UNIVERSITY OF CALIFORNIA DAVIS
FORENSIC SCIENCE GRADUATE PROGRAM

Graduate Student Manual 2023-2024

Statement on non-discrimination:

In accordance with all applicable state and federal laws and University policy, the University of California, Davis, does not discriminate on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, age, medical condition (cancer related or genetic characteristics), ancestry, marital status, citizenship, sexual orientation, or service in the uniformed services (includes membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services), status as a Vietnam-era veteran or special disabled veteran. As required by Title IX, the University of California, Davis, does not discriminate on the basis of sex in its educational programs, admissions, employment, or other activities.

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Vision Statement

Our vision is to inspire new forensic scientists to search for the truth through science and shape the future of the field using new knowledge and innovation.

Mission Statement

Our mission is to provide exemplary forensic science education, developing in students the skills necessary for success in a science profession, including ethics, integrity, the ability to devise innovative methods and techniques, and the capacity to integrate new technology.

Goals

- Present curriculum based on theoretical concepts and real-world examples
- Promote critical thinking skills
- Focus on innovative M.S. thesis research that has the potential to improve the practice of forensic science
- Promote the ethical and professional standards of the profession of forensic science
- Prepare students for careers in science

Welcome to UC Davis

The University of California at Davis is truly an exceptional school. It offers you a wealth of opportunities to draw upon from our staff and faculty through our laboratory, library, and social resources. UC Davis was founded in 1908 to serve the state of California and has grown into one of the world's top universities. Along with being ranked a top educational institution, we are also ranked number one in the US for diversity, inclusiveness, and internalization. In fact, one of the major goals of the Forensic Science Graduate Program is to foster a culture of inclusion for our students so that we may help them overcome any obstacles they face on the path to completing their Master's Degree and embarking on their future careers. Please join all of us in striving to always interact with each other in a spirit of mutual respect and understanding.

In order to help our students, this graduate student handbook has been created to supply you with information about resources you can draw on while at UC Davis. You can also find more information on the program's website at https://forensicscience.ucdavis.edu

You can also find more information about your education here at UCD at the Office of Graduate Studies (Grad Studies) website: https://grad.ucdavis.edu.

Graduate Student Guide

Some important resources for new and continuing students at UC Davis include those of our library system, the student health center, and our graduate student center.

Library Resources:

The UCD library system includes the Peter J. Shields Library, the Carlson Health Sciences Library, the Mabie Law Library and the Blaisdell Medical Library. In total the library system holds over 10 million items in its collections and is ranked among the top academic research libraries in North America. The library is an integral partner in the teaching, research and academic mission of UC Davis. The library's highly regarded research and academic services support the students and faculty of the forensic science program through consultation services, instructional services and its vast collections. As a UCD graduate student, you have full access to its library resources including a Forensic Science Subject Guide created specifically for our program. The guide can be found online at https://www.library.ucdavis.edu/guide/forensic-science/. If you are in need of help when at Shields Library, stop by Room 388 to see if a librarian may be available. Research assistance is also available at the 2nd floor Library Research Consult desk https://www.library.ucdavis.edu/service/researchsupport/.

As a graduate student at UC Davis, you will receive your own AggieCard which serves to help you access a variety of privileges and services here. Your AggieCard is also your library card and may be used at any of the UC Davis libraries to check out books etc. New students can activate their first AggieCard for library privileges online at https://www.library.ucdavis.edu/service/library-accounts-and-borrowing/

Student Health Resources:

All students are required to have medical insurance. The University of California Student Health Insurance Plan (UC SHIP) provides high-quality, affordable and convenient coverage that protects students from unexpected health care costs. UC SHIP offers medical, pharmacy, dental, vision, mental health and substance use disorder benefits for graduate students and their eligible dependents. For information on enrolling in UC SHIP please visit the eligibility webpage at https://shcs.ucdavis.edu/voluntary-student-dependent

Because all UC students are required to have medical insurance, UC automatically enrolls all registered students — including domestic and international students, and students *in absentia* — in UC SHIP medical, pharmacy, dental and vision coverage. You will find the cost of coverage (premium) on your registration bill. You can waive UC SHIP coverage if you already have a health plan that meets the university's health coverage requirements. Visit the UC SHIP Waiver Information page at https://shcs.ucdavis.edu/uc-ship-waiver-information to learn how to waive enrollment in UC SHIP before the waiver deadline for your campus. You must re-apply to waive coverage each academic year.

UC Davis Student Health and Counseling Services (SHCS) located at 930 Orchard Park Rd in Davis provides UC Davis students with confidential counseling services, wellness, illness and injury care. Services are available to all registered students, regardless of insurance. Student Health and Counseling Services also provides other services, including intervention services, lab and x-ray services, and physical therapy. All registered UC Davis students are eligible for services available through Student Health and Counseling Services (SHCS) at student rates. No payment is required at the time of service or purchase. All students have accounts maintained by UC Davis accounting and charges incurred at student health are billed directly to a student's UC Davis billing account towards the end of each month.

Graduate Center:

The UC Davis Graduate Center is a dedicated space for graduate students and postdoctoral scholars to meet, connect, and engage. Opened in 2021, the Graduate Center promotes interdisciplinary interactions and builds community by serving graduate students and postdoctoral scholars. The Graduate Center houses a variety of spaces including informal interaction areas, a quiet writing room, a parent study room, meeting rooms, and conference rooms for graduate student and postdoctoral scholar use. In addition, the Graduate Center provides access to a variety of graduate student and postdoctoral scholar services, including the Graduate Student Association Student Pantry, Graduate Studies GradPathways Institute for Professional Development, diversity resources, counseling, advising, and more. The Graduate Center is located in Walker Hall and forensic science students are encouraged to explore the resources it has available for them.

People

The UC Davis Forensic Science Graduate Program has a wealth of people to help you throughout your journey. During your stay here, you will have a chance to meet many of them in-person starting with our administrative staff below.

Director ……..Dr. Ashley Hall
Graduate Program Coordinator ……..Brianna Payne
Graduate Program Chair ……Dr. Ben Moeller
Graduate Advisor, DNA Track……..Dr. Christyann Darwent
Graduate Advisor, Criminalistics Track, ……...Dr. Robert Poppenga

A listing of all current teaching faculty members of the Forensic Science Graduate Program can be found on our website at https://forensicscience.ucdavis.edu/faculty . The research interests of the Forensic Science Graduate Program are served by the Graduate Group: https://forensicscience.ucdavis.edu/graduate-group. Members of the Graduate Group support Forensic Science Master's students in their thesis research.

The Dean of Graduate Studies appoints the graduate advisors for each graduate program. The mentoring of graduate students by faculty is an integral graduate experience for both parties. Each of you will be assigned a faculty graduate advisor when you enter our program. Graduate Advisors are a resource for information on academic requirements, policies and procedures, and registration information. These official advisors often also provide signatures as required by the Office of Graduate Studies on student forms pertaining to your progress in the program. Students meet with their Graduate Advisor at least once a year.

Your Graduate Program Coordinator is a resource, guiding you through your 2 years and making you aware of all filing deadlines, paperwork requirements, etc. They are available to answer any questions and help you locate necessary resources.

The Program Director can also assist you with any question you may have. They can help you with identifying a principal investigator (thesis chair), understanding general university policies, selecting courses relevant to your career goals, etc.

Advising and Mentoring:

Graduate Group Advisors: Each graduate advisor shall evaluate the transcripts of incoming students, establish a program of study which satisfies the requirements of the Group, and advise graduate students within his/her jurisdiction in accordance with the regulations of the Office of

Graduate Studies and the Group. Graduate advisors are appointed by Graduate Studies, and have signature authority from Graduate Studies, are a resource for information on academic requirements, policies and procedures, and registration information. Only the graduate advisors who hold appropriate University titles and the graduate group chair will make decisions on courses, curriculum, and individual students' programs relative to core courses, background courses, and remedial courses. Students are required to meet with their advisor at a minimum of once per annum to ensure that adequate progress is made towards completion of degree requirements.

Major Professor: The major professor is the faculty member who provides guidance in selecting and developing thesis or capstone research projects and supervises the student's research progress. The major professor may serve as the chair of the thesis Committee.

Major Professor Assignments:

i. **Each full-time student** will select a major professor by the end of the third quarter. A student who does not have a major professor by that time will be required to meet with their graduate advisor and/or program staff to help identify a major professor.

ii. **Each part-time student** will have selected a major professor before completing **50%** of their course work. A student who does not have a major professor by that time will be required to meet with their graduate advisor and/or program staff to help identify a major professor.

Graduate Program Staff: The forensic science program staff assists students with identifying a major professor, identifying appointments, fiscal issues, Graduate Studies policies and deadlines and general university policies.

Mentoring Guidelines

(https://grad.ucdavis.edu/graduate-program-roles-and-responsibilities

Mentoring is defined as a close relationship between a graduate student and a faculty member who provides guidance, support and research advice in an individualized manner.

Graduate Council recognizes that the mentoring of graduate students by faculty is an integral part of the graduate experience for both. The responsibilities of the faculty mentor are broad and diverse. They include, but are not limited to serving as a role model, advising a student as to course work requirements, and providing formal instruction in a given discipline as well as helping students identify and achieve their individual short and long-term educational goals..
While the major professor usually acts as a student's primary mentor, many of the mentoring "functions" described below, may also be performed by other program/group faculty and staff over the course of a student's graduate experience. A corollary to this recognition is that much of the interaction of faculty with all students includes important mentoring components. Similarly, graduate students have important responsibilities to ensure they are open to and accepting of faculty mentoring and articulate their needs effectively. Thus, it is together that faculty and students identify and discuss their goals and expectations for each other, and outline approaches to reach those goals and satisfy those expectations.
Basic mentoring practices include guiding students through program expectations, protocols of academic conduct, degree requirements, research and teaching, capstone work (such as thesis or dissertation research), and professional development.

1. Mentors and/or the advising system should provide, and students should acquire, a clear map of program requirements from the beginning, making clear the coursework requirements, and expected timelines for completion of all required examinations and capstone requirements.

Mentors are responsible for

1. Respecting their student, including the student's identity including race, ethnicity, gender and gender expression, age, visible and non-visible disability, nationality, sexual orientation, citizenship status, veteran status, religious/non-religious, spiritual, or political beliefs, socio-economic class, status within or outside the university, or any of the other differences among people.
2. Assisting students in the identification of support networks (people who can help the student for different aspects of their tenure at UCD).
3. Being a student's advocate and assisting the student in a timely manner in finding sources to support dissertation research (teaching assistantships, research assistantships, fellowships, research needs and required resources, including desk and/or laboratory space).
4. Addressing problems or challenges that could affect completion of the degree as soon as they become aware of them.
5. Tailoring, modifying or adjusting the faculty member's mentoring style to the particular needs of each graduate student, to a reasonable extent.
6. Encouraging an open exchange of ideas, including by empowering students to independently follow research ideas of their own whenever feasible.
7. Checking regularly on progress. Graduate Council recognizes each graduate program/group, mentor and mentee should agree upon a reasonable frequency of meetings and communications, which may vary widely by discipline, but should not usually occur less than at least once per quarter.

8. Encouraging and giving feedback on written work, oral presentations and experimental work in a timely manner within a mutually agreed upon time frame, and consistent with Graduate Council policies
9. Providing and discussing clear criteria for authorship of collaborative research, consistent with Graduate Council policies on co-authorship.
10. Encouraging participation in professional meetings of regional groups as well as of learned societies and facilitating interactions and networking with other scholars, on campus and within the wider professional community.
11. Helping the student in identifying appropriate resources for career guidance, providing help with preparations of CV and job interviews, as well as writing letters of recommendation in a timely manner.
12. Empowering and encouraging the student in seeking their own career paths and supporting the student independent of the chosen career paths they identify.
13. Participating regularly in mentorship training.

As partners in the mentoring relationship, graduate students have responsibilities. These responsibilities include:

1. Respecting their mentor, including their mentor's identity including race, ethnicity, gender and gender expression, age, visible and non-visible disability, nationality, sexual orientation, citizenship status, veteran status, religious/non-religious, spiritual, or political beliefs, socio-economic class, status within or outside the university, or any of the other differences among people
2. Seeking assistance from multiple individuals/organizations to fulfill the mentoring roles described above, because one faculty member may not be able to satisfy all of a student's mentoring needs.
3. Understanding and clearly articulating to their mentors their own mentoring needs and how they change through their graduate tenure.
4. Respecting their mentor's other responsibilities and time commitments.
5. Communicating regularly with their mentors, especially their major professor, including updates on progress, challenges, needs, goals and expected completion timelines.
6. Completing tasks in a timely fashion and following mutually agreed upon timelines and informing mentors about expected absences and delays before they occur.
7. Participating in departmental and graduate program/group community including attending activities, lectures, and events.
8. Acting in a manner that will encourage professors to see them as colleagues. Seeking constructive criticism and feedback on academic work.
9. Seeking information, exploring career options and developing clear career goals.
10. Participating regularly in mentee-ship training.

Forensic Science Student Organization

The Forensic Science Student Organization (FSSO) was founded in 2009 and is dedicated to supporting the graduate students enrolled in the UC Davis Forensic Science Graduate Program. The secondary focus of the student lead and operated FSSO is to expand public knowledge by providing assistance to non-program members and facilitating networking opportunities with professionals in various forensic science-related fields. The members of the FSSO hope to inspire and educate all interested individuals on issues and topics within forensic science. All forensic science graduate students are encouraged to join FSSO and to take part in our yearly events.

Funding Your Degree

The Financial Aid Office at UC Davis provides information and student loan services for students in our program. Their office is located in Dutton Hall and information on their services can be found at https://financialaid.ucdavis.edu/graduate/apply.

At the University of California, Master's Degree students are eligible for financial assistance via Federal Student Loans. These are applied for and administered through the Financial Aid Offices on each UC campus. The amount of loan provided depends on each student's need as well as their status as full- or part-time students. Students must enroll in a minimum of 5 units per quarter to receive student loan funding.

In addition to graduate student loans, our students can earn money to help defray the cost of their education by seeking employment on or off the UCD campus. Our students are free to seek employment as Teaching Assistants (TA) in campus departments offering courses they excelled in as undergraduates. While you are free to contact any UCD department you think you'd like to TA for, past forensic science students have been able to find TAships in the Biology, Microbiology and Chemistry departments here in particular. Students who are native speakers of languages foreign to the US are welcome to apply for TAships with the relevant foreign language department. It will be the responsibility of the student to contact the department they wish to apply to directly rather than applying through the Financial Aid Office which does not administer student employment.

The Forensic Science Graduate Program hires one TA per year for our DNA Typing Laboratory Course. In order to be considered for this position, you must score at the top of the class the quarter you take the course yourself. In addition to this TAship, some of our instructors hire students to serve as "Readers" for their courses. Readers are students hired to serve as course assistants whose duties vary according to the instructor, but, primarily involve grading papers and examinations. Readers are not expected to lead discussion groups or laboratory sessions. In order to serve as a Reader for a course, you must have completed the course yourself in good standing and be appointed by the instructor of the course.

The final category of student employment within the Forensic Science Graduate Program is that of Lab Assistantships for students hired to maintain either the DNA Typing Lab or the Criminalistics Lab and their equipment at the UC Davis Forensic Science Center. As with our TAs and Readers, the Lab Managers are chosen from those students performing at the top level of the DNA Typing and Analytical Instrumentation laboratory classes. These positions provide a small monthly income for 9-12 months and are only very occasionally renewed for another year.

Each student in the program is awarded $2000 in research funds which are directed toward their major professor to help pay for the costs associated with conducting their M.S. thesis. These funds are transferred

to the student's major professor upon approval of the students' research proposal and advancement to candidacy forms.

If a thesis project is expected to cost over $2000, the student can apply for a small amount of further funding through the Forensic Science Graduate Program's scholarship funds. These funds originate from the California Association of Criminalists (CAC) and are typically provided to this program on an annual basis to promote forensic science research and education in California. The CAC scholarship funds must be applied for using forms provided by our Graduate Student Coordinator and the outcome of the application is not guaranteed. Students applying for such funds must be members of the California Association of Criminalists and must agree to present the findings of their research project at a CAC conference once it is completed. In addition to providing small (e.g. $100-$1000) research scholarships, the CAC funds provided to our program can also be used to help defray travel costs to forensic science conferences provided the student is a member of the CAC, applies for the travel funds specifically and presents their research data at the conference.

M.S. Program

The UC Davis Forensic Science M.S. Degree (MSFS) program is focused on providing future employees for the ISO 17025-accredited Forensic Science Facilities (Crime Labs) in the United States. These ISO-accredited facilities are the backbone of the forensic sciences as currently practiced in the United States.

The curriculum and degree requirements described below were designed to ensure that students completing our program have the necessary education and skills for working in a U.S. crime lab.

Admission Requirements:

Students wishing to apply to the program must obtain a bachelor's degree in an appropriate scientific field. Additional requirements including three letters of recommendation, official transcripts, TOEFL or IELTS score (if applicable) can be submitted via the Office of Graduate Studies online application system with fee by the admission deadline. A minimum overall GPA of 3.0 is required along with a minimum GPA of 3.0 in prerequisite courses. Meeting some or all of these criteria does not guarantee admission, but merely eligibility. The decision to recommend admission to the Dean of Graduate Studies is made by the Program Admissions Committee on the basis of available space and the competitiveness of applicants within the eligible pool.

Applicants from countries whose official language is not English must provide TOEFL or IELTS scores to demonstrate English language proficiency. TOEFL scores must be 105 or above, with speaking and writing scores of 25 or above. IELTS scores must be 7.5 or above. Scores must be no more than 2 years old. Official scores must be sent from the electronic testing service to UC Davis. UC Davis will not accept unofficial score reports or score reports sent directly by the applicant. Applicants who have completed a degree at an approved English-medium institution are exempt from this requirement.

a) Course Prerequisites:

In addition to the admission requirements stated above, applicants are expected to have the minimum equivalent of the following UC Davis courses:

MAT16A/B/C Calculus 9 quarter units
PHY7A/B/C Physics 12 quarter units
CHEM 2A/B/C General Chemistry 9 lecture units and 6 lab units
CHE 118A/B Organic Chemistry 6 lecture units and 2 lab units
STA13 Statistics 4 quarter units

b) Course Deficiencies:
Deficiencies in some of the above undergraduate courses may be made up prior to or during the first year of graduate studies at UCD. These courses do not count toward completion of the MS degree. A grade of B or better is required in these courses.

Program Tracks:

The UC Davis Forensic Science Graduate Program offers two areas of academic emphasis—Forensic DNA and Forensic Criminalistics—in addition to the core curricula required for all students. These forensic specialty tracks consist of specific courses tailored to provide in-depth education within the specialty. The Forensic DNA track focuses on molecular biology and DNA analysis courses, while the Forensic Criminalistics track emphasizes chemistry and instrumental analysis. Any student seeking employment in an area other than forensic DNA analysis, should follow the Criminalistics track.
Graduate students in one track are welcome take courses from the other track and use these courses to satisfy the elective requirements. Switching from one track to the other is allowed, but, may result in having to take more units than the standard total number of course units in order to fulfill the final track's course requirements.

Full- and Part-Time Status:

This program accepts both full time and part time students. Full-time status is defined by our program as 9 or more units per quarter for domestic students. In order to maintain part-time enrollment status, students must enroll in a minimum of 4 units per quarter. Please note that registration in fewer than 12 units per quarter may be considered less than full-time enrollment by some administrative units on campus (e.g. Office of the University Registrar, Financial Aid and Scholarships, Graduate Studies). International students must maintain a minimum of 12 units per quarter.

M.S. Plan I and Plan II:

In addition to completing the program track's course requirements, students must also perform research relevant to the forensic science field in order to complete the program. The particular combination of coursework and research a student follows is referred to as the degree plan. Our program offers two degree plan options, with Plan I being by far the most commonly followed.

Plan I is a traditional thesis-based plan requiring a total of 54 course units (see below) including 36 units of lecture, lab and seminar coursework along with 18 units of 299 research. The 299 research units are accomplished by performance of research in the major professor's lab. Accompanying the lab work, students must write up the results of their research as a thesis which must be approved by the thesis committee. Plan I is particularly attractive to both students and future employers as it involves hands-on lab work relevant to forensic science.
Plan II is a comprehensive examination-based plan designed for students unable to complete a traditional thesis. This plan requires a total of 54 course units, including 48 units of lecture, lab and seminar coursework along with 6 units of 299 research. As less research is undertaken, more lecture coursework is required than with Plan I which can result in increased total tuition, depending on how many 299 units the student has paid for before deciding to follow Plan II. While no thesis is required, Plan II requires completion of an approved capstone project including a written capstone document as well as a final

comprehensive oral examination on the major subject carried out by the capstone committee. Students are cautioned that Plan II involves far less laboratory research which may hinder applicants seeking crime lab employment later. Therefore, students are advised to discuss the Plan II option with their program director and major professor carefully, before choosing to follow it.

Course Requirements – Core and Electives (total 54 units)

Twenty-four units (15 core general and 9 core track) of required lecture courses along with the appropriate lab, seminar and research units are required of all students. DNA and Criminalistics track students are also required to take 6 or 7 units of electives, respectively. The minimum course load is 4 units each academic quarter unless the student has been approved for Filing Fee (Filing Fee | UC Davis Graduate Studies) or Planned Educational Leave Program (Planned Educational Leave Program (PELP) | UC Davis Graduate Studies). There are strict requirements to qualify for each, be sure to check with your program director and/or program coordinator to learn the details and apply.

In addition to the information contained in this handbook, Forensic Science Advising Worksheets are available to students on our website to help you plan your course schedule for the program.
Criminalistics Track: https://forensicscience.ucdavis.edu/forensic-criminalistics-track
DNA Track: https://forensicscience.ucdavis.edu/forensic-dna-track

Common Required Core Courses - 15 units (both tracks)

- FOR201A Forensic Science Fundamentals - A (3)
- FOR201B Forensic Science Fundamentals - B (3)
- FOR201C Forensic Science Fundamentals - C (3)
- FOR218 Forensic Case Reports (3)
- FOR240 Homicide Crime Scene Investigation (3)

DNA Track Required Courses – 12 units

- FOR278 Molecular Techniques (3)
- FOR280 Forensic DNA Analysis (3)
- FOR276 Population Genetics or any 200 genetic or bioinformatics course (3)
- FOR281 Principles and Practices of DNA Typing (3)

A note about the DNA track: DNA track students must meet the FBI Quality Assurance Standards (QAS) DNA analyst minimum educational requirements including successful completion of 12 -18 units of biochemistry, genetics, statistics and/or population genetics and molecular biology during their undergraduate and/or graduate degree education in order to qualify for employment as forensic DNA Analysts. Additionally, the UC Davis DNA track requirements are designed so that graduates will meet the FBI QAS standards for crime lab DNA Technical Lead. These requirements call for a MS degree in the

sciences, specified DNA related courses and background DNA experience. A brief summary of the national level DNA Technical Lead requirements are:

- Master's degree in a biology-, chemistry- or forensic science- related area
- Successfully completed 12 semester or equivalent credit hours from a combination of undergraduate and graduate course work covering the following subject areas:
    - Biochemistry (taken as an undergraduate or program elective),
    - Genetics (taken as an undergraduate or program elective),
    - Molecular biology (covered in FOR278),
    - Statistics or population genetics (covered in FOR276).

Our program structure meets these guidelines.

Criminalistics Track Courses – 11 units

- FOR207 Advanced Spectroscopy (3) or equivalent
- FOR220 Analysis of Toxicants (3)
- FOR268 Forensic Statistics (3)
- FOR221L Forensic Science Analytical Instrumentation (2)

Elective Courses - (6 to 7 units for a total of 33 units, or 18 to 19 units for a total of 45 units)

We encourage but do not require the student to take units from the other track for the following reasons:

- Typically, the crime lab entry job will be in DNA/biology area doing basic serology/DNA analysis or the Criminalistics area conducting drug or toxicology analysis.
- The goal is on obtaining entry into the highly competitive crime lab field; once hired they can promote to different areas.
- The other more advanced crime lab sections usually become available to a person only with more laboratory experience.

Other than that, we allow for and have a wide variety of elective Forensic Science courses and campus wide courses that the students can select from. See below for a list some of these courses.

FOR290 Seminar Requirements

We require a total of 3 seminar courses taken for a total of 3 units for students in both tracks. Our program offers two FOR-based seminar courses. For the third seminar course, we suggest either one Non-FOR science-based seminar or attendance of a forensic science conference consisting of at least 10 hours of forensic seminars.

In summary, to satisfy this requirement students need to take:

- Two FOR290 Seminars - 1 unit ea, (usually fall and spring quarter),
- One XXX290 (non-FOR) Science Seminar – 1 unit

– or -

- Alternatively, one FOR290C Conference based seminar credit may be taken for attendance at a forensic science conference occurring over at least 3 days.

Research Unit Requirements

- Plan I requires 18 FOR299 research units
- Plan II requires 6 FOR299 research units

FOR299 research units are taken under the major professor's specific 299 course number (CRN). The specific CRN for enrollment can be obtained from the Graduate Coordinator each quarter.

Miscellaneous Curriculum Advising Issues:

Quantitative Analysis Issue

Most California labs require a specified chemistry-based 3 semester-unit course in Quantitative Analysis. The reason for this requirement relates to California state regulations in a very narrow analytical field. These state regulations were withdrawn in April 2017. However, we expect this entry level requirement to be active in California crime labs for at least the next several years. Successful completion of CHE002A,B,C as an undergraduate will satisfy this requirement as will completion of ETX102B as an undergraduate or graduate student. ETX102B qualifies as an elective in our program.

FORENSIC SCIENCE COURSE SCHEDULE 2023-2024

Fall Quarter 2023

Course	CRN	Units	Course Name	Day	Time	Instructor
FOR201A	34048	3	Forensic Science-A Fundamentals	Monday	6:00-9:00 PM	Hall, Triebold
FOR207	34049	3	Forensic Spectroscopy	Wednesday	6:00-9:00 PM	B. Miller
FOR220	34050	3	Analysis of Toxicants	Tuesday/Thursday	3:10 -4:30 PM	Zhang
FOR221L	34051	2	Forensic Instrumentation Lab	Thursday	6:00-10:00 PM	Triebold
FOR280	34052	3	Forensic DNA Analysis	Thursday	4:00-7:00 PM	Hall
FOR290	34053	1	Seminar in Forensic Science	Friday	4:30-5:30 PM	Gonzalez
FOR290C	34054	1	Graduate Research Conference	TBS	TBS	Hall
FOR299	varies	0-18	Research in Forensic Science	TBS	TBS	various

Winter Quarter 2024

Course	CRN	Units	Course Name	Day	Time	Instructor
FOR201B	25602	3	Forensic Science-B Fundamentals	Thursday	6:00-9:00 PM	Hall, Hess, Viray
FOR208	25603	3	Forensic Toxicology	Wednesday	6:00-9:00 PM	Triebold
FOR268	25605	3	Forensic Statistics	Monday	4:00-7:00 PM	B. Miller
FOR276	25606	3	Population Genetics	Tuesday	6:00-9:00 PM	Rodzen
FOR278	25607	3	Molecular Techniques	Monday/ Wednesday	4:10-5:30 PM	Parker
FOR218	25604	3	Forensic Case Reports	Friday	3:10 - 6:00 PM	Waltonen
FOR290	25608	1	Seminar in Forensic Science	Tuesday	5:00-6:00 PM	Hall
FOR298	25610-25612	3	Group Study (Forensic Photography)	Friday	9:00 AM-12:00 PM	Hess
FOR299	varies	0-18	Research in Forensic Science	TBS	TBS	various
FOR290C	25609	1	Graduate Research Seminar	TBS	TBS	Hall

Spring Quarter 2024

Course	CRN	Units	Course Name	Day	Time	Instructor
FOR201C	42166	3	Forensic Science-C Fundamentals	Monday	4:00-7:00	Hall, Chamberlain
FOR240	42168	3	Homicide Crime Scene Investigation	Friday	4:00-7:00	Hess
FOR281	42169	3	Forensic DNA Lab	Wednesday/Thursday	4:00-7:00	Hall
FOR298	42171	3	Group Study - Genomics and Transcriptomics	Tuesday	4:00-7:00	N. Miller
FOR290C	42170	1	Graduate Research Conference	TBS	TBS	Hall
FOR299	varies	0-18	Research in Forensic Science	TBS	TBS	

Thesis and Comprehensive Examination (Capstone) Committees

Plan I Students should begin looking for a MSFS program faculty member with whom to do their laboratory research and write their thesis upon entering the program in fall quarter. The faculty mentor with whom the graduate student works most closely (often their primary investigator) is known as the major professor, or Principal Investigator (PI). The major professor guides the graduate student through the process of identifying a desired area of focus, selecting a research topic, completing the research, and writing their thesis. The major professor also serves as the chair of the student's thesis committee. The program website contains information on current faculty from which students can select those whom they would like to talk to further about performing their research project with. The fall quarter seminar series invites MSFS program faculty to present their research to give students a better idea of the research they

are currently focusing on in their labs as well. Students can also talk with graduate advisors, the Graduate Coordinator, the program Director, as well as the program's Technical Advisor for guidance on finding a research project and major professor. Please note that your graduate advisor cannot serve as your major professor as well.

The thesis committee is ultimately comprised of a student's major professor and two additional committee members. The student, in consultation with his/her major professor and graduate advisor, nominates the two additional faculty to serve on the thesis committee. At least one member of the committee must be a member of UCD's Academic Senate. The committee may (but is not required to) include one additional faculty member from outside the program. Affiliated faculty of the program may serve as the external faculty member. These nominations are submitted to the Office of Graduate Studies for formal appointment in accordance with Graduate Council policy.

Students should discuss the desire to change their major professor and/or their research projects with their graduate advisor. Changes to the thesis committee must be approved by all members of the revised committee along with any accompanying changes to the research proposal.

A similar process is in place for those following Plan II in that a major professor and capstone project are first identified. The comprehensive examination committee will be structured the same as a thesis committee and will follow the same qualification rules as established by the Office of Graduate Studies for thesis committees. The major professor serves as Chair of the committee. In addition to mentoring the Plan II student in conducting their research and writing the technical capstone document, the capstone committee members will conduct a final comprehensive oral examination of the student's knowledge in their subject area as required for completion of their project.

Research Proposal

Once a major professor has been identified and a research project agreed on by both parties, the student must write a research proposal detailing the project they propose to perform. The proposal is written on a form provided to students by the program to help guide them in its composition (https://forensicscience.ucdavis.edu/policies-and-forms) . The proposal contains introductory information including references, the theory behind the project as well as practical matters in performing the research such as the location where it will be conducted, the supplies involved and the budget. The major professor will guide the students in writing the research proposal which must be signed off on by all three committee members for approval. The proposal serves as a starting point for the student's research and results need not be included.

Advancement to Candidacy and Research Fund Transfer

Once the research proposal has been approved by all three members of the thesis / comprehensive examination (capstone) committee, the student is ready to advance to candidacy at UC Davis. Every student must file an official application for candidacy for the Degree of Master of Forensic Science and pay the candidacy fee after completing one-half of their course requirements and at least one quarter before completing all degree requirements; this is typically the fourth quarter of study. The Candidacy for the Degree of Master form can be found online at http://www.gradstudies.ucdavis.edu/forms/. Students must have their Graduate Advisor and thesis committee Chair sign the Candidacy Form before it can be submitted to Graduate Studies. If the candidacy is approved, the Office of Graduate Studies will send a copy to the appropriate Graduate Program Coordinator and the student; the Thesis Committee Chair will

also receive a copy, if applicable. If the Office of Graduate Studies determines that a student is not eligible for advancement the program and student will be told the reasons for the deferral. Some reasons for deferring an application include a GPA below 3.0, outstanding incomplete grades, and/or insufficient units.

Once the student has advanced to candidacy, the program will transfer $2000 in research funds to the major professors account to be used in purchasing supplies for the project.

Research Projects

Thesis:

Research for the Plan I Master's thesis is to be carried out under the supervision of a faculty member of the program and must represent an original contribution to knowledge in the field. The thesis research must be conducted while the student is enrolled in the program. Your thesis should be structured so that it can be submitted for publication in an appropriate scientific journal. It is submitted to the thesis committee at least one month before the student plans to make the requested revisions. All three committee members must approve the thesis and sign the title page before the thesis is submitted to Graduate Studies for final approval.

The thesis must be filed in a quarter in which the student is registered or on filing fee. Instructions on preparation of the thesis and a schedule of dates for filing the thesis in final form are available from Graduate Studies; the dates are also printed in the UC Davis General Catalog.

Comprehensive Examination:

Fulfillment of the comprehensive examination is the last requirement of the M.S. Plan II. Students may take the comprehensive oral examination once they have advanced to candidacy. However, it is important that the comprehensive examination requirement be completed at or near the end of the coursework for the Master's degree. For most full-time Plan II students, the exam is taken at the end of the 6th quarter. The comprehensive examination requirement includes both the submission of a technical capstone report submitted to the Comprehensive Examination committee and passing an oral comprehensive exam administered by that same committee. The technical report is to be written under the direction of the major professor, who must be a member of the Comprehensive Examination committee and who cannot be your graduate advisor. The technical report can be an extensive review of the literature in a focused subject area, a report on a validation of new instrumentation, research performed as part of the program, or any other technical report deemed suitable and approved in advance by the committee.

The scope of the oral exam is the candidate's coursework as well as the technical report. The exam committee must approve the student's passing the exam unanimously. If a student does not pass, the committee may recommend that the student be re-examined a maximum of one more time, provided the student's graduate advisor agrees with the committee. The second exam must take place within one quarter of the first. A student who does not pass on the second attempt is subject to disqualification from the program.

Special Program Completion Requirements:

All MS program degree candidates are expected to present their thesis or capstone results to faculty and students.

A copy of your signed thesis must be provided to the program upon graduation for inclusion in our Forensic Science Library.

Students must have a cumulative GPA of 3.0 for the M.S. degree to be awarded.

Normative time to degree

Program students must be enrolled in 9 units per quarter to obtain full-time status. Full-time enrollment allows degree completion in two years and is compatible with the need of many students to balance academic, career, and other obligations. Normative time for a full-time student to complete all M.S.F.S. degree requirements, assuming they are making adequate progress, is 2 years. For a part-time student the normative time to degree completion is 5 years. After this deadline has passed, the student must obtain the recommendations of the major professor and graduate advisor to remain in the program.

Typical Timeline and Sequence of Events

Year One	**Fall**	**Winter**	**Spring**	**Units**
Common Courses	FOR201A-F.S. Fundamentals (3) FOR290-Seminar (1)	FOR201B F.S. Fundamentals (3) FOR218 Technical Writing F.S. (3) FOR290 Seminar (1)	FOR201C F.S. Fundamentals (3) FOR290C or XXX290 Seminar (1)	15
DNA Track courses	FOR240-Crime Scene (3) FOR280 Forensic DNA Analysis (3)	FOR276 Population Genetics (3)	FOR281 DNA Typing Lab (3)	12 Total: 27
Criminalist Track Courses	FOR220- Analysis of Toxicants (3) FOR207 Forensic Spectroscopy (3)	FOR268 Forensic Statistics (3)	FOR221L Instrumental Analysis (2) FOR240 Crime Scene (3)	14 Total:
Year Two	**Fall**	**Winter** (advancement to MS candidacy)	**Spring**	
DNA Track Courses	FOR200 series Elective (3) FOR299 Research (6)	FOR278 Molecular Techniques (3) FOR299 Research (6)	FOR200 series or XXX100/200 series elective (3) FOR299 Research (6)	27 Total: 54
Criminalistics Track Courses	FOR200 series Elective (3) FOR299 Research (6)	FOR200 series Elective (2) FOR299 Research (6)	FOR200 series or XXX100/200 series elective (2) FOR299 Research (6)	25 Total:

Special Program Completion Requirements:

All MS program degree candidates are expected to present their theses or capstone results to faculty and students.

Students must have a cumulative GPA of 3.0 for the M.S. degree to be awarded.

Master of Science in Forensic Science Degree Progress Checklist

Student Name: _____

Graduate Advisor: _____

Program Track: _____Date: _____

These requirements are derived, in part, from the FEPAC accreditation standards.

COMMON CORE PROGRAM COURSES COMPLETED (B grade or higher)		**UNITS**	**DATE**
FOR201A	Forensic Science Fundamentals - A	3	
FOR201B	Forensic Science Fundamentals - B	3	
FOR201C	Forensic Science Fundamentals - C	3	
FOR218	Forensic Case Reports	3	
FOR240	Homicide Crime Scene Investigation	3	
FOR290	Fall Seminar	1	
FOR290	Winter Seminar	1	
XXX290	Any campus seminar or FOR290C Conference credit	1	
FOR299	Research (Plan 1 18 units Plan II 6 units)	6 or 18	

DNA TRACK CORE PROGRAM COURSES COMPLETED (B grade or higher)		**UNITS**	**DATE**
FOR280	Forensic DNA Analysis	3	
FOR276	Population Genetics	3	
FOR278	Molecular Techniques	3	
FOR281	Principles and Practice of Forensic DNA Typing (Lab)	3	

CRIMINALISTICS TRACK CORE PROGRAM COURSES COMPLETED (B grade or higher)		**UNITS**	**DATE**
FOR207	Advanced Spectroscopy Methods in Forensic	3	
FOR268	Forensic Statistics	3	
FOR220	Analysis of Toxicants	3	

FOR221L	Forensic Science Instrumental Lab	2	

ELECTIVE COURSES COMPLETED **6-7 units for Plan I & 18-19 units for Plan II**		**UNITS**	**DATE**
	Optional Electives or other Campus Science Courses ***Limited to no more than 12 upper division units***		
FOR2XX	Additional Courses from DNA or Criminalistics Track	As desired	
FOR208	Forensic Toxicology	3	
FOR209	Forensic Alcohol	3	
FOR221L	Forensic Science Instrumental Lab	2	
FOR263	Forensic Computer Investigation	2	
FOR268	Forensic Statistics	3	
FOR280	Forensic DNA Analysis	3	
FOR281	Principles and Practice of Forensic DNA Typing (Lab)	3	
FOR283	Forensic Biology	3	
FOR298	Group Study	Varies	
ETX102B	Quantitative Analysis of Environmental Toxicants	5	

Course Descriptions

Common Core Classes for all Students

FOR201A, B, C Forensic Science Fundamentals (3 units each)
Overview of Forensic Science. Problem definition, strategies for problem solving, analytical tools, and professional and ethical considerations.

FOR218 Forensic Case Reports (3)
How to write clear, credible forensic science reports and scientific articles that (a) serve the ends of the justice system, (b) meet their readers' varying needs and (c) reflect well on the author.

FOR240 Homicide Crime Scene Investigation (3)
Processing and evaluating complex homicide scenes. Functions and activities of police agencies. Recognition, documentation, identification, and collection of evidence. Event sequence reconstruction. Evidence collection, preservation, and report writing. Courtroom presentation.

DNA Track Classes

FOR276 Population Genetics (3)
Population Genetics. This course provides an overview of the principles of population genetics as they apply to forensic science. A strong emphasis will be placed on the theories and models of population genetics.

FOR278 (ETX278) Molecular Techniques (3)

Recombinant DNA technology and its applications.

FOR280 (ETX280) Forensic DNA Analysis (3)

Foundation in theory and practice of forensic DNA analysis; past, present, and emerging technologies; legal and quality assurance issues. DNA extraction, DNA quantitation, multiplex amplification of STR loci, capillary electrophoresis of amplified products, and analysis of STR typing data.

FOR281 Principles & Practical DNA Typing (3) (Lab)

Comprehensive overview of forensic serology and DNA typing techniques and technologies. Strong emphasis on real-world applications, including preservation and tracking of biological evidence, detection and identification of bodily fluids, and methods to extract, quantify, and type human DNA.

Criminalistics Track Classes

FOR207 Advanced Spectroscopy (3) or equivalent

Discuss, evaluate and interpret advanced molecular spectra/structure; chemical applications of spectroscopic methods, vibrational, rotational spectra; electronic spectra, photoelectron spectroscopy generated by various analytical instruments used in forensic science community.

FOR220 (ETX220) Analysis of Toxicants (3)

Principles of microanalysis of toxicants. Theoretical considerations regarding separation, detection, and quantitative determination of toxicants using chemical and instrumental techniques.

FOR221L Forensic Science Instrumental Lab (2)

Methodology and instruments used for the analysis of substances of interest in the discipline of Forensic Science. Practical experience with modern instrumental techniques & methodologies used in the advanced forensic science laboratory.

FOR268 Forensic Statistics (3)

Statistics that are used by the forensic scientist, their limitations/applications in presenting evidential results in such areas as DNA-STR results, trace evidence correlation, fingerprint statistics, population sampling and the Bayes method.

Forensic Science Graduate Program Elective Courses

FOR208 Forensic Toxicology (3)

This course focuses on forensic toxicology as it relates to driving under the influence of drugs (DUID) investigations, its detection and evaluation through the use of standardized field sobriety tests and drug recognition protocols.

FOR209 Forensic Alcohol Analysis (3)

The course will be concentrated on analytical methods used in the determination and quantitation of ethanol in biological matrices commonly encountered in cases involving operating a motor vehicle. Students will explore direct oxidation (titration) methods for determining calibrators as well as a method of analysis. The majority of the course will be on current instrumental methods in forensic alcohol analysis as well as the application and history of California Code of Regulations, Title 17 and a discussion on absorption, distribution, metabolism and elimination (ADME) processes specifically for the purposes of peak ethanol content determination and extrapolations related to hypothetical scenarios in court.

FOR215 Forensic Arson and Fire Investigation (3)

Principles and techniques of scientific investigation of fires and related crimes; offer peer-reviewed protocols for processing fire and explosion scenes; discuss recognition, collection, analysis of physical evidence, and describe the scientific method for decision-making in fire/arson investigation.

FOR263 Forensic Computer Investigation (3)

Discuss the threats to the security of any kind of evidence that is captured, transmitted, or stored digitally and develop critical thinking and basic knowledge of computer forensic science issues in the evaluation of digital evidence.

FOR268 Forensic Statistics (3)
Statistics that are used by the forensic scientist, their limitations/applications in presenting evidential results in such areas as DNA-STR results, trace evidence correlation, fingerprint statistics, population sampling and the Bayes method.

FOR276 Population Genetics (3)
Population Genetics. This course provides an overview of the principles of population genetics as they apply to forensic science. A strong emphasis will be placed on the theories and models of population genetics.

FOR283 Forensic Biology (3)

Overview to the foundational concepts in forensic biology: chemistry and molecular biology of biological evidence, genetic basis of biological uniqueness, evolutionary basis of species differences, patterns and dynamics of evidence deterioration, and the legal/ professional considerations associated with biological evidence.

FOR293 Research Methods in Forensic Science (2)
Introduction to identification, formulation, and solution of meaningful scientific problems encountered in the Forensic Science area including experimental design and/or theoretical analysis of new and prevailing techniques, theories and hypotheses. Students will present and defend their thesis research/journal article proposals.

Campus Elective Courses Suitable for the Forensic Science Program

Below are some of the suggested courses. Other courses can be taken if approved by the Graduate Advisor. In essence, the courses should be used to enhance their research effort and be scientific in nature. Note that for the MS FS program, upper division course work is limited to no more than 12 quarter units.

These courses may be scheduled alternate years, so the student needs to check their availability and see if the consent of the current instructor is required.

Campus Elective Options

ANG111 Molecular Biology Laboratory Techniques (4)
Biological Sciences 1C, 101, 102, 103. Introduction to the concepts and techniques used in molecular biology; the role of this technology in both basic and applied animal research, and participation in laboratories using some of the most common techniques in molecular biology.

ANG212. Sequence Analysis in Molecular Genetics (2)
Lecture/laboratory—2 hours. Prerequisite: Biological Sciences 101 or the equivalent; graduate standing or consent of instructor. Use of computer algorithms and online databases to analyze nucleic acid and protein sequences in molecular genetics research.

CHE115 Instrumental Analysis (4)
Lecture—2 hours; laboratory—6 hours. Prerequisite: courses 105 and 110B (may be taken concurrently) or 107A-107B. Intermediate theory and laboratory techniques in analytical and physical chemistry. Advanced data analysis methods and

goodness-of-fit criteria. Fourier transform spectroscopic methods and instrumentation. Mass spectrometry. Electrochemistry. Liquid chromatography

CHE205 Symmetry, Spectroscopy, and Structure (3)
Lecture—3 hours. Prerequisite: course 201 or the equivalent. Vibrational and rotational spectra; electronic spectra and photoelectron spectroscopy; magnetism; electron spin and nuclear quadrupole resonance spectroscopy; nuclear magnetic resonance spectroscopy; other spectroscopic methods

CHEM217 X-Ray Structure Determination (3)
Lecture—3 hours. Prerequisite: consent of instructor. Introduction to x-ray structure determination; crystals, symmetry, diffraction geometry, sample preparation and handling, diffraction apparatus and data collection, methods of structure solution and refinement, presentation of results, text, tables and graphics, crystallographic literature.

CHE219 Organic Spectra (4)
Lecture—3 hours; laboratory—2.5 hours. Prerequisite: course 128C or the equivalent. Identification of organic compounds and investigation of stereo chemical and reaction mechanism phenomena using spectroscopic methods—principally NMR, IR and MS

CHE240 Adv. Analytical Chemistry (3)
Lecture—3 hours. Prerequisite: courses 110A and 115 or the equivalent. Numerical treatment of experimental data; thermodynamics of electrolyte and non-electrolyte solutions; complex equilibria in aqueous and non-aqueous solutions; potentiometry and specific ion electrodes; mass transfer in liquid solutions; fundamentals of separation science, including column, gas and liquid chromatography.

CHE241C Mass Spectrometry (3)

Lecture—3 hours. Prerequisite: course 110C and 115 or the equivalent. Mass spectrometry and related methods with emphasis on ionization methods, mass analyzers, and detectors. Related methods may include ion-molecule reactions, unimolecular dissociation of organic and bio-organic compounds, and applications in biological and environmental analysis.

EMS182 Failure Analysis (4)
Lecture—3 hours; laboratory—3 hours. Prerequisite: C- or better in Engineering 45; course 174 (recommended). Analysis of the way materials fail. Effects of temperature, mechanical deformation and corrosion on the properties of materials. forensics and methodologies for investigating failures of materials including optical microscopy, x-ray analysis and scanning electron microscopy. Investigation of practical problems.

EMS230 Electron Microscopy
Lecture—2 hours; lecture/discussion—1 hour. Prerequisite: course 162. Principles and techniques of scanning and transmission of electron microscopy used in the study of materials will be described. Emphasis upon practical applications.

ETX102B Quantitative Analysis of Environmental Toxicants (5) NOTE: Quantitative Analysis Equivalent
Lecture—3 hours; laboratory—3 hours; discussion—1 hour. Prerequisite: course 102A. Sample preparation methods for trace analysis of environmental toxicants. Concept and techniques of advanced analytical instrumentation. Interpretation and use of analytical data. Not open for credit to students who have completed course 112B.

ENT158 Forensic Entomology (3)
Lecture—2 hours; laboratory—4 hours. Prerequisite: Biological Sciences 1B or Entomology 100, upper division standing. Arthropods, their general biology, succession, developmental cycles and population biology in matters of criminal prosecution and civil litigation. Emphasis on basic arthropod biology, ecological and developmental concepts and methods, development of reasoning abilities, implication, development of opinions and evidence

FPS161 Structure and Properties of Fibers (3)
Lecture—3 hours. Prerequisite: Textiles and Clothing 6 and Chemistry 8B. The structure, properties and reactions of natural- and man-made fibers; the relations between molecular structure of fibers and their physical properties; interactions of fibers and detergents

FPS161L Textile Chemical Analysis Lab (1)
Laboratory—3 hours. Prerequisite: course 161 (may be taken concurrently). Laboratory methods and procedures employed in qualitative and quantitative analysis of textile fibers and auxiliaries

MCB120L Biochemistry Lab (6)
Laboratory—10 hours; lecture—2 hours; laboratory/discussion—1 hour. Prerequisite: Biological Sciences 102 or consent of instructor. Restricted enrollment. Introduction to laboratory methods and procedures employed in studying molecular biology and biochemical processes. Designed for students who need experience in the use of molecular biology and biochemical techniques as research and analytical tools.

MCB162 Human Genetics (3)
Lecture—3 hours. Prerequisite: Biological Sciences 101. The human genome and genetic variation in human populations, molecular and genomic approaches in the practice of human genetics, epigenetic gene regulation, personal genetics and genomic medicine

EMA161 Combustion and the Environment (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: grade of C- or better in course 106. Introduction to combustion kinetics; the theory of pre-mixed flames and diffusion flames; turbulent combustion; formation of air pollutants in combustion systems; examples of combustion devices which include internal combustion engines, gas turbines, furnaces and waste incinerators; alternative fuel sources.

MAE217 Combustion (4)
Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: Engineering 103 and 105, Mechanical Engineering 106. Restricted to graduate students. Review of chemical thermodynamics and chemical kinetics. Discussion of reacting flows, their governing equations and transport phenomena; detonations; laminar flame structure and turbulent combustion.