



### M.Sc. in Forensic Sciences & Toxicology (2 Years, 4 Semesters)

#### Overview

The M.Sc. in Forensic Sciences & Toxicology is a specialized postgraduate program designed to provide comprehensive training in forensic investigation, crime scene analysis, forensic chemistry, toxicology, and legal medicine. This interdisciplinary program integrates forensic biology, forensic pathology, digital forensics, and advanced toxicological studies to prepare graduates for careers in law enforcement, forensic laboratories, research, and legal consulting.

Forensic science plays a crucial role in the criminal justice system by applying scientific principles to solve crimes and analyze evidence. The program covers forensic toxicology, DNA profiling, trace evidence analysis, forensic anthropology, and advanced instrumental techniques, ensuring graduates are well-equipped to handle complex forensic cases.

**Affiliated Institution:** School of Medical Sciences and Technology, Malla Reddy Vishwavidyapeeth (Deemed to be University)

**Eligibility:** A pass in B.Sc. (Forensic Science, Chemistry, Biochemistry, Biotechnology, Life Sciences, or related fields) with at least 50% marks in the qualifying examination.

#### Key Highlights

- **Comprehensive Training in Forensic & Toxicological Sciences** – Covers forensic investigation, crime scene analysis, and toxicology.
- **Multidisciplinary Approach** – Collaboration with forensic experts, toxicologists, pathologists, and law enforcement agencies.
- **Practical & Hands-on Training** – Exposure to real crime scene simulations, forensic labs, and advanced analytical instruments.
- **Advanced Forensic Techniques** – Includes DNA profiling, fingerprint analysis, ballistics, cyber forensics, and forensic anthropology.
- **Research & Evidence-Based Practice** – Conducting studies on forensic pathology, drug analysis, and environmental toxicology.

#### Course Curriculum

The program spans two years, comprising theoretical coursework, practical training, internships, and research projects.

#### Year 1

##### Core Modules:

- **Fundamentals of Forensic Science** – Introduction to forensic investigations, crime scene management, and legal procedures.



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- **Forensic Chemistry & Toxicology** – Analysis of poisons, drugs, and toxic substances in biological specimens.
- **Forensic Biology & DNA Analysis** – DNA profiling, forensic serology, and biological evidence examination.
- **Forensic Pathology & Medicolegal Aspects** – Autopsy techniques, cause of death determination, and postmortem changes.
- **Trace Evidence & Ballistics Analysis** – Examination of fibers, paint, gunshot residues, and firearm analysis.
- **Questioned Documents & Fingerprint Examination** – Handwriting analysis, ink chemistry, and fingerprint classification.

### Practical Training:

- Hands-on experience in forensic analysis, toxicological screening, and crime scene investigations.

### Year 2

#### Advanced Modules:

- **Advanced Instrumental Techniques in Forensic Science** – GC-MS, LC-MS, FTIR, SEM, and electrophoresis techniques.
- **Cyber Forensics & Digital Crime Investigation** – Data recovery, cyber fraud analysis, and digital evidence handling.
- **Environmental & Industrial Toxicology** – Impact of toxins on human health, pollution forensics, and hazardous materials analysis.
- **Forensic Psychology & Criminal Profiling** – Behavioral analysis, offender profiling, and psychological assessments.
- **Research Methodology & Biostatistics in Forensic Science** – Designing forensic research studies and statistical analysis.
- **Ethical & Legal Aspects in Forensic Science** – Courtroom testimony, forensic ethics, and expert witness training.

#### Dissertation & Research Project:

- Independent research on forensic case studies, toxicological analysis, or crime scene reconstruction.

#### Internships & Field Training:

- Specialized training in forensic laboratories, law enforcement agencies, and toxicology research institutions.

## Career and Academic Opportunities

### Career Opportunities:



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- **Forensic Scientist** – Working in crime labs, analyzing evidence, and assisting in criminal investigations.
- **Forensic Toxicologist** – Examining poisons, drugs, and toxic chemicals in forensic and clinical settings.
- **Crime Scene Investigator (CSI)** – Collecting and analyzing physical evidence at crime scenes.
- **Forensic Pathologist** – Conducting autopsies and determining causes of death.
- **Digital Forensic Analyst** – Investigating cybercrimes, data breaches, and electronic fraud.
- **Ballistics & Firearm Examiner** – Analyzing firearms, bullets, and gunshot residues.
- **Document & Handwriting Expert** – Examining questioned documents, forged signatures, and counterfeit currency.
- **Forensic Anthropologist** – Identifying human remains and assisting in mass disaster investigations.
- **Legal Consultant in Forensic Science** – Providing expert testimony and forensic consulting services.

### Higher Education & Research Prospects:

- **Ph.D. in Forensic Science & Toxicology** – Advanced research in forensic investigations and toxicology.
- **Fellowship in Forensic Toxicology or Cyber Forensics** – Specialization in forensic drug analysis or digital forensics.
- **Master of Laws (LL.M.) in Forensic Law** – Focusing on forensic science applications in the legal system.

### Labs & Training Facilities

- **Forensic Chemistry & Toxicology Lab** – Drug analysis, poison detection, and chromatography techniques.
- **DNA & Serology Lab** – DNA extraction, PCR amplification, and forensic serology.
- **Ballistics & Firearm Examination Lab** – Firearm testing, bullet trajectory analysis, and gunshot residue detection.
- **Cyber Forensics & Digital Crime Lab** – Data recovery, network forensics, and digital fraud investigations.
- **Trace Evidence & Microscopy Lab** – Analysis of fibers, hair, paint, glass, and soil samples.
- **Crime Scene Simulation & Reconstruction Lab** – Hands-on crime scene processing and forensic photography.



## PROGRAM OUTCOMES (POs)

PO	Program Outcomes
PO-1	Apply scientific techniques in crime scene investigation and forensic analysis.
PO-2	Develop expertise in forensic biology, toxicology, and DNA analysis.
PO-3	Utilize modern tools for evidence collection, preservation, and interpretation.
PO-4	Adhere to ethical and legal standards in forensic investigations.
PO-5	Conduct research on forensic methodologies for improved criminal justice outcomes.
PO-6	Communicate forensic findings effectively in legal and investigative settings.

## COURSE STRUCTURE – M.Sc. Forensic Sciences

### SEMESTER – I

Sl. No.	Broad Category	Course Code	Name of the Subject/Practical	Contact hours/week			Credits
				L	T	P	
1.	<b>Major (Core)</b>	MSFS 101	Introduction to Forensics, Psychology, Law and Statistics	2	1	0	3
2.		MSFS102	Forensic Biology and Anthropology	2	1	0	3
3.		MSFS103	Crime Scene Management and Forensic Evidences	2	1	0	3
4.		MSFS104	Fingerprints and Questioned Documents	2	0	2	3
5.	<b>Minor</b> Select any two minor courses, each worth 3 credits, for a maximum of 6	MSFS105	1. Forensic Psychology 2. Information Security and Cyber Crimes	2	0	2	6
			3. Forensic Chemistry and Toxicology 4. Criminal Law 5. Forensic Genetics and Serology	2	0	2	





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	credits per semester		6. Research Methodology & Biostatistics				
6.	Skill Enhancement Courses	MSFS106	1. Instrumental Techniques	0	0	2	2
			2.Crime Scene Investigation, & Reconstruction	0	0	2	
			Total				12
Total Contact Hours				25			

### Course Outcomes for B.Sc. Forensic Sciences MAJOR-Introduction to Forensics, Psychology, Law, and Statistics

Sr. No.	Course Outcome	Description
1	Understand the Basics of Forensic Science	Explain the principles of forensic investigations, evidence collection, and crime scene analysis.
2	Describe the Role of Psychology in Forensic Investigations	Learn about criminal behavior, offender profiling, and the psychological aspects of witness testimony.
3	Explain the Legal Framework Governing Forensic Science	Understand key legal principles, forensic evidence admissibility, and ethical considerations in investigations.
4	Analyze the Application of Statistics in Forensic Science	Learn about probability, data interpretation, and statistical methods used in forensic analysis.
5	Understand Psychological Assessments in Legal Contexts	Explain the use of mental health evaluations, risk assessments, and competency evaluations in court cases.
6	Describe the Role of Forensic Medicine in Legal Cases	Learn about autopsy procedures, toxicology reports, and cause-of-death determinations.



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Sr. No.	Course Outcome	Description
7	Explain the Interplay Between Law, Ethics, and Forensic Science	Understand the role of forensic experts in court, legal rights, and ethical responsibilities.
8	Apply Knowledge of Forensics, Psychology, Law, and Statistics in Real-World Cases	Develop analytical skills in evaluating forensic evidence, psychological reports, and statistical data for legal purposes.

### Course Outcomes for B.Sc. Forensic Sciences MAJOR-Forensic Biology and Anthropology

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Forensic Biology	Explain the role of biological evidence in forensic investigations, including DNA, blood, and other bodily fluids.
2	Describe Techniques for Biological Evidence Collection and Analysis	Learn about proper methods for collecting, preserving, and analyzing biological samples at crime scenes.
3	Explain the Principles of DNA Profiling	Understand forensic DNA extraction, amplification, sequencing, and its role in criminal identification.
4	Analyze the Role of Forensic Anthropology in Human Identification	Learn how skeletal remains are analyzed to determine age, sex, ancestry, and cause of death.
5	Understand the Study of Decomposition and Postmortem Changes	Explain forensic taphonomy, estimation of time since death, and factors affecting decomposition.
6	Describe the Use of Serology and Microbiology in Forensic Science	Learn about blood typing, body fluid identification, and microbial forensics in criminal investigations.
7	Explain the Role of Forensic Odontology in Investigations	Understand how dental records, bite mark analysis, and dental forensics contribute to identification.



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Sr. No.	Course Outcome	Description
8	Apply Knowledge of Forensic Biology and Anthropology in Real-World Cases	Develop practical skills in analyzing biological evidence and skeletal remains for forensic applications.

### Course Outcomes for B.Sc. Forensic Sciences MAJOR-Crime Scene Management and Forensic Evidences

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Crime Scene Management	Explain the principles of securing, documenting, and processing a crime scene.
2	Describe Crime Scene Investigation Procedures	Learn about crime scene reconstruction, search patterns, and evidence recovery techniques.
3	Explain the Types and Classification of Forensic Evidence	Understand physical, biological, trace, and digital evidence used in forensic investigations.
4	Analyze the Role of Evidence Collection and Preservation	Learn about chain of custody, contamination prevention, and proper handling of forensic samples.
5	Understand the Techniques for Processing Different Types of Crime Scenes	Explain methods for investigating homicides, sexual assaults, arson, and cybercrimes.
6	Describe the Role of Forensic Photography and Documentation	Learn how to accurately document a crime scene using sketches, notes, and photographic evidence.
7	Explain the Legal and Ethical Aspects of Forensic Evidence	Understand forensic evidence admissibility, expert testimony, and ethical responsibilities of forensic professionals.
8	Apply Knowledge of Crime Scene Management and Forensic Evidences in Real-World Cases	Develop skills in crime scene analysis, evidence interpretation, and investigative reporting.



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### Course Outcomes for B.Sc. Forensic Sciences MAJOR-Fingerprints and Questioned Documents

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Fingerprint Examination	Explain the principles of fingerprint identification, including uniqueness and classification.
2	Describe the Techniques for Fingerprint Detection and Collection	Learn about dusting, chemical methods, and digital enhancement techniques for lifting fingerprints.
3	Explain Fingerprint Classification and Automated Systems	Understand Henry's classification system, AFIS (Automated Fingerprint Identification System), and digital fingerprint databases.
4	Analyze the Role of Latent, Patent, and Plastic Fingerprints in Investigations	Learn how different types of fingerprints are formed, detected, and analyzed in forensic cases.
5	Understand the Basics of Questioned Document Examination (QDE)	Explain the forensic analysis of handwriting, signatures, typewriting, and printed documents.
6	Describe Techniques for Detecting Forgery and Document Alteration	Learn about ink analysis, erasures, indentations, and methods used to identify fraudulent documents.
7	Explain the Role of Paper and Ink Analysis in Forensic Science	Understand forensic techniques like chromatography, spectral analysis, and watermarks in document examination.
8	Apply Knowledge of Fingerprint Analysis and Questioned Document Examination in Criminal Investigations	Develop skills in fingerprint comparison, handwriting analysis, and forensic document authentication.

### Course Outcomes for B.Sc. Forensic Sciences MINOR- Forensic Psychology:





## School of Medical Sciences & Technology

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Forensic Psychology	Explain the role of psychology in criminal investigations, legal proceedings, and correctional settings.
2	Describe Criminal Behavior and Psychological Profiling	Learn about offender profiling, personality disorders, and factors influencing criminal behavior.
3	Explain the Role of Mental Disorders in Criminal Cases	Understand the impact of mental illnesses such as schizophrenia, psychopathy, and antisocial personality disorder on criminal actions.
4	Analyze Psychological Assessment Techniques Used in Forensic Settings	Learn about competency evaluations, risk assessments, and malingering detection.
5	Understand the Psychology of Victims and Witnesses	Explain how trauma, memory, and suggestibility affect eyewitness testimony and victim behavior.
6	Describe the Role of Forensic Psychology in Interrogation and Confessions	Learn about psychological techniques used in interviews, deception detection, and false confessions.
7	Explain the Legal and Ethical Aspects of Forensic Psychology	Understand expert witness testimony, ethical considerations, and the intersection of psychology and law.
8	Apply Knowledge of Forensic Psychology in Criminal Investigations and Legal Cases	Develop skills in psychological profiling, forensic interviewing, and analyzing offender behavior.

### Course Outcomes for B.Sc. Forensic Sciences MINOR-Information Security and Cyber Crimes

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Information Security	Explain the principles of data protection, confidentiality, integrity, and availability in cybersecurity.



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Sr. No.	Course Outcome	Description
2	Describe Various Types of Cyber Crimes	Learn about hacking, phishing, identity theft, cyberstalking, financial fraud, and online harassment.
3	Explain Cybersecurity Threats and Attack Vectors	Understand malware, ransomware, denial-of-service (DoS) attacks, and social engineering techniques.
4	Analyze Digital Forensic Investigation Techniques	Learn about data recovery, network forensics, and evidence extraction from digital devices.
5	Understand Legal Frameworks Governing Cyber Crimes	Explain cyber laws, data privacy regulations, and legal actions against cybercriminals.
6	Describe Cybercrime Prevention and Security Measures	Learn about firewalls, encryption, multi-factor authentication, and security policies.
7	Explain Ethical Hacking and Penetration Testing	Understand the role of ethical hackers in identifying and mitigating security vulnerabilities.
8	Apply Knowledge of Cybersecurity in Investigating Cyber Crimes	Develop skills in digital evidence analysis, incident response, and cybercrime case studies.

### Course Outcomes for B.Sc. Forensic Sciences MINOR-Forensic Chemistry and Toxicology

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Forensic Chemistry	Explain the role of chemistry in forensic investigations, including analysis of physical and chemical evidence.
2	Describe the Principles of Toxicology	Learn about the effects of poisons, drugs, and chemicals on the human body in forensic cases.
3	Explain Methods of Chemical Analysis in Forensic Science	Understand chromatography, spectroscopy, and mass spectrometry for analyzing forensic samples.
4	Analyze the Role of Toxicological Investigations in Criminal Cases	Learn about postmortem toxicology, drug overdose cases, and poisoning investigations.



## School of Medical Sciences & Technology

Sr. No.	Course Outcome	Description
5	Understand the Detection of Alcohol, Drugs, and Poisons	Explain breathalyzer tests, drug screening methods, and forensic analysis of toxins.
6	Describe the Identification of Explosives and Fire Debris	Learn about forensic examination of explosives, accelerants, and arson-related chemicals.
7	Explain the Legal and Ethical Aspects of Forensic Chemistry and Toxicology	Understand forensic toxicology reports, expert testimony, and regulatory standards.
8	Apply Knowledge of Forensic Chemistry and Toxicology in Criminal Investigations	Develop skills in analyzing chemical and toxicological evidence for forensic casework.

### Course Outcomes for B.Sc. Forensic Sciences MINOR-Criminal Law

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Criminal Law	Explain the principles, objectives, and scope of criminal law in the legal system.
2	Describe the Classification of Crimes	Learn about felonies, misdemeanors, white-collar crimes, and cybercrimes.
3	Explain the Elements of a Crime	Understand actus reus (guilty act), mens rea (guilty mind), and strict liability offenses.
4	Analyze Criminal Procedure and Investigation	Learn about the roles of law enforcement, evidence collection, and trial procedures.
5	Understand the Legal Framework for Punishments and Sentencing	Explain the types of punishments, including imprisonment, fines, probation, and capital punishment.
6	Describe the Rights of the Accused and Victims	Learn about constitutional protections, legal aid, fair trial principles, and victim rights.



## School of Medical Sciences & Technology

Sr. No.	Course Outcome	Description
7	Explain the Role of Criminal Law in Forensic Investigations	Understand how forensic evidence is used in criminal trials and legal decision-making.
8	Apply Knowledge of Criminal Law in Real-World Legal Cases	Develop skills in analyzing case laws, drafting legal documents, and understanding judicial precedents.

### Course Outcomes for B.Sc. Forensic Sciences MINOR-Forensic Genetics and Serology

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Forensic Genetics	Explain the principles of DNA structure, inheritance patterns, and genetic markers used in forensic analysis.
2	Describe DNA Profiling Techniques	Learn about DNA extraction, PCR (Polymerase Chain Reaction), STR (Short Tandem Repeat) analysis, and next-generation sequencing.
3	Explain the Applications of Forensic DNA Analysis	Understand how DNA evidence is used in criminal investigations, paternity testing, and disaster victim identification.
4	Analyze the Role of Forensic Serology in Crime Investigations	Learn about the identification and analysis of blood, semen, saliva, and other bodily fluids at crime scenes.
5	Understand Blood Group Typing and Its Forensic Significance	Explain the ABO and Rh blood group systems and their role in forensic investigations.
6	Describe Advanced Serological Techniques	Learn about immunological assays, ELISA, and electrophoresis used in forensic serology.
7	Explain the Legal and Ethical Aspects of Forensic Genetics and Serology	Understand privacy concerns, database management, and the admissibility of genetic evidence in court.
8	Apply Knowledge of Forensic Genetics and Serology in Criminal Cases	Develop practical skills in DNA analysis, bloodstain pattern interpretation, and forensic serological testing.





## School of Medical Sciences & Technology

### Course Outcomes for B.Sc. Forensic Sciences MINOR-Research Methodology & Biostatistics

Sr. No.	Course Outcome	Description
1	Understand the Fundamentals of Research Methodology	Explain the key concepts, objectives, and types of research in scientific investigations.
2	Describe Research Design and Data Collection Methods	Learn about qualitative, quantitative, and mixed-method research approaches.
3	Explain Sampling Techniques and Data Collection Tools	Understand probability and non-probability sampling methods, surveys, and experiments.
4	Analyze the Role of Biostatistics in Research	Learn about statistical methods used for data analysis in healthcare and forensic sciences.
5	Understand Descriptive and Inferential Statistics	Explain measures of central tendency, dispersion, hypothesis testing, and regression analysis.
6	Describe Data Interpretation and Presentation Techniques	Learn about statistical software, data visualization, and result interpretation.
7	Explain Ethical Considerations in Research	Understand research ethics, plagiarism, informed consent, and data confidentiality.
8	Apply Knowledge of Research Methodology & Biostatistics in Scientific Studies	Develop skills in designing research projects, analyzing data, and publishing findings.

### Course Structure & Syllabus

**Total Course Duration: 2 Years (4 Semesters)**

**Total Credits: 80–100**

**Total Teaching & Training Hours: ~3,600**



## Assessment Methods

Assessment Component	Weightage (%)	Details
Continuous Internal Assessment (CIA)	40%	Includes internal exams, assignments, presentations, case studies, and practical performance
End-Semester Examination (ESE)	60%	Divided into theory (40%) and practical (20%)
Mid-Semester Exams	20% (Part of CIA)	Two internal tests per semester
Assignments & Case Studies	5% (Part of CIA)	Research-based assignments, literature reviews, radiation safety case reports
Seminars & Presentations	5% (Part of CIA)	Oral/poster presentations on radiation biology topics
Practical Performance & Lab Evaluation	5% (Part of CIA)	Skill-based assessments in radiation labs
Attendance & Participation	5% (Part of CIA)	Regularity in theory & practical sessions
Theory Examination (Final)	40% (Part of ESE)	Structured written paper covering subject knowledge
Practical Examination (Final)	20% (Part of ESE)	Includes viva, skill demonstration, radiation safety procedures
Dissertation/Research Project	Mandatory	Evaluated in the final year by internal & external examiners
Internship/Training in Radiation Biology	Pass/Fail	Logbook-based evaluation with mentor review

## Marking System & Grading

Marks (%)	Grade	Grade Point (GPA/CGPA Equivalent)	Classification
90 - 100	O (Outstanding)	10	First Class with Distinction
80 - 89	A+ (Excellent)	9	First Class with Distinction
70 - 79	A (Very Good)	8	First Class
60 - 69	B+ (Good)	7	First Class



## School of Medical Sciences & Technology

Marks (%)	Grade	Grade Point (GPA/CGPA Equivalent)	Classification
50 - 59	B (Satisfactory)	6	Second Class
<50 (Fail)	F (Fail)	0	Fail (Re-exam Required)

### Pass Criteria:

- Minimum 50% marks in each subject (Theory & Practical separately).
- Aggregate of 55% required for progression to the next semester.
- No more than two backlogs allowed for promotion to the final year.

## Exam Pattern for Theory & Practical

### A. Theory Examination Pattern

**Total Marks: 100 (Converted to 40% for End-Semester Assessment)**

**Duration: 3 Hours**

Section	Question Type	No. of Questions	Marks per Question	Total Marks
Section A	Short Answer Type (SAQ)	10 (Attempt all)	2	20
Section B	Long Answer Type (LAQ)	5 (Attempt any 4)	10	40
Section C	Case-Based/Research Scenario	3 (Attempt any 2)	15	30
Section D	MCQs/Objective Type	10 (Compulsory)	1	10
Total				100

### Weightage:

- Forensic Biology & DNA Analysis – 30%
- Criminalistics & Crime Scene Investigation – 30%
- Toxicology & Forensic Chemistry – 20%
- Digital Forensics & Cybercrime – 10%
- Research & Legal Aspects – 10%

**Passing Criteria: Minimum 50% (50/100 marks)**

### B. Practical Examination Pattern



## School of Medical Sciences & Technology

**Total Marks:** 100 (Converted to 20% for End-Semester Assessment)

**Duration:** 4–6 Hours

Component	Marks Distribution
Crime Scene Investigation & Evidence Analysis	30
OSCE (Objective Structured Clinical Examination) – Skill Demonstration	25
Toxicological & Chemical Analysis	20
Lab-Based Examination (Fingerprint Analysis, DNA Profiling, Drug & Poison Detection)	15
Record Work (Logbook & Assignments)	10
<b>Total</b>	<b>100</b>

**OSCE (Skill-based Assessment) includes stations on:**

- Fingerprint Identification & Comparison
- Blood & Biological Fluid Analysis (Serology, DNA Extraction)
- Drug & Poison Detection in Biological Samples (Chromatography, Spectroscopy)
- Crime Scene Documentation & Evidence Collection Procedures

**Passing Criteria:** Minimum 50% (50/100 marks) in practicals.

### Conclusion

The M.Sc. in Forensic Sciences & Toxicology equips students with specialized skills in forensic investigation, toxicology, and crime scene analysis. With growing opportunities in forensic research, law enforcement, and legal consulting, graduates are well-prepared to contribute to the field of forensic science, ensuring justice and scientific advancements in criminal investigations.