M. Sc in Forensic odontology course is required to carry out work on a selected research Dissertation under the guidance of a recognized post graduate teacher in their respective subjects. The results of such work shall be submitted in the form of a Dissertation The student can choose topic related to Forensic Odontology from the following subjects: 1. Forensic Odontology 2. Oral Radiology/Oral Medicine 3. Oral Pathology and Microbiology 4. Forensic Medicine and Toxicology 5. Pedodontics and Preventive Dentistry 6. Prosthodontics, Crown and Bridge 7. Endodontics and Materials Science 8. Forensic Science and Criminology 9. Medical and Dental Jurisprudence.

The project is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, and comparison of results and drawing conclusions. Every candidate shall submit a synopsis in the prescribed format containing particulars of proposed Dissertation work within Nine months from the date of commencement of the course and on or before the dates notified by the SDC, SIMATS the synopsis shall be sent through the proper channel. Such synopsis will be reviewed and the project topic will be registered by the SDC, SIMATS. No change in the project topic or guide shall be made without prior approval of the SDC, SIMATS. The candidates shall report the progress of the project work to the concerned guide periodically and obtain clearance for the continuation of the Dissertation work. The Dissertation report shall be written under the following headings 1. Introduction 2. Aims and Objectives of study 3. Review of Literature 4. Material and Methods 5. Results 6. Discussion 7. Conclusion 8. Summary 9. References 10. Tables 11. Annexure.

11. SCHEME & SCHEDULE OF FINAL EXAMINATION

- The SDC, SIMATS Examination for M. Sc Forensic Odontology shall be held at the end of I and II Year
- FIRST YEAR EXAM & FINAL EXAM: The exam shall consist of written paper (Theory), Practical, Viva-voce and Project.
- Written Examination (Theory): A written examination shall consist of three papers, each of three hours duration.
- Each paper shall carry 100 marks. Distribution of Marks at the Deemed to be University Examination Theory

First Year Exam

Theory	Title	Max Marks	Practical Marks
Paper I	Human Anatomy and Dental Anatomy	100	200
Paper II	Molecular Biology	100	
Paper III	Advanced Forensics	100	

Final Year Exam

THEORY	TITLE	MAX MARKS	PRACTICAL MARKS
PAPER I	Basic Dental and Forensic Sciences	100	200
PAPER II	Forensic Medicine and Toxicology	100	
PAPER III	Forensic Odontology	100	

12. APPOINTMENT OF EXAMINERS:

- For I & II Year- There shall be four examiners in practical examination. Out of them two shall be external examiner and two shall be internal examiner.
- External examiner from outside institution. Postgraduate teacher with MD/MS/PhD degree with 5 years of experience shall be appointed as examiners.
- The Internal/external examiner shall be from the either Medical faculty (Forensic Medicine department) and Dental faculty (Oral Medicine/Oral Pathology/forensic odontology/Prosthodontics/Pedodontics). The Internal and External examiners will be alternating between these subjects mentioned every year.

13. CRITERIA FOR DECLARING AS PASS IN EXAMINATION:

Final examination: a candidate shall secure not less than 50% marks in each head of passing which shall include (1) theory, (2) practical and viva voce examination. A candidate securing less than 50% of marks as described above shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee.

Resident Responsibilities:

- The resident must demonstrate the particular practical exercise and case report writing.
- Practice based learning and improvement in the area of Age Estimation and Sex Determination.
- The resident will demonstrate the case presentation in interest of Court of Law
- The resident will demonstrate the Lifting of Finger Prints, Foot Prints, Lip Prints, DNA Analysis, Bite Mark Analysis and Other difficult cases.
- The resident will take the students to field visits and Clinical Postings as well for observation of Cases.

Clinical Posting Departments:

- Department of Oral Medicine and Radiology
- Department of Oral and Maxillofacial Surgery.
- Department of Pedodontics
- Department of Prosthodontics
- Law clinic

DOCUMENTATION TO BE MAINTAINED BY THE PG RESIDENTS:

PG Work Documentation
Seminar and journal discussion documentation
Pedagogy documentation
CAT Documentation
Mind Mapping Documentation and Activity Documentation
Checklist to be completed in the 3 months
Documentation of cases and practical works
Forms signed by the particular faculty & Log Book Documentation

Why Forensic Odontology?

Forensic Odontology is the application of dental knowledge to the investigation of crime, particularly in establishing the causes of injury or death related to the oral and maxillofacial region. Our program is unique and exhaustive as it prioritizes practical applications synchronous to comprehensive theoretical

learning. Additionally, enormous thrust is given to research related activities.

Forensic dentistry mainly involves the identification of an assailant by comparing a record of their dentition (set of teeth) with a record of a bite mark left on a victim. The forensic dentist, however, is to an ordinary dentist what the forensic pathologist is to an ordinary physician.

Using the teeth and dental records to identify the dead people is the main field of odontology and forensic dentistry. Forensic dentists have become a very important part of investigation on missing persons, disaster recovery, and solving and prosecuting crimes.

What will students learn?

- Basic application of forensic odontology to the process of medicolegal death investigation.
- Improved crime scene processing skills, including the recognition, documentation, collection, and analysis of physical evidence associated with the episode of death
- Improved professional report writing for use in legal investigations
- Enhanced ability to provide expert witness testimony in the courtroom.

SYLLABUS

BROAD AREAS OF THE CORE COURSE

1. **Basics of Forensic Sciences:** Basics, Ethics, Rules, Laws, Procedures, Cross Examinations, Investigating the Crime Scene (The Crime Scene and the Collection of Evidence); Investigating and Processing Physical Evidence, The Microscope and Forensic identification of Hair and Fibers, Toxicology, Forensic Medicine, DNA and Serology,
2. **Introduction to Forensic Odontology / Dentistry,** Introduction to Forensic Anthropology, Role and Importance of Forensic Odontologist, Forensic Dentistry and the Law, Identification of human remains, Identification in mass fatalities, Assessment of bite mark injuries, Age estimation, Bite Marks, Use of Bite Marks to Identify Individuals, Post- mortem Identification, Evaluation of dental evidence, Dental Records and Profiling, DNA extraction from tooth.
3. **Advanced Forensic odontology** Scientific methods of Identification and Issues Regarding Scientific Testing, Identification of human remains and Testing Human remains, Post-mortem Identification (Medical and Dental Autopsy), Dental Structure Identification and Classification of Dental Remains, Odonto-anthropology and Buried Crime Scene Evidences, Forensic Odonatological Databases, Serological Markers, Salivary Drug Detection, DNA Analysis in Biological Specimens, DNA Contamination issues, DNA Dental Applications, The Frye Test, Instrumentation, Problems in applying DNA Test Results, Quality Assurance and Testing Procedures, Forensic / Dental Photography Techniques, Radiography, and Photographic Evidences, Mass Disaster Management and Forensic Dentistry Considerations, Dental Records and Role of Dental Professionals, Virtual Dentitions, Facial Reconstructions, Report Writing, Components of a Forensic Odontology Report.
4. **Dental Ethics** particularly relevant to postgraduate dental education and the specialty practice of dentistry will constitute this course. Following completion of online activities, students review modules with individual Postgraduate Program Directors to explore and

reinforce ties between ethics concepts learned and specific applications in dental specialty practice.

5. **Radiology:** This course offers the fundamentals of theory and practice that constitute a working knowledge of the radiologic sciences as they apply to general and forensic dentistry. Laboratory exercises will be utilized to develop practical skills in the area of dental radiographic procedures which serve as the foundation for intraoral radiographic image acquisition and interpretation. The course will cover basic principles and anatomy revealed by intraoral and panoramic imaging as well as cone beam computed tomography (CBCT).

6. **Clinical Head & Neck Anatomy** detailed study of anatomic structures fundamental to dental specialty training. Emphasis is placed on functional (rather than architectural) relationships as they relate to growth, development, and clinical treatment. Participants review standard texts of anatomy and radiology, and other professional literature, in order to support specialty-specific questions/topics. Instructor will guide discussion, add and source information, present clinical case(s), sample corollaries and questions. Groups, with representatives' clinical correlates and imagery.

7. **Forensic Criminology:** Introduction to Crime, Criminology and Laws; Theories of Criminology; The Criminal Justice System; Criminal Profiling; How to Be Your Own Private Investigator; Crime against woman and child; Drug Addiction and crime White Collar Crime; Political Crime; Property Crime; Violent Crime; Forensic Psychology, Anthropology, Forensic Engineering, Forensic Entomology, Wildlife Forensics and other important issue.

8. **Fingerprint** Introduction to Fingerprints; History and Development of Fingerprints; Classification of Fingerprints; Henry system of fingerprint classification; Identifying various fingerprint patterns; Identifying individuals from fingerprint patterns.; Lifting fingerprints from various objects.; Types of Fingerprints and Class & Individual Characteristics; Different methods of latent fingerprint development; Photography of fingerprints; Fingerprint Chart Preparation, Fingerprinting, Comparison / Verification of fingerprints, Automatic fingerprint identification system, Fingerprint expert in court, Expert Opinion Writing.
9. **Forensic Biotechnology and DNA Fingerprinting** History of DNA fingerprinting; Ethics, Rules and Procedures; Restriction fragment length polymorphism (RFLP); Random amplified polymorphic DNA (RAPD); Amplified fragment length polymorphism (AFLP); Microsatellites; PCR amplifications; Single nucleotide polymorphism (SNuPs); Genetic linkage mapping; Physical mapping of the genome; BAC end sequencing; Extract DNA from blood and biological material; and other tests for DNA; DNA Testing Tool, Kits and Equipment.
10. **Forensic Fire Investigations** Introduction to Fire and Arson Investigation, Understanding Fire, Fire Chemistry, Fire Dynamics, Types of fires, Fire and combustion, some relevant properties of materials, Heat transfer, Combustion, Development and behavior of fires in compartments, Factors affecting fire growth, Spread of flame to other compartments, Ignition, Fire Related Human Behavior, Incendiary Fire Analysis and Investigation, Evidence collection and preservation,
11. **Forensic Psychology and Criminal Profiling** Introduction to Forensic Psychology, Psychologists & the Legal System, Personality Assessment in Personal Injury Litigation, Identification and Evaluation of Criminal Suspects, Violence Risk Assessment- Research, Legal and Clinical Considerations, The Rights of Victims and The Rights of the Accused, Psychology of Victims, An introduction to personality disorders. Therapy interfering behaviours.; Intro. to Criminal Profiling, Polygraph Testing, Narco-analysis, Lie-Detection, Brain Profiling, Interviewing techniques, Offender profiling, Modus Operandi, Portrait Parle etc...; Role of psychologists in relation to the legal framework.

12. **Forensic Photography** Fundamentals of Photography, choosing your Camera, use of natural light and portrait photography, Crime scene photography, Micro and Macro photography, Color Photography, Advanced Digital Photography Techniques, Crime Scene Sketching and Digital Photography, Photography Effects, Post Processing, Introduction to Photoshop,
13. **Wildlife Forensics and Comparative dental Anatomy** Introduction to Wildlife, Environment Forensics, Protected and endangered species of Animals, Reptiles, Snakes and Plants etc. Identification of Pug marks of various animals / birds and Study of Plant Poisons. Introduction to Plant and Snake Poisons, DNA Sample Examination.
14. **Crime Scene Investigation** Introduction to Crime Scene Investigation; – Locard’s Exchange Principle; – Types of Evidence and Protecting the Evidence; Dealing with Suspect Persons, Witnesses and Family Members; – Identifying Physical Evidence; – Examination of glass and soil; – Role of Crime Scene Investigator; – Processing a Crime Scene; – Crime Scene Documentation; – Collecting the Evidence; – Crime Scene Photography and Sketching; – Chain of custody and Forwarding of different types of evidences to the laboratories; – Interpreting a Crime Scene; – Techniques for Handling Evidence; – Blood Spatter Analysis; – Reconstructing a Crime Scene; – Crime Scene Tool, Kits and Equipment
15. **Forensic Pharmacy** Forensic Pharmacy – Pharmaceutical Jurisprudence, Concept of Law and Pharmaceutical Legislation, Drugs, Poisons and Medicines by Forensic view. Pharmaceutical Legislation, Pharmacy and Health Care System, Code of Pharmaceutical Ethics, Pharmacy Act, Drugs and Cosmetics Acts and Rules, Narcotic Drugs and Psychotropic Substances Act and Rules.
16. **Injuries:** Types and classification of injuries, anti-mortem and post-mortem injuries, aging of injuries, artificial injuries.; Introduction to Medical Jurisprudence and legal procedure, Law and Medicine, Law in relation to the Medical Profession, practice of Legal Medicine.; Medico legal Autopsy: Introduction to Autopsy, collection and preservation of viscera for analysis, postmortem report.; Death: Introduction to death, Causes of death, determination of time since death, medico legal aspects of death investigation, types of deaths, Personal Identification; Abortion; General study and Isolation techniques of toxins, drugs, Volatile poisons, vegetable poisons (As this is Forensic Course it covers only forensic part, legal procedures, ethics, laws etc.

ADDITIONAL SUPPORTING COURSES

Statistics for Research: Principles and application of statistical methodology, integrated with considerable use of major statistical computing system. Probability and probability distributions, forming and testing hypotheses using parametric and nonparametric inference methods. Matrix-based simple linear regression and correlation. The biostatistics portion of this course introduces students to widely used methods for analysis of experimental and observational data with orientation toward statistical inference from dental research. The research methods aspect of this course serves as an introduction to research, including methods for handling experimental data.

Forensic Dentistry Research and Manuscript: Students will work on the inception, implementation, and submission for publication of a research project with an individual advisor. Student activities include library research, writing a literature review, developing a research protocol, hands-on research, gathering and analyzing data, interpreting experimental results, developing conclusions, and publishing outcomes. Submission for publication of the original research is required.

Special Courses:

1. 3D Forensic Facial Reconstruction
2. Forensic Crime Scene Photography
3. Police Forensic Team Training
4. Autopsy trainings and findings

FIELD VISIT'S:

1. Abroad training for three months, countries like UK and Malaysia for improving field skills
2. Forensic Medicine Department visit for autopsy cases, case observation and practical session.
3. Court visits for improving their knowledge and cases observation.

PRACTICAL SESSION AND HAND'S ON:

S.NO	TOPIC
1.	Age estimation using pulp-tooth area ratio method
2.	Gleiser and hunt 7 & 8 teeth staging method
3.	Age estimation Demirjian's 7 teeth method
4.	Age estimation using gonial angle Edentulous and dentulous
5.	Age estimation from dentin translucency (Length and Area) method
6.	Nolla's Age Estimation Method
7.	Age estimation Demirjian's 8 teeth method
8.	London Atlas method (Software)
9.	Sex determination using Ramus Flexure
10.	Accuracy of >/<14yrs
11.	Probability of >/<18
12.	Anderson method
13.	Age Estimation by Attrition Method
14.	Cheiloscopy & Palatoscopy
15.	Age estimation using Willem's method
16.	Mincer method
17.	Sex Determination using intercanine width
18.	Antemortem and Postmortem charting
19.	Analysis of odontometric sexual dimorphism and sex assessment accuracy in Indian population
20.	Age and Sex Determination using mandibular parameters
21.	Age and Sex Determination by Using Mandibular Basal Bone Height
22.	Bite Mark Analysis Using Manual & Software
23.	Validation of UT Software in Indian Population
24.	Age Estimation by Using Dentin Translucency Comparing Visual and Digital Method
25.	Forensic Facial Reconstruction
26.	DNA Analysis

27.

Forensic Photography in different scenario

