Naif Arab University for Security Sciences

Prospectus

College of Forensic Sciences

Riyadh - 2005

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For Inquiries

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PREFACE

Upon the recommendations of the board of directors, the council of higher education and by the gracious approval of HRH Prince Naif Bin Abdulaziz Al-Saud, the former department of Forensic Science Laboratories of NAUSS has recently acquired an independent College status.

I overwhelmingly applaud this decision and welcome the addition of new college of forensic sciences (CFSc) in the university system to take up even larger role in pursuit of providing a wider educational and research opportunities. Over the number of years this laboratories division (now a College) has shown an outstanding performance in educating, training and upgrading a vast number of students from all Arab member states who are already serving in all fields of forensic sciences - governmental laboratories and many have been employed at managerial and supervisory positions in various administrative departments of security sciences affairs of their own countries.

However this exceptional track of services rendered by the forensic sciences division and its over due recognition as an independent college could have not been possible without untiring dedication, sense and the efforts of concerned professionals who helped shape the forensic sciences laboratory department to an independent college which stands as highly meritorious among the most advanced institutes of forensic sciences in the world.

Recently the college (CFSc) has compiled its syllabi for the

professional and higher diploma (PDFSc & HDFSc) as well for post-graduate (Master's) degree program (MFSc) in forensic science which are well comparable to the syllabi of the most prestigious programs in Forensic Sciences across the globe . I wish every success to the college to widen its horizon by successfully launching more new programs of study and yet maintaining highest academic standards and a true leadership role in teaching and research in the arena of security Sciences.

Prof.Dr. Abdulaziz S. Al-Ghamdi
President
Naif Arab University of Security Science

FOREWORD

It is a landmark achievement in the history of NAUSS that its own Forensic Sciences Laboratories has been granted a full accreditation to an independent status of college of forensic sciences. My special thanks are due to our University President Dr. Abdulaziz Bin Sagr Al-Ghamdi who so kindly provided all administrative, finance and material support added with his keen personal interest in transformation of this forensic Sciences laboratories in to a technologically advanced forensic sciences college of international repute.

I believe that this newly established college will attain new heights under the leadership of Dr. Abdulaziz Al Ghamdi and by continued devotion and hard work of our exceptionally qualified staff members.

In near future the college will open its doors to the students to professional and higher diploma programs (PDFSC, HDFSc) or to the master's programs in the forensic sciences (MFSc) in the near future. Currently the college houses comfortable and spacious lecture halls equipped with latest amenities, teaching aids, close circuit TV and by all standards the technological advanced laboratories with the state of the art analytical instruments, accessible by students and the staff members for teaching and research activities.

In addition more faculty members and professional staff are being hired to meet the demand of large number of prospective students. However, students are firmly encouraged to conduct a research under the supervision of the faculty member of Naif University or by joint

collaboration with the researchers of the scientific institutes, research centers and universities elsewhere.

Omer E. Elassam
Dean, College of Forensic Sciences (CFSc)
Naif Arab University for security Sciences

INTRODUCTION

Naif Arab University for Security Sciences (NAUSS) is a regional university engaged in education, research and training in the fields of crime control and criminal justice.

NAUSS is comprised of four colleges and two Centers. These are:

a) The College of Graduate Studies

b) The Training College

c) The College of Languages

d) The College of Forensic Sciences

e) The Studies and Research Center

f) The Information and Computer Center

The college of Forensic Sciences (CFSc) is located on the east side within the main university campus on Dammam highway, housed in a two story building composed of furnished offices for faculty and staff members, attached with modern laboratories, spacious lecture halls, equipped with close circuit cameras and television for effective delivery of lectures and easy viewing of related demonstrations. A medium size cafeteria and a library are also attached for the convenience of the students and staff members of the college. The college has attained international recognition for its highest standards in utilizing the state of the art Analytical instruments and equipments in its laboratories. This college pledges to provide world class education to the prospective students from all Arab states in order to prepare them for future vibrant role in academia,

security and research. Students may also be granted an equivalent standing when transferring from other programs of study from recognized institutess to CFSc programs at NAUSS.

The college proudly announces two programs of study. (1 &2):

1. A professional diploma and
2. A higher standard diploma,

Both would be offered on alternate years leading to the award of PDFSc and HDFSc, in all disciplines of forensic sciences with availability of a variety of subspecialities offered at NAUSS campus in city of Riyadh, Kingdom of Saudi Arabia.

The college is divided into four major departments:

1)Forensic Chemistry Department(FCD)

2)Forensic Biology Department(FBD)

3)Physical Evidence Department (PED)

4) Crime Scene Department (CSD)

Each department is sub-divided into various academic units. These units cover a variety of specific areas of course subjects and topics of research supervised by a team of qualified faculty and skilled professionals. Students are given broad background in theory through extensive class room lectures supplemented by unparallel hands on experience with a variety of tools and the advanced analytical instruments utilized in any modern laboratory.

The content and syllabus of each department and its units are deliberately modified and updated to meet the challenges of changing

times regarding security and well being of the citizens of all Arab States. The training and educational programs are flexible modules, for students who have forensic sciences background. These departments are:

1. Forensic Chemistry Department (FCD)

This department's activities are divided into the following units:

a) Toxicology Unit: This unit deals with identification and analysis of drugs of abuse in body fluids like blood, urine, saliva, sweat and hairs. The unit employs various isolation techniques and advanced instruments for both qualitative and quantitative analysis.

b) Explosive and Fire Debris Unit: The unit emphasizes on the trace evidences of residues left behind after head space, explosion incidences and fire debris

c) Paints, Inks, and Dyes Unit: This unit involves in extracting, analysing and identifying the residues of paints, inks and dyes in relation to their source of origin.

d) Advanced Analytical Instrument Unit : This is a special unit which provides a theoretical basis through extensive class room lectures and laboratory exercises by operating, trouble shooting of most advanced instruments as required in any accredited forensic sciences laboratory.

2. The Forensic Biology Department (FBD)

This department provides instructions on the investigations of trace biological evidence, collection, packing and examination by utilizing different analytical techniques. Considerable amount of information is gained on methodological aspect by working with forensic DNA, its extraction from blood stains, saliva and semen and identification constituting a most valuable piece of evidence collected from crime its origin and surroundings.

The department includes following units:

a) Analytical Serology Unit: In this unit forensic identification is conducted using Elisa, FIP, Histochemical, Immunological and blood grouping as well as HLA sharing.

b) Hair and Dye Unit: Here trace forensic differences in dye components are identified. Examination of hair in minute detail exhibits presence of environmental contaminant and excretion of drugs of abuse and poisons. The biological and chemical characteristics are also examined.

c) DNA Technology Unit: This unit engages in study of forensic significance of DNA, employing PCR, STR and RFLP techniques

3.The Physical Evidence Department (PED)

This department involves teaching various means of collection of trace evidence from crime scenes their examination, documentation, finger printing and tools marks identification.

The department is divided in to the following unit:

a) Documentation and Examination Unit: In the unit students are demonstrated the authenticity of documents which includes its characteristics,extracting information on composition including paper, ink, and handwriting features and typewriting scripts. Here advanced instruments like high magnifying microscopes, chromatography and mass spectrometry and routinely utilized.

b) Finger print Technology Unit: This important forensic technique is described in detail since no two individuals have identical finger prints. Gallen's Loop calculations, Core, Arch and ridge characteristics are highlighted. In this course several data base are described like AFIS & APS are described. Also importance of preservation of impression liftings are emphasized for further investigative studies.

c)Ballistic and Tool marks Unit: Students learn the motion and impact of projectile such as range, trajectory or penetration power of fire bullets and ricochet patterns. Here extensive use of microscope, sketehces, photography, and impression lifting are utilized.

4.The Crime Scene Department (CSD)

This department provides background to investigate evidence including documents, scan of photographs and impressions pertaining

to crime scene. Video recording based on still and motion photography are made which help the judiciary to examine detailed features of crime evidence, thereby shedding light on the source and perpetrators involved in committing the crime.

This department operates through following units:

a) Sketching and Crime Scene Inspection Unit: Sketching of crime scene and surroundings are collected through accurate documentation and interviewing of the available witnesses.

b)Photography Unit: The state of the art cameras (IR, UV, X-Ray, Digital, still and video) are valuable in collection of the original status of the crime scene for successful investigation.

c) Video recording and database Unit: Still and video cameras are routinely used to record the crime as it is being committed and hence this evidence can be displayed to the law enforcement officials and judges to gain better insight into the criminal activity in process.

THE TRAINING PROGRAM

The annually scheduled training programs are usually categorized into three main levels:

1. Basic training courses.

2. Advance refreshment courses.

3. Advance technique-training courses.

1. Basic training courses:

These programs cover all areas of forensic science and they are usually designed for candidates who are newly joining or nominated to join forensic laboratories. They are as follows:

A. Forensic chemistry programs:

(i) Identification and analysis of drugs of abuse.

(ii) Analysis of drugs in body fluids, urine, tissues, hairs, sweat, saliva and blood samples (Toxicology).

(iii) Laboratory based analysis of explosives gunshot residues.

(iv) Laboratory based analysis of arson accelerants.

(v) Field test for drugs of abuse.

B. Forensic biology programs

(i) Biological traces and trace evidence in the crime scene (blood stains,

seminal stains, viginal secretion, hair & fiber)

(ii) Genetic fingerprint, DNA techniques.

C. Physical evidence programs

(i) Finger print techniques.

(ii) Document examinations.

(iii) Firearms and tool marks microscopic examination.

(iv) Foot, shoes and tires impression lifting.

D. Crime Scene Documentation:

(i) Photography techniques.

(ii) Video recording.

(iii) Imaging, and tracing analysis.

2. Advance refreshment courses:

These courses represent specific topics within each and every field of the forensic sciences. Thus in forensic chemistry the courses include:

(i) Residual analysis of gunshot; (ii) Paints and ink analysis.

In Forensic biology the advance refreshment courses include:

(i) DNA profiling techniques;

(ii) DNA data stations.

In Forensic physical evidences the refreshment programs include:

(i) Hand writing examination;

(ii) Magnetic cards examination;

(iii) Shoes, tires and foot impressions lifting and computer database for sports shoes.

3. Advance technique training courses:

These courses cover the state of art techniques in all areas of forensic aspects such as:

(i) Drugs analysis in hair.

(ii) S.T.R. techniques in DNA profiling.

(iii) Laser and computer techniques in fingerprint data base.

(iv) Imaging, sketching and computer technology in forensic photography.

However specialized technical training programs are also offered and could possibly be designed to be more flexible to meet the actual needs of forensic sciences laboratories in Arab world and other laboratories of related activities. These include:

(i) Gas chromatography/ Mass spectrometry (GC/MC). 1ea.

(ii) Scanning electron microscopy (SEM). 1ea.

(iii) Gas chromatography (GC) 4ea.

(iv) High performance liquid chromatography (HPLC) 3ea.

(v) Atomic Absorption spectroscopy (AAS) 1ea.

(vi) UV/ Visible spectrophotometry (UV/Vis). 3ea.

(vii) Fourier-transform infrared spectrophotometry (FT-IR) 3ea.

(viii) High performance electrophoresis (HPCE). 1ea.

(ix) Polymerase chain reaction technique (PCR) 1ea.

(x) Video spectral comparator (VSC) 1ea.

(xi) Laser detection of fingerprint. 1ea.

Achievements:

Since 1988 NAUSS's College of Forensic Sciences contributed effectively in the NAUSS's annual program by announcing the forensic science training programs and post-graduate and under graduate diploma programs (starting September 2005) for the interested candidates from all Arab member states. The nature and number of the training programs and the time they would be held (continued).

Professional Diploma in Forensic sciences (PDFSc):

PDFSc is an undergraduate program of study that aims to prepare students to enable them to work in crime/police laboratories, forensic sciences laboratories and related law enforcement agencies. The students enrolled in PDFSc program at NAUSS should have completed High school certificate or may have been working in any of the branches of forensic sciences for not less than one year.

The prospective students are required to register for two semesters a total of 20 credit hours in order to earn this diploma (PDFSc). The syllabus is divided in two categories:

Category I. Includes a group (block) of five core courses (10 hrs), which must be taken by all students studying for PDFSc regardless of their own selection to specialize in any particular area.

Category 2. Includes a variety of (11 options) blocks of courses for sub-specialilzation under any chosen department. Students can select any one group (Block) of courses (10 hrs) listed under respective department in order to specialize in the area of their interest.

Category 1
Core courses requirement:
(Compulsory)

C100	Scene of Crime (Basic Principles)	3 Credit Hrs.
C101	Introduction to the Criminal justice	2 Credit Hrs.
C102	Basic computer sciences	3 Credit Hrs.
C103	Safety guidelines in forensic labs	2 Credit Hrs.
	Total	**10 Credit Hrs.**

- Prefix C = deal with core (compulsory) courses PDFSc = Professional Diploma in Forensic Sciences
- Prefix D = Departmental courses
- CFSc = College of Forensic Sciences
- NAUSS = Naif Arab University of Security Sciences

Category 2

Department of Forensic Chemistry:

Selection of only one block of four courses is allowed from all eleven blocks under respective departments.

Ist Block of Courses

Course No.	Course Title	Credit hours
D104	Introduction to explosive materials and fire debris.	3 Hrs.
D105	Methods of detection and extraction Procedures of explosive and fire debris.	3 Hrs.
D106	Instrumental analysis of explosives and fire accelerants.	2 Hrs.
D107	Dissertation (in partial fulfillment)	2 Hrs.
	Total	**10 Hrs.**

2nd Block of Courses

Course No.	Course Title	Credit hours
D108	Introduction to Toxicology	2 Hrs.
D109	Methods of separation and extraction of drugs, alcohol and toxins	3 Hrs.
D110	Instrumental analysis of drugs, alcohol and toxins	2 Hrs.
D111	Dissertation (graduation project)	2 Hrs.
	Total	**10 Hrs.**

3rd Block of Courses

Course No.	Course Title	Credit hours
D112	Basic principles of paints, dyes and inks	4 Hrs.
D113	Methods of Extraction and separation of dyes, paints and inks	3 Hrs.
D114	Dissertation (graduation project)	3 Hrs.
	Total	**10 Hrs.**

Department of Forensic Biology:

1st Block of Courses

Course No.	Course Title	Credit hours
D115	Introduction to Serology	2 Hrs.
D116	Methods of testing of biological and seminal fluids	3 Hrs.
D117	Microscopic examination and instrumental analysis	3 Hrs.
D118	Dissertation	2 Hrs.
	Total	**10 Hrs.**

2nd Block of Courses

Course No.	Course Title	Credit hours
D119	Principles of examination of tissues, hair and fibers	2 Hrs.
D120	Microscopic examination of hair and fibers	3 Hrs.
D121	Microscopic techniques	3 Hrs.
D122	Dissertation	2 Hrs.
	Total	**10 Hrs.**

3rd Block of Courses

Course No.	Course Title	Credit hours
D123	Principles of genetic sciences	2 Hrs.
D124	DNA techniques and technology	3 Hrs.
D125	Forensic DNA Analysis	3 Hrs.
D126	Dissertation	2 Hrs.
	Total	**10 Hrs.**

Department of Crime Scene:

1st Block of Courses

Course No.	Course Title	Credit hours
D127	Principles of crime scene and inspection	2 Hrs.
D128	Crime scene documentation procedure	3 Hrs.
D129	Documentation of crime scene tools, equipment and techniques	3 Hrs.
D130	Dissertation	2 Hrs.
	Total	**10 Hrs.**

2nd Block of Courses

Course No.	Course Title	Credit hours
D131	Principles of forensic photography	2 Hrs.
D132	Methodology of photographing techniques	3 Hrs.
D133	Techniques of forensic photography	3 Hrs.
D134	Dissertation	2 Hrs.
	Total	**10 Hrs.**

Department of Physical Evidence:

1st Block of Courses

Course No.	Course Title	Credit hours
D135	Fingerprints Identification	2 Hrs.
D136	Methods of prints search and visualization techniques	3 Hrs.
D137	Fingerprint, classification, comparison and automated system (AFIS) techniques	3 Hrs.
D138	Dissertation	2 Hrs.
	Total	**10 Hrs.**

2nd Block of Courses

Course No.	Course Title	Credit hours
D139	Principles of Documents Examination	2 Hrs.
D140	Examination of handwriting, printers, and colored printers and colored photocopiers	3 Hrs.
D141	Examination techniques and technology involved to study documents, IDS, passports, traveler checks and bank notes	3 Hrs.
D142	Dissertation	2 Hrs.
	Total	**10 Hrs.**

3rd Block of Courses

Course No.	Course Title	Credit hours
D143	Principles of firearms and tool marks examination	2 Hrs.
D144	Microscopic examination of firearms and different tools marks	3 Hrs.
D145	Microscopic Examination technologies	3 Hrs.
D146	Dissertation	2 Hrs.
	Total	**10 Hrs.**

Courses Description:

C 100. Scene of Crime:

This course deals with crime scene examination, documentation, recognition, collection, preservation, and transportation of physical evidence for laboratory examination.

C 101. Introduction to Criminal Justice:

This course offers and interdisciplinary program in criminal justice. Students gaine understanding of the law enforcement agencie's rules pertaining to the justice system and the role of social, legal and technological as well as in psychological causes of criminal behavior. Students also require knowledge in prosecutorial, judicial defense, corrections and others branches of criminal justice.

C 102. Basic Computer Sciences:

Students are given an overview of full potential of computer technology which includes data entry, and its analysis by statistical methods. Also is discussed the uses of the computers in crime investigation and networking with the national and international data bases.

C 103. Safety Guidelines in Forensic Labs:

In this course students learn how to safeguard themselves and other co-workers from any accidental exposure or harm in the work place area. Precautions and possible accidental prone areas as well as equipment hazards are identified in order to minimize accidents and thus avoiding any injury or physical damage.

D 104. Introduction in Serology:

In this course students learn broad scope of laboratory tests that utilize specific antigen and serum antibody reaction. The most wide spread application of serology is typing of whole blood for its A-B-O identity. Also they will learn chemical color test for presence of enzyme activity, heredity check, allele gene and Punnet square method.

D 105. Methods of Detection and Extraction Procedures of Explosives and Fire Debris:

Here students are provided current information on extraction and extraction procedures of disintegrated explosives and various trace components of resulting debris from fired weapons including used casings.

D 106. Instrumental Analysis of Explosives and Fire Accelerants:

This course teaches practical aspects of instruments for detection and analysis of explosives before detonation and also instructs analysis and identification of fire accelerants. This includes use of microscopes, chemical, chromatography and mass spectrometric methods.

D 107. Dissertation:

This requirements is in partial fulfillment for the award of PDFSc. The selection of the topic and conducting the research is pursued with the consultation of the academic adviser.

D 108. Introduction to Toxicology:

Students learn the toxic behavior of a variety of substances and their implication on biological systems. Basic pharmacological and

toxicological laboratory methods are demonstrated. Use of analytical instruments like GLC / TLC / HPLC and MS inclusive of interpretation of results obtained.

D 109. Methods of Separation and Extraction of Drugs, Alcohol and Toxins:

In this course separation and extraction procedures are described based on the nature and chemical reactivity as well as biological behavior of the above substances (drugs, alcohol and toxins) their isolation from interfering substances is emphasized.

D 110. Instrumental Analysis of Drugs, Alcohol, and Toxins:

The students learn the use of various classical instruments and automated analyzer to identify and quantify the above group of substances. Special emphasis is given to chromatographic methods, Mass spectrometry and some of the immunological methods.

D 111. Dissertation: (Equivalent to D 107)

This is a graduation requirement. The selection of the topic and conducting the research is pursued with the consultation of the academic adviser.

D 112. Basic Principles of Paints, Dyes and Inks:

This course demonstrates the general use, nature and composition of paints, dyes and inks. Students come to learn the forensic implication of the above substances, involving isolation, detection, and quantification of residing residue.

D 113. Methods of Extraction and Separation of Paints, Dyes and Inks:

In this course instructor provides various methods of separation and extraction of above substances based on their chemical behavior and on the level of detection desired. Special emphasis is given to the use of advanced analytical instruments.

D 114. Dissertation: (Equivalent to D 107)

This is a graduation requirement. The selection of the topic and conducting the research is pursued with the consultation of the academic adviser.

D 115. Introduction to Serology: (Equivalent to D 104)

In this course through lectures and laboratory sessions principles of serology and forensic application are described. Theory and practice of instrument like ELISA readers, Dx, FIP, and examination of blood grouping, use of immunohistochemical methods, examination of blood, saliva, hair, tissues and botanical samples are discussed.

D 116. Methods of Testing Biological Fluids including Semsn:

By enrolling in this course students will learn various methods to handle, analyze and identify the biological fluids with the most advanced instruments in practice. This also includes separation of endogenous as well as administered substances with the use of auto-analyzers like sperm counters, motility and morphology readers of sperm.

D 117. Microscopic Examination and Instrumental Analysis:

This course deals with identification and analysis of trace evidence and residue analysis using microscopes with diverse lenses and varied optic sources.

D 118. Dissertation: (Equivalent to D 107)

This is a graduation requirement. The selection of the topic and conducting the research is pursued with the consultation of the academic adviser.

D 119. Principles of Examination of Tissues, Hairs, and Fibres:

This course demonstrates the composition of body tissues, hair and fibers. The magnification technology provides ultra fine characteristics which are helpful in differentiation of crime sources and its surrounding.

D 120. Microscopic Examination of Tissues, Hairs and Fibres:

The important characteristics of each above are studied with the help of microscopes which renders ultra fine characteristic of above artifact in relation to crime committed.

D 121. Microscope Techniques:

This short course provides the information on the use of microscopic techniques available to study samples of tissues, hair and fibers, including used of microscope, photography and scanning electron microscope.

D 122. Dissertation: (Equivalent to D 107)

This is a graduation requirement. The selection of the topic and conducting the research is pursued with consultation of the academic adviser.

D 123. Principles of Genetic Sciences:

Teachers provides principles of genetics in human, it includes gender identification, hereditary traits, familial background and related anthropological features. Including genetic markers (the DNA typing) and finger print.

D 124. DNA Techniques and Technology:

This course presents an extensive background on the metholdological and technological advancements in DNA biochemistry and its implication on human genetics.

D 125. Forensic DNA:

By attending this course students will understand forensic DNA typing and will also learn the fundamental concepts and techniques applied in the specific DNA tests. The instructors discuss the underlying scientific principles of forensic DNA typing, clarify terminology using understandable explanations to the common person. This course will also emphasize interpretation of and evaluation of actual DNA test results. Students will gain an appreciation of the advantages and limitations of this unique laboratory tests. They will learn use of current data bases for identification purposes.

D 126. Dissertation: (Equivalent To D 107)

This is a graduation requirement. The selection of the topic and conducting the research is pursued with the consultation of the academic adviser.

D 127. Principles of Crime Scene Search and Inspection:

Instructions are provided on conducting a complete search at the crime scene and protecting the crime scene by keeping the evidences uncontaminated until it is thoroughly completed and recorded (documented).

D 128. Crime Scene Documentation Procedure:

This also deals with the crime scene evidence collection and emphasis is given to the complete documentation procedures, including details of evidences, sketches, photographs, and video recordings in order to prepare a complete forensic report and presentable to the judiciary.

D 129. Documentation of Crime Scene, Tools and Equipment:

In this course emphasis is given on the use of different tools, equipments and techniques utilized in order to study the crime scene. Also Bullets, casing, guns and other tools along with the preservation of their lifting of impressions and maintaining the existing state to avoid any tempering of the evidences.

D 130 Dissertation : (Equivalent to D 107)

This is graduation requirement. The selection of the topic and conducting the research is pursued with consultation of the academic adviser.

D 131. Principles of Photography:

This course is open to all students who have good photography skills they are trained with specialized techniques such as I.R., U.V. and monochromatic photography and rendering latent photographic evidences which are note visible to unaided human eye.

D 132. Methodology of Photographing Techniques :

This course teaches specialized training in recreating lighting conditions, the use of appropriate filters, infra red and ultra violet photography, x-rays, and photomicrography (photographing under a microscope).

D 133. Techniques in Forensic Photography:

This course strengthens students specially by teaching them various techniques of photography used in forensic sciences. They are trained in recreating lighting conditions, motion pictures, and use of video tape recording as well as their efficient archiving and retrieving from the huge data bases.

D 134. Dissertation: (Equivalent to D 107)

This is a graduation requirement. The selection of the topic and conducting the research is pursued with the consultation of the academic adviser.

D 135. Finger Print Identification:

Fundamental principles including finger print patterns, classification of finger print, and method of development of latent finger prints will be described. Also widely used software programs are introduced during this course.

D 136. Methods of Print Search and Visualization Techniques:

This course sheds light on the search of print impressions of fingers and foot prints (shoes). Here new computer base data banks are introduced in order to search and differentiate the individual involved in crime. The data bases are D I S, AFIS, ADIS, and print quest.

D 137. Finger Print, Classification, Comparison and Automated System (AFIS) Techniques:

This course provides information on turn key Automated Finger Prints Identification System (AFIS), the finger print identification system software and its components. This also includes basic finger print image

processing / encoding software and matching engines to complete finger print identification system.

D 138. Dissertation: (Equivalent to D 107)

D 139. Principles of Documents Examination:

The instructors cover a variety of aspects dealing with documents examination which include identification of handwriting, signature, analysis of typewriting and printed matter , distinguish forgery from genuiness, analyzing inks, papers, and other substances that are combined into a document. Here deduction of additions and substitutions on a document and the restoration or decipherment of erased and obliterated writing is also reviewed.

D 140. Examination of Handwriting, Printers, and Colored Printers and Colored Photocopiers:

This entire course is devoted to the handwriting, printers, and photocopiers. Here the similarities and difference are deduced. Also the differential examination of printers, paper quality, inks, dot matrix features are studied. Use of chromatography is extensively described, especially for colored, normal printers and copiers.

D 141. Examination Techniques and Technology to Study Documents, IDS, Passports Traveler's Checks and Bank Notes:

In this course all existing techniques are used to examine the document, ID's, Passport, Cheques and bank notes. The identification is based on quality of paper, plastic material, inks, holograms, magnetic stripe, and signature. Also lamination, indecent stripe, color shifting ink, security thread, and water marks are closely monitored.

D 142. Dissertation : (Equivalent to D 107)

D 143. Principles of Firearms and Tool Marks Examination:

In this course students will learn the mechanics and tools utilized to commit crimes including firearms.

D 144. Microscopic Examination of Firearms and Different Tool Marks:

Students will learn various modes of microscopes used in examination of the firearms and tools. Here emphasis is given to the safety in handling the firearms and tools. Extensive photography lifting impression and finger printing as well as trace analysis of elements will be described.

D 145. Microscopic Examination Technologies:

In this course rapidly changing microscopic technology is presented in relation to its magnification capabilities. Student will learn imaging from virtual to real images. Discussion will also include compound, electron, scanning electron microscope, comparison between microscopes and stereoscope.

D 146. Dissertation: (Equivalent to D 107)

Higher Diploma in Forensic Sciences (HDFSc)

HDFSc is a post graduate program of study that aims to train candidates who already have been engaged in various fields of forensic sciences and wish to upgrade their skill, widen their horizon and enhance their technical capabilities in the field of thin interest in ever changing discipline of forensic sciences.

These students could be graduates of college of science, college of pharmacy, medical sciences, engineering, and their equivalent colleges of accredited universities.

The prospective students are required to register for two semesters of total 30 credit hours to earn this diploma (HDFSc). The syllabus is divided into three categories of subjects, the first category represents the faculty requirement of 5 subjects (Core Courses), first 4 subjects would be shared with students of department of police sciences at the graduate college programs of criminal investigation and forensic evidence. The fifth subject is exclusively incorporated for the students who are enrolled in forensic sciences (HDFSc) The courses listed under Category 1 are compulsory for all students entering in the college of Forensic science (CFSc) at NAUSS. However students can select one block of courses of their interest from category 2 and one block of four courses from category 3 as sub-specialty.

Category 1 (Core courses)
Compulsory
College Entrance Requirements

Course No.	Course Title	Credit hours
401	Crime Scene, (Police sciences dept)	2 Hrs.
402	Investigation and forensic search (Police sciences dept)	2 Hrs.
403	Islamic Protective Policy from crime and crime control (Criminal justice dept)	2 Hrs.
404	Principles of scientific Research (Dept of social sciences)	2 Hrs.
405	Introduction to forensic sciences	2 Hrs.

Category 2
Department of Forensic Chemistry
Selection of only one department is allowed

Course No.	Course Title	Credit hours
406	Principles of forensic chemistry	2 Hrs.
407	Introduction to organic synthesis	2 Hrs.
408	Introduction to chromatographic separation	3 Hrs.
409	The Forensic Report	2 Hrs.

Department of Forensic Biology

Course No.	Course Title	Credit hours
410	Introduction to forensic biology	2 Hrs.
411	An introduction to biochemistry	3 Hrs.
412	Principles of electrophoresis	3 Hrs.
413	The Forensic Report	2 Hrs.

Department of Crime Scene

Course No.	Course Title	Credit hours
414	Principles of crime scene documentation	2 Hrs.
415	Introduction to forensic photography	2 Hrs.
416	Introduction to the techniques and tools of crime scene search	3 Hrs.
417	The Forensic Report	2 Hrs.

Department of Physical Evidences

Course No.	Course Title	Credit hours
418	Introduction to applied physics	2 Hrs.
419	Principles of magnification techniques	3 Hrs.
420	Introduction to physical examination	3 Hrs.
421	The Forensic Report	2 Hrs.

Category 3
Subspeciality Blocks of courses

Selection of only one subspeciality block is allowed from eleven options below

Forensic Explosives and Fire Subspeciality

Course No.	Course Title	Credit hours
422	Introduction to explosive materials and explosive devices	2 Hrs.
423	Introduction to the nature of combustion and fire accelerants	2 Hrs.
424	Principles of methods of detection and extraction of explosives and fire debris	2 Hrs.
424	Qualitative and quantative analysis	2 Hrs.
426	Dissertation project	2 Hrs.

Forensic Toxicology, Subspeciality

Course No.	Course Title	Credit hours
427	Introduction to toxicology	2 Hrs.
428	A preface on precursors and chemicals used in illicit production of drugs	2 Hrs.
429	Field test of toxins and drugs of abuse and laboratory analysis	2 Hrs.
430	Instrumental Analysis	2 Hrs.
431	Graduation project	2 Hrs.

Paints, Inks and Dyes, Subspeciality

Course No.	Course Title	Credit hours
432	Introduction to paints, inks and dyes	2 Hrs.
433	Principles of dyes and paints: their use and their restriction	2 Hrs.
434	Basic methods of detection and extraction	2 Hrs.
435	Instrumental analysis	2 Hrs.
436	Graduation project	2 Hrs.

Biological Methods, Subspeciality

Course No.	Course Title	Credit hours
437	Introduction to serology	2 Hrs.
438	Principles of testing serum, blood, serum and semen	2 Hrs.
439	Basic methods of biochemical testing and microscopic	2 Hrs.
440	Instrumental Analysis	2 Hrs.
441	Graduation project	2 Hrs.

Microscopic Examination, Subspeciality

Course No.	Course Title	Credit hours
442	Introduction to hair and fibers	2 Hrs.
443	Microscopic examination of hair and fibers	2 Hrs.
444	Principles of scanning electron microscope	2 Hrs.
445	Instrumental analysis	2 Hrs.
446	Graduation project	2 Hrs.

Forensic DNA, Subspeciality

Course No.	Course Title	Credit hours
447	Introduction to human genetics	2 Hrs.
448	Principles of DNA techniques and technology	2 Hrs.
449	Methods of sample collection and extraction of DNA	2 Hrs.
450	Analytical techniques and database	2 Hrs.
451	Graduation project	2 Hrs.

Physical Evidence, Subspeciality

Course No.	Course Title	Credit hours
452	Principles of crime scene, search and sketching	2 Hrs.
453	Introduction to crime scene documentation	2 Hrs.
454	Documentation techniques and tools	2 Hrs.
455	Principles of evidential search	2 Hrs.
456	Graduation project	2 Hrs.

Forensic Photography, Subspeciality

Course No.	Course Title	Credit hours
457	Introduction to forensic photography	2 Hrs.
458	Principles of photography	2 Hrs.
459	Basis of photographed forensic reports	2 Hrs.
460	Introduction to photographic techniques	2 Hrs.
461	Graduation project	2 Hrs.

Personal Identification, Subspeciality

Course No.	Course Title	Credit hours
462	Introduction to personal identification (PID) means	2 Hrs.
463	Introduction to finger printing science	2 Hrs.
464	Principles of finger print visualization	2 Hrs.
465	Basis of automated finger print identification system (AFIS)	2 Hrs.
466	Graduation project	2 Hrs.

Document Examination, Subspeciality

Course No.	Course Title	Credit hours
467	Introduction to forgery and counterfeit	2 Hrs.
468	Handwriting printers and means and tools of writing	2 Hrs.
469	Identical writing and signature	2 Hrs.
470	Instrumental techniques	2 Hrs.
471	Graduation project	2 Hrs.

Personal Identification, Subspeciality

Course No.	Course Title	Credit hours
472	Introduction to firearms and tool marks	2 Hrs.
473	Principles of firearms evidence and characteristics of tool marks	2 Hrs.
474	Basis of microscopic examinations	2 Hrs.
475	Advanced examining techniques and databases	2 Hrs.
476	Graduation project	2 Hrs.

Higher Diploma in Forensic Sciences (HDFSc)

Course Description:

C 401. Crime Scene:

This course deals with crime scene examination, documentation, recognition, collection, preservation and transportation of physical evidence for laboratory examination.

C 402. Investigation in Forensic Search:

This course teaches scope and methods of search conducted by investigation team such as a police officer, custom official, fisheries or wildlife officer, taxation officer etc. The body, clothing, premises or other property of the victims and perpetrator need to be examined whether a warrant is issued to do so or not in order to determine if a person should be arrested or to look for additional evidence relevant to the criminal offense committed.

C 403. Islamic Protective policies for Crime and Crime Control:

Highest moral code and conduct are observed by the law enforcement official for the safeguard of personal dignity of perpetrators and victims alike when examining the crime committed. This course emphasizes the protection of victims' personal safety, their property as well as of the perpetrators.The slightest level of verbal or physical abuse are absolutely forbidden. During the entire process a complete respect of privacy, cultural and religious values of both sides are equally valued. A strict Islamic Shariah (judicial system) is observed.

C 404. Principles of Scientific Research:

This course presents principles of scientific research including selection of subjects, gathering of resources, facility and allocating sufficient funds. The results of the finding should be publishable in a professional journal. The selection of a topic of research and its execution is carried out under the supervision of the academic advisor.

C 405. Introduction to Forensic Search:

This course provides systematic guidelines how to conduct a search during the course of investigation. Students will be explained the steps to collect each aspect of evidence such as sketching the crime scene, impression lifting, collecting firearms and tools etc. The physical evidence is properly labeled and transported to the laboratory for testing .

S 406 Principles of Forensic Chemistry:

This course teaches examination of arson accelerants, textile fibers, plastic and paints. Laboratory exercises include infra red spectrophotometry, pyrolysis- gas liquid chromatography of polymeric materials as well as chemical and physical methods of analysis.

S 407. Introduction to Organic Synthesis:

This teaches various classes of organic compounds based on their functional groups, this includes single to multi step reactions to obtain the end product.

S 408. Introduction to Chromatographic Separation:

This course presents the most applied information on the basic chromatographic techniques including TLC, column chromatography,

paper chromatography, gas liquid chromatography and high pressure liquid chromatography.

S 409. Preparation of a Forensic Report:

This short course provides method of preparing a forensic report which must include all collected facts and evidence about the crime and crime scene and its surrounding area. This report must include evidence in the form of documentation, photographs and recordings as well as impressions of foot prints, finger print, firearms, and tool marks. These recordings should be displayable by the examiners if required again.

S 410.An Introduction to Forensic Biology:

This lecture/laboratory course will cover an overview of the biological evidence utilized in investigation of the crime. Topics will include study of human skeletal and dental remains, trauma to human body, facial reconstruction, forensic entomology and botanical hair & fiber samples. The course will also include an examination of DNA that contributes to DNA profiling particularly RFLP, VNTR and STR-PCR analysis of population variability and demographics.

D 411. The Introduction to Biochemistry:

In this course the basic biochemistry principles are described. Also nucleic acids, biological membranes and physiological functions of various body organs and related biochemical pathways are discussed.

S 412. Principles of Electrophoresis:

This course provides a method to separate, identify and purify small size

charged molecules, peptides and macromolecules under electrical field which also including DNA fragments, RNA and oligonucleotides and many more.

S 413.The Forensic Report: (also equivalent to 409)

Students are instructed how to prepare a forensic report about the crime by collecting the physical evidence, witnesses, photographs, impressions and the crime scene sketches including collection of fingerprints, impression liftings, DNA samplings, transportation and safe storage of the evidence for future study.

S 414. Principles of Crime Scene Documentation:

This course deals with the emphasis on the significance of narrative description of its crime scene documentation in its original form. Documentation report must be promptly prepared before the scene is altered or disturbed. All the facts, observations, evidence and construed thoughts must be documented and signed by the preparer.

S 415. Introduction to Forensic Photography:

This course teaches specialized techniques in recreating lighting conditions, the use of appropriate filters, infra red and ultra violet photography, monochromatic photography, and photomicrography (photographing under a microscope) of the forensic samples.

S 416. Introduction to Techniques and Tools of Crime Scene Search:

In this course students learn a systematic approach to search the crime scene. The course recommends use of standardized tools by the investigation team members to carry out the search process. Collection of physical evidence, documentation by sketching and impressions lifting,

fingerpting, photographing, labeling and transporting to the laboratory constitute an important objective of the search.

S. 417 The Forensic Report: (equivalent to 409)

D 418 Introduction to applied Physics:

This course is presented by invited guest professionals to provide some of the basic laws of physics applied in functioning of instruments and equipments used in forensic sciences.

D 419. Principles of Magnification Techniques:

In this course various image magnification principles are desceibed. This includes development of new lenses for still, video photography and microscopy as well as new detectors for ultra-trace analyses of flavors, aroma, and odors sensors. The instructions are based on demonstration based class room lectures.

D 420. Introduction to Physical Examination:

In this course physical properties like weight, volume, color, boiling point, melting point, are described. In addition other physical properties of matter such as conductivity, temperature, metric system, mass, density, refractive index and reflection as well as refraction are also reviewed.

D 421. Forensic Report: (equivalent to 409)

D 422 Introduction to explosive materials explosive devices:

Classification of explosive substances, detonation and explosions, effect of explosions, military and industrial explosives "improvised explosives devices" explosives residues examinations are studied in this course. Principles behind the explosive nature of chemicals and various

devices are presented. This extracted information becomes invaluable in order to prevent the crime before it is committed.

D 423. Introduction to the nature of combustion and fire accelerants:

In this course some of the physical and chemical principles governing process of combustion and role of fire accelerants their identification are described with reference to crime and its prevention (use of fire retardants).

D 424. Principles and Methods of Detection and Extraction of Explosive and Fire Debris:

This course provides basic information on liquid-liquid and solid-base solid extraction methods to isolate the residue and their detection from explosion site and from debris remains Also the required analytical instruments are discussed.

D 425. Qualitative and Quantitative Analysis:

This is a special course which teaches both wet chemical methods and the instrumental means used in the identification and quantification of forensic residue from related crime objects, debris and from a variety of artifacts collected at the scene of crime.

D 426. Research Dissertation:

This requirement is in partial fulfillment for the award of HDFSc. The selection of the topic and conducting the research is pursued with the consultation of the academic advisor.

D 427. Introduction to Toxicology:

Students are provided with the toxic nature of chemical species and poisons. Students are also exposed with the concepts of drugs, their route of administration, absorption, distribution, disposition and mechanisms of toxic behavior that influence toxicity and their evaluation.

D 428. A preface on precursor and chemicals used in illicit production of drugs:

This course provides insight to the basic precursors used to produce illicit drugs. The source of precursors can be found from gross sales record and net weight and/or quantities (inventory), number of person employed, organizational structures and other pertinent information.

D 429. Field test of toxins and drugs of abuse and laboratory analysis:

In this course various chemicals methods and automated instrumental teclmiques are used to conduct the identification and quantification of toxins and drugs of abuse in the field at the site of crime or on the specimen submitted to the laboratory.

D 430. Instrumental Analysis:

This course entails use of instrumentation such as microscopes, infra red, ultra-violet, x-ray diffraction, emission spectroscopy, chromatography and mass spectrometry to study a variety of potential evidence from crime scene. Also use of scanning electron microscopy and photography as well as impression reading devices are described.

D 431. Graduation Project:(equivalent 426)

D 432. Introduction to Paints, Inks and Dyes:

This course will instruct students the nature and composition of paints, inks, and dyes. Here students will learn the forensic implications of dyes, paints and inks, their residue collection, extraction and their identification from objects collected at the crime scene.

D 433. Principles of Paints, Dyes and Inks:

Students will learn the basic principles and forensic implications of paints, dyes, and ink In such examination use of microscopes and many chromatographic and atomic absorption spectrometric methods will be discussed which provide a wealth of information regarding crime and the alleged perpetrator.

D 434. Methods of Detection and Extraction of dyes, paints and inks:

Here specific chemical and solid-phase methods of extraction and detection of the components of dyes, paints and inks will be discussed Methods of detection and identification of trace of paints, inks, and dyes from the objects collected at the crime scene and its surroundings.

D 435. Instrumental Analysis:

This course involves teaching the modem instrumentations used in identification and quantification of the trace components of the dyes, paints and inks from crime scene and its surroundings. Sufficient time is spent on the use of pyrolysis- gas liquid chromatography, mass spectrometric, infra red and atomic absorption spectrometric methods. Other instruments include fingerprinting readers, photographic instruments and various types of microscopes, voice recording analyzers and DNA typing related instruments.

D 436. Gradnation Project: (equivalent to 426)

D 437.1ntroduction to Serology: (equivalent to 104)

D 438. Principles of testing serum, urine and semen:

This course teaches identification by chemical, microscopic and other instrumental means on vaginal smears or swabs on a rape victim's clothing. This also includes the A-B-O grouping and enzyme (p GM) typing when sufficient sample size and acceptable quality of specimen are available. Difficulties encountered in isolation of analytes of interest from above matrices are also discussed.

D 439.Basic methods of biochemical testing and microscopic examination:

This course provides instructions on various biochemical (enzymatic) methods and use of microscopic testing of drugs, histological specimen, a variety of residues and biological samples (hair and nails), microorganisms and numerous other forensic objects, artifacts and impression are examined.

D 440. Instrumental Analysis: (equivalent D 435)

D 441. Graduation Report (equivalent to 426).

D 442. Introduction to Hair and Fibers:

Here students will learn ultra fine biological and physical characteristics of hair and fibers respectively and their implication in a variety of forensic situations.

D 443. Microscopic Examination of Hair and Fibers:

Students will learn to study the finest details of the chemicals and physical composition of hair and fibers. Students will gain interpretation skill of forensic results derived from the differential examination of both hair and fibers from the crime scene.

D 444. Principles of Scanuing Electron Microscope (SEM):

Students will study the principles behind scanning electron microscopy (SEM) where abeam of electrons are absorbed onto the specimen and in return an electron emission is projected on a closed T V circuit The principles of the SEM are demonstrated by actual hands on practice and through series of classroom lectures.

D 445. Instrumental Analysis (equivalent to 435)

D 446. Graduation Project: (equivalent to 426)

D 447. Human Genetics:

This course teaches an introduction to develop understanding of the concept of genetic markers analysis (especially DNA) that forms the core of identity test of humans. Also fulfills the genetic course requirement for classification of technologists working in crime laboratory as “DNA analyst” as defined by the DNA board.

D 448. Principles of DNA technology: (addendnm to S 410)

This course describes the biochemical features of DNA, its involvement as a powerful marker to study the genetic trait. The student will also learn significance of DNA typing in relation to genotype and molecular biology.

D 449. Methods of DNA Extraction and Sample Collection:

This course describes various chemical extraction methods of DNA from variety of sources like stains (from clothing etc), blood, semen, tissues, hair, saliva and nails.

D 450. Analytical Techniques and Database:

Instructors discuss underlying principles of analytical methodologies and forensic DNA typing and chemical analysis Instruments like chromatographs, mass spectrometers, nucleic acid analyzer and atomic absorption spectrometry and their related data bases (Incos and Finnigan Mat and GLC retention times library etc).

D 451. Graduation Project: (equivalent to 426)

D 452. Principles of Crime Scene Search and Sketching:

Instructions are provided on the criteria of conducting an investigative search of crime scene, including collection of physical evidence, photographing and sketching of crime related objects and surroundings.

D 453. 1ntroduction to Crime Scene Documentation

This course describes the protocol of complete documentation of all the evidence from unaltered crime scene, safe preservation of the documented records etc.

D 454. Documentation Techniques and Tools:

In this course students learn methods to document the records of photographs, sketches, voice recordings, video and still recordings. Also includes discovered tools, casings of bullets, and fire debris, residue of

paints, dyes and inks as well as finger and foot impressions Additional documentation may include DNA sampling of hair, nail and from trail of blood.

D 455. Principles of Evidential Search:

This course emphasizes heavily on the promptness of evidential search of the crime The preservation of collected documents, objects, impression lifting of fingerprinting, foot (shoe) and sketches and photographs The crime scene should be left in its original state even after the completion of the search.

D 456. Graduation Project: (equivalent to 426).

D 457. 1ntroduction to Forensic Photography:

In this course different specialized techniques such as IR., U. V. and monochromatic photography are described. The photographs of the physical evidence like impressions of tool parts, fIrearms, explosives, bullets and casings are only possible with skilled photography without which this evidence may not otherwise be visible to unaided human eye.

D 458. Principles of Photography:

Students will learn the fuudamental basis of the electronics, lighting and optical effects in functiouing of a photographic camera. Students will become versed in use of 35mm, 4x5, press, view, copy, or finger prints cameras and will gain an understanding of filters in UV, IR, orthostereoscopy, photomicrography, color work, radiography, gammagraphy, cinematography, and projection work.

D 459. Basis of Photographed Forensic Reports:

Experienced instructors describe means of enhancement of poor quality photographed exposures and print . The attending students learn to compare in detail the un-known subject's clothing as detected in the film with the clothing obtained from a suspect Actual heights and facial features are also studied in comparison of the suspect. Other information like origin of the film, type of camera used, or sources of the film used or from throw-away portion may reveal many other aspects of the crime.

D 460. Introduction to Photographic Techniques:

In this course instructors demonstrate techniques of photography using various types of cameras and new lens technology used during the investigation of the crime scene. This may include various light sources like UV, IR Also includes photographing by still, video and digital cameras the images of the palm impression, finger prints & foot impression liftings (foot and shoes).

D 461. Graduation Project@ equivalent to 426)

D 462. Introduction to Personal Identification:

Students learn to conduct the personal identification by examining driver license, bank cards, passports and other identification carrying documents. In addition use of sketches, photographs, finger prints, voice prints, odontology, and study of skeletal remains are also described.

D 463. Introduction to Finger Printing Sciences:

This important investigative technique is described in detail since no two individuals have identical finger prints. Galton's calculation, ridge,

loops, core, and arches' characteristically are described. Henry system of classification and use of AFIS, APIS, Print Quest are described.

D 464. Principles of Finger Print Visualization:

This course describes the interpretation of finger print scans and also examines false match, false non match, and failure to enroll for leading biometric technologies and facial recognition.

D 465. Basics of Automated Finger Print Identification System (AFIS):

This course provides information on turn key automated finger print identification system (AFIS), the finger print identification system software and its components. This also includes basic finger print image processing/encoding software and matching engines to complete finger print identification examination.

D 466. Graduation Project: (equivalent to 426)

D 467. Introduction to Forgery and Counterfeit:

This course teaches identification of handwriting, typewriters and forged signature, erasers, and alteration on documents and their detection, by using computer programs, photographs, as well as analytical instruments.

D 468. Handwriting, Printers, Means and Tools of Writing:

This course involves study of handwriting and type writing to ascertain the authenticity of questioned documents. Techniques of microscopy, photography, and even analytical instruments using chromatography, which are helpful to uncover all efforts. Both brazen and subtle designs which may change the content or meaning of the documents.

D 469. Identical Writing and Signature:

In this course indented impression, chemical composition of a document and inks may reveal authenticity and their true sources. This course places emphasis on use of erasures and chemical agents to alter and forge the signature which are deducible by IR or U.V.light source.

D 470. 1nstrumental Techniques:

This course describes the basic theory in visual examination of documents includes visual and color theory, measurement tools, instruments such as simple chromatography, microscopy, and photographic teclmiques. Also provides technical description of operation and practical use of various instrumentation devices used in the field like the electrostatic detection apparatus (ESDA) and video spectrum comparator (VSC).

D 471. Graduation Project: (equivalent to 426)

D 472. 1ntroduction to Fire Arms :

This course teaches methods of routine operability and safety measures associated with fire arms. The test bullets and cartridge cases are classified and compared to bullets and cartridge cases in the open case file Gunshot residue kits (hand swab) are tested using microscopy, chromatography, atomic absorption spectrophotometry and confirmation by mass spectrometry.

D 473. Principles of Fire Arms Evidence and Characteristics of Tool Marks:

Students are instructed on the principles of fire arms and tool marks

evidence based on the hand impressions and finger prints The tools are retained on which the marks exist. Many casting medium are used to lift the tool marks and fire arms impressions In essence this course teaches tool mark identification, restoration of fired off bullets and erased marks Information from fire arms bullets and cartridge case identification, pellets and wads and ways to predict firing range are also described.

D 474. Basis of Microscopic Examination:

In this course instructor covers the operation of microscope, sample preparation and digital imaging techniques. However sufficient light is shed on comparison between simple, compound, electron microscopy and energy dispersive x-ray microscopes etc. Also discussed are laser scanning, confocal microscopes and the lightsources, filters, and fluorescence and reflection imaging.

D 475. Advanced Examining Techniques and Databases:

Students in this course learn the most advanced and confirmatory examination methods based on latest technology and also learn to use the invaluable databases for identification and analysis of forensic evidence collected from crime scene. Extensive use of internet is emphasized, some popular data bases like codex, AFIS, APIS, Print Quest, and Finnigan Incos/Mat-Mass Spectrometric and Gas-Chromatographic retention times data library are also covered.

D 476. Graduation Report: (equivalent to 426)

Regional and International Cooperation

The college of Forensic Sciences has established mutual cooperation and active collaboration with prominent institutes, universities, and research centers around the world. This partnership has significantly encouraged joint research interests, has upgraded training programs and teaching methods. In addition exchange of visits by collaborating experts are arranged to share common experiences to fight and investigate crime. These centers are:

a. Forensic Science Unit, University of Strathclyde, UK.

b. Forensic Science Program, Department of Justice, University of Alabama at Birmingham, AL USA.

c. Divisions of Narcotic Drugs (DND), Vienna Austria, Italy and USA.

d. Drug Enforcement Administration (DEA), USA.

e. Investigation Bureau (IB), Taiwan.

f. Federal Bureau of Investigation (FBI), USA.

g. Royal Canadian Mountain Police, Canada.

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