



Design, Technology and Management Society International
Company Limited by Guarantee
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in collaboration with



POTGIETER TRAINING CONSULTANTS
Registration Number 2007/162926/23
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**DTMSI DIPLOMA PROGRAM
AND
DEGREE EQUIVALENCY PROSPECTUS**

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**POSTGRADUATE TECHNOLOGY
AND
ENGINEERING PROGRAMS**

PROFILE

The Design, Technology and Management Society International officially started in 1995 as a professional learned institution with a vision to provide a service to the world community in the fields of endeavor encompassed by it. It is one of the most diversified and structured institutions and has a multi-disciplined structure with two chapters. Membership is possible within either the Technological Chapter or Managerial Chapter. Both chapters are structured with sub-divisions and interest groups. Some of these sub-divisions are The MBA and Professional Managers Guild, International of Institute Engineers, International Guild of Academicians and the International Institute of Scientists.

The Society is one of few professional learned institutions in the world with its own developed degree programs from diploma level to the doctoral level in many fields of endeavor. Degree programs are available through approved academic institutions associated with the DTMS – International. It is one of few professional learned institutions worldwide with a certification and registering sub-division in many fields of endeavor. It also provides a certification service to the managerial community and is one of few institutions of this nature in the world.

The Society operates internationally with representation in many countries in the world such as: The Peoples Republic of China, Japan, Indonesia, Hong Kong, Macau, Vietnam, Malaysia, Singapore, Philippines, United Kingdom, USA, Italy, Malta, India, Fiji Islands, France, South Africa, Tanzania, Sierra Leone and Nigeria, Uganda, Ghana and several other countries.

Through its links all over the world, it has buildup relations with many prominent organizations and educational establishments. The Society's objects are to assist its members to gain the maximum level of professionalism and professional standing in their careers, which is possible to achieve. Professional development is the key objective along with the society's usual services to members and member organizations.

PROGRAM AND COURSE EVALUATION



The Design, Technology and Management Society International Professional Development Education meets the minimum standards and requirements by law in the USA applicable to professional education providers. Our staff's qualifications have been evaluated by California University FCE as having met the requirements of the U.S. Law on Continuing Education of Licensed Professionals. DTMSI graduates may apply to California University FCE for the evaluation of their DTMSI Professional Development Education based on the rules and regulations applicable to Continuing Education Providers as meeting the equivalent academic standards comparable to accredited university degree level coursework. For more information about their services, applicable fees and an application, kindly contact them at:

<http://www.cufce.org/> E-mail Address: cauniversity@cufce.org
Tel No: (323) 464-5285, Tel No: (213) 447-3546, Fax No: (323) 871-0863

Postal Address:

6556 Fountain Avenue, Los Angeles, CA 90028-7823

Rush Delivery Address:

California University Foreign Credential Evaluations & Research
6556 Fountain Avenue, Los Angeles, CA 90028-7823



California University FCE Los Angeles

Certificate of Affiliation

We it known that in recognition of the splendid performance and achievements in higher continuing education for the promotion and development of Engineering, Design, Science, Technology and Management, this certificate of affiliation is hereby awarded upon

Design, Technology & Management Society International

Whereas, its member-graduates are awarded certificates and continuing education credits; these credits shall be given the equivalency credits awarded by the regionally and nationally accredited colleges and universities of the United States of America.

In testimony whereof, the seal of California University FCE, the signature of the President, the Secretary and the Executive Director are herewith affixed. Given at the Los Angeles, California, United States of America, this 17th day of September 2008.

Document No: CU4314-09-1808



Luhammad
LUHAMMAD
President

Enrique Valladares
ENRIQUE VALLADARES
Executive Director

Luhammad
LUHAMMAD
Secretary

State of California
SECRETARY OF STATE

I, DEBRA BOWEN, Secretary of State of the State of California, hereby certify that Dean C. Logan whose name appears on the annexed certificate, was on June 12, 2008, the duly qualified and acting Register-Recorder/County Clerk of the County of Los Angeles, in said State.

That the seal affixed thereto is the seal of said County, that the signature thereon appears to be the signature of M. Fisher, Deputy and that the annexed certificate is in due form and by proper officer.

Enrico Salvagni

In Witness Whereof, I execute this certificate and affix the Great Seal of the State of California this 12th day of June 2008.

John Bowen
Secretary of State

Maria Fisher
Deputy



State of California
Certificate of Authentication of Signatures
For the
Secretary of State Apostille

To All To Whom These Presents Shall Come, Greetings

This is to certify that this authentication is issued to Mr. ENRICO SALVAGNI, to affirm the validity of his equivalency degree of Master of Engineering Management from DTMSI as equivalent to the same degree awarded by the regionally and nationally accredited colleges and universities in the United States of America. He has satisfactorily completed all of the other requirements for graduation as certified by California University FCE, Los Angeles, California, United States of America.

California University FCE is listed among those qualified to do Evaluation and Assessment in higher education organizations recognized by the United States Department of Education. On the U.S. Dept. of Education web site: <http://www.ed.gov/about/offices/list/oea/oea/oea/evaluation.html> the American Evaluation Association is listed number one under the heading, "Evaluation and Assessment". California University FCE is listed in the American Evaluation Association web site: www.aeaweb.org under the heading, "Find an Evaluator", "Browse All Listings".

California University FCE-American Foundation, Inc. and its president, Luis Amador are members of the four most prestigious, world renowned, higher education organizations which are recognized by the United States Department of Education. These higher education organizations are listed in its web site: <http://www.cuonline.edu/cuonline>

That all the signatures in this report have the legal authority to evaluate, examine and verify the authenticity of the attached documents.


In witness whereof, I have herewith affixed my signature in the presence of a Notary Public at the City of Los Angeles, California, United States of America this 12th day of June 2008.

STATE OF CALIFORNIA - 08

STATE OF CALIFORNIA
COUNTY OF LOS ANGELES
DEAN C. LOGAN, Acting Register-Recorder/County Clerk of the County of Los Angeles, State of California, being a public entity having by law a seal, do hereby certify that Nancy Kim whose name is subscribed to the annexed DOCUMENT, was at the time of signing the same a NOTARY PUBLIC, duly qualified and authorized by law to execute said instrument, and full faith and credit are given to all of said OFFICE'S affixed herein on each. And I do further certify, that I am well acquainted with the handwriting of said OFFICER, and believe that the signature of the said instrument is genuine.

IN WITNESS WHEREOF, I have herewith set my hand and affixed the seal of the County Clerk of said County of Los Angeles at my office in said County this _____ day of _____ 2008

Debra Bowen
DEBRA BOWEN, Acting Register-Recorder/County Clerk
Deputy



RECOMMENDATION TO STUDENTS

The DTMSI highly recommend our graduates have their Society diplomas evaluated by CUFCE as per the above samples. The following is recommended:

1. An Apostille from the USA Secretary of State testifying the authenticity of your DTMSI credential
2. The CUFCE Credential Report stating its USA equivalency, and
3. The equivalent CUFCE Diploma with Transcript with USA equivalency suitable for usage and framing

These documents are legal in any country and testify that your diploma is equivalent to a regionally accredited USA degree from a recognized USA university.

Benefits of credential evaluation:

1. These credentials can also be used by students to seek employment or to apply to USA or similar institutions abroad for further studies.
2. It may also serve to assist students to apply for professional registration or membership with such organizations.
3. Prove you have an acceptable and recognized qualification to your employer for career advancement.

APPLICATION PROCEDURES TO STUDY DTMSI COURSE PROGRAMS

Prospective students are requested to apply through your consultant or agent and to provide all the information to them. This will ensure that all the required information copies of documents and any further requested information shall be obtained. It will ensure that there will be no delays. Where mature students apply, the agency or consultancy may on the request of the DTMSI interview the applicant and also conduct a survey to assess the eligibility of the applicant. Such applicants will be enrolled provisionally under conditions applicable to each case. The agency shall also give the student all the relative information and guidance to enroll into the appropriate program best suited to their ability. An assessment shall also be conducted to ensure that the student can meet the practical and laboratory requirements as well as having the minimum time available to undertake and complete the course of study.

This procedure is applicable to all enrolments for all the schools listed below.

1. Completed application form
2. Copies of credentials with transcripts detailing subjects completed
3. Comprehensive CV – resume with a detailed description of the prospective student's employment, responsibilities, practical experience and EXPERIENTIAL LEARNING achievement.
4. recommendation letters from referees where required or letter from employer
5. Information about completed research, studies or work undertaken NOT PREVIOUSLY PRESENTED for diploma/degree award.
6. Information about how tuition shall be paid and the presentation of such documents
7. Registration fee applicable
8. Copy of ID or valid passport
9. Statement of how you wish to study and whom will be appointed as mentor where required
10. Postgraduate student's needs to complete a narrative as required for the program in the proposed field of study. Details will be given to the applicant what is required.

AVAILABLE CERTIFICATE AND DIPLOMA PROGRAMS

POSTGRADUATE Diplomas awarded by DTMSI in –

**Master of Science (M S) Degree in Forensic Science, or
Master of Science (M S) Degree in Technology, or
Master of Science (M S) Degree in Environmental Science, or
Master of Engineering (M Eng) Degree in Electrical Engineering, or
Master of Engineering (M Eng) Degree in Mechanical Engineering, or
Master of Engineering (M Eng) Degree in Civil Engineering, or
Master of Engineering (M Eng) Degree in Transportation Engineering, or
Master of Engineering (M Eng) Degree in Engineering Management, or
Master of Science (M Sc) in Aviation Technology, or
Master of Science (M Sc) in Aeronautical Engineering, or
MS in Construction Management, or
MS in Facilities Management**

GENERAL INFORMATION

All DTMSI developed programs are equivalent to university degree programs. For example, a BBA would be equivalent to the Advanced Diploma and a Masters Degree equivalent to the Postgraduate Diploma. Usually when students are enrolled within universities where they study DTMSI developed degree programs they are eligible to apply to the DTMSI for the appropriate Society credential. The Society will award them our related credential and appropriate transcript upon application and payment of the applicable fee. Where students are enrolled into joint DTMSI – University Degree programs, students will receive their DTMSI credentials at no additional cost upon successful completion of the program.

Likewise, where DTMSI enrolled students have successfully completed their Society diploma program they may apply to the DTMSI for the equivalent degree awarded by the cooperating university. In this case the appropriate graduation fees and any administrative fees payable must be paid.

It is usually advantageous for students to choose to enroll first into the DTMSI program and to transfer their credits to the equivalent university degree program at a later stage or to apply for the degree upon completion. During their studies they are able to study more flexible as well as having more freedom due to different rules and regulations while enrolled via the DTMSI. The equivalency of the programs makes it possible to consider this as an option because the same textbooks, study guides and coursework requirements are used.

Students may apply to the DTMSI through our appointed representatives or cooperating partners for these awards.

ENROLMENT

The DTMSI uses the open enrollment system, which means students may enroll at any date and time throughout the year. Students may also enroll for the complete program or part of any program or for each section such as the certificate, diploma and complete program. The usual rules applicable to universities will apply. Where students do not have the required entry level knowledge or requirements, the DTMSI will prescribe bridging coursework as required to meet the minimum entry level requirements.

SINGLE SUBJECTS

Any subjects for any diploma program may be taken as a single course. Students may enroll at any time to study single subjects. Subjects may be listed on transcripts and specified as independent completed coursework. For less than seven completed courses, the DTMSI will issue the usual transcript in the prescribed manner. For completed coursework containing more than seven subjects, the DTMSI will award a certificate and transcript. For more than fourteen subjects, a diploma will be awarded when students choose to study single subjects.

Postgraduate Course Options:

POSTGRADUATE Diploma awarded by DTMSI or Master of Science (M S) Degree in Forensic Science Awarded by affiliated universities

The program is available to suitably qualified bachelors degree level graduates. Those without a scientific or technical background will need to study additional courses for acceptance into the program.

The program is divided into three groups, group A – Technical; group B – Investigative; and group C – Scientific. A minimum of 9 (nine) courses must be studied by candidates. More courses can be taken if required. A minimum of four courses must be selected from any group and the remaining courses from any of the other groups. Each course = 3 credits

Group A – Technical

FSR4021 Vehicle Crash Mechanics
FSR4022 Forensic Engineering
FSR5023 Geological and Soil Forensics
FSR5024 Forensic Material Engineering
FSR5025 Vehicular Accident Forensics
FSR4026 Engineering Catastrophes
FSR5027 Safety Analysis
FFT5012 Fires and Explosions

Group B – Investigative

FSR3041 Forensic Detection
FSR4042 Cyber Forensics
FSR4017 Forensic Radiology
FSR5044 Fire and Arson Forensics
FSR4045 Document Forensics
FSR5046 Computer Crime Forensics
FSR5047 Footwear Forensics
FSR4048 Tire Imprint Forensics

Group C – Scientific

FSR4061 Fingerprint Forensics
FSR4062 Bloodstain Forensics
FSR5063 Forensic Entomology
FSR5064 Forensic Art Illustration
FSR4065 Fatality Forensics
FSR5066 Forensic Pathology
FSR5067 Forensic Toxicology
FSR4068 Crime Scene Forensics

Course Completion - Compulsory Units:

EMR4003	Research Methods	6 credits
Course Completion:	Thesis/project	9 credits

**POSTGRADUATE Diploma awarded by DTMSI or
Master of Science (M S) Degree in Technology**
Awarded by affiliated universities

Technology may be defined as everything usable in commerce and industry. In reality, technology is the application and usage of knowledge. This application of knowledge is noticeable in the business environment, industry and everywhere where there are human activities. Technology includes the skills, techniques, procedures, equipment, systems and devices to perform the work. Technology is the technical and scientific means people use to improve their surroundings in the busy lifestyle we encounter daily. We use technology to control the world and environment we are living as well as to improve our ability to work and have a better life. Technology helps us to travel, to communicate, to educate ourselves and to produce goods or services and many useful activities for everyone and to make our living world better.

The aim of this program is to enable the student to focus on those areas of technology, science and the application of the knowledge as well as to devise new applications. To ensure the application and usage of these technologies and knowledge in areas where there is room for improvement. It equips the student with the ability to use and apply the knowledge gained from the particular study area and to present it in a practical format for the usage of those whom can benefit from it usefulness.

A total of 6 (six) modules, of which four is compulsory, two optional and a final thesis (module) to complete the program is required. The degree course is very flexible and can be completed in any field of endeavor. The courses are adapted to the field and study requirements for each student. Each course requires a mini thesis (no length restrictions) and the research area is based on the nature of the field of study in the particular study approved for the degree. The purpose of the assignments for each course is to gather information and knowledge, to discuss these issues and to drawn from it for the next courses. The gathering and compilation of facts and information in each course is well planned and each assignment serves as a complete reference and sources of information for the final thesis. Each course use the previous study area and builds on to the next course and builds the knowledge area for the final thesis that utilizes the various aspects and research completed from each assignment and specialize in the approved field of the study area also utilizing the particular researched areas from each mini theses (assignments) completed for each course. The program utilizes a combination of textbooks, other sources and resources for research and study for each course. Textbooks may be prescribed as a guide, but students may use any references and textbooks applicable to the area of research during the course of study.

MST5001	Advanced Mathematics	3 credits
MST5002	Technology and Industry	3 credits
MST5003	Technology and Economics	3 credits
MST5004	Technology and Development	3 credits
Optional Modules: <i>Select any three courses from (3 credits per course)</i>		
MST6041	Technology and Engineering	3 credits
MST6042	Technology and Manufacturing	3 credits
MST6043	Technology and Applied Science	3 credits
MST6044	Technology and Health Sciences	3 credits
MST6045	Technology and Management	3 credits
Course Completion – Compulsory Units:		
EMR4003	Research Methods	6 credits
EMR4004	Statistical Probability and Related Analysis	6 credits
Course Completion:	Thesis/project	9 credits

POSTGRADUATE Diploma awarded by DTMSI or Master of Science (M S) Degree in Environmental Science

Awarded by affiliated universities

Technology may be defined as everything usable in commerce and industry. In reality, technology is the application and usage of knowledge. This application of knowledge is noticeable in the business environment, industry and everywhere there is human activities. Technology includes the skills, techniques, procedures, equipment, systems and devices to perform the work. Technology is the technical and scientific means people use to improve their surroundings in the busy lifestyle we encounter daily. We use science and technology to control the world and environment we are living as well as to improve our ability to work and have a better life. Technology helps us to travel, to communicate, to educate ourselves and to produce goods or services and many useful activities for everyone and to make our living world better.

The aim of this program is to enable the student to focus on those areas of applied science and technology, the application of the knowledge as well as to devise new applications and usefulness of our knowledge in areas where there is room for improvement. It equips the student with the ability to use and apply the knowledge gained from the particular study area and to present it in a practical format for the usage of those whom can benefit from its usefulness.

A total of 6 (six) modules, of which four is compulsory, two optional and a final thesis (module) to complete the program is required. The degree course is very flexible and can be completed in any scientific field of endeavor. The courses are adapted to the field and study requirements for each student. Each course requires a mini thesis (no length restrictions) and the research area is based on the nature of the field of study in the particular study approved for the degree. The purpose of the assignments for each course is to gather information and knowledge, to discuss these issues and to drawn from it for the next courses and to complete the final theses. The gathering and compilation of facts and information in each course is well planned and each assignment serves as a complete reference and sources of information for the final thesis. Each course use the previous study area and builds on to the next course and builds the knowledge area for the final thesis that utilizes the various aspects and research completed for each assignment and specialize in the approved field of the study area also utilizing the particular researched areas from each mini theses (assignments) completed for each course. The program utilizes a combination of textbooks, other sources and resources for research and study for each course. Textbooks may be prescribed as a guide, but students may use any references and textbooks applicable to the area of research during the course of study.

The program below has been designed for those students whom want to specialize in Environmental Science at the master's level. The format and nature of research is as described above.

Compulsory Modules

MST5001	Advanced Mathematics	3 credits
MST5101	Statistical and Quantitative Methods	3 credits
MST5202	Environmental Science and Legal Requirements	3 credits
MST5303	Science and Economics	3 credits
MST5404	Science and Development	3 credits

Optional Modules: *Select any three courses from (3 credits per course)*

MST6101	Environmental International Standards	3 credits
MST6202	Environmental Science and Industry	3 credits
MST6303	Applied Science and the Environment	3 credits
MST6404	Environmental and Health Sciences	3 credits
MST6505	Environmental Science and Management	3 credits

Course Completion – Compulsory Units:

EMR4003	Research Methods	6 credits
Course Completion:	Thesis/project	9 credits

**POSTGRADUATE Diploma awarded by DTMSI or
Master of Engineering (M Eng) Degree in Electrical Engineering**
Awarded by affiliated universities

POSTGRADUATE DIPLOMA IN ELECTRICAL ENGINEERING (Light Current)

Compulsory Course Section

MST5001	Advanced Mathematics
ELE5020	Advanced Modern Control
ELE5021	Simulation of Industrial Processes and Control

Optional Course Section 1: *Select one course from –*

ELE5022	Electronic Devices and Process Simulation
ELE5023	Solid State Device Failure Mechanics
ELE5024	Linear State Space Systems
ELE5025	Control System Technology and Automation

Optional Course Section 2: *Select one course from –*

ELE5026	Satellite Communication
ELE5027	Radio Antenna Technology
ELE5028	Radio Networks, Planning and Optimization
ELE5029	Cellular Mobile Radio Systems

Optional Course Section 3A (Electronics Engineering): *Select one course from –*

ELE5030	Advanced Computer Architecture Design
ELE5031	Advanced Digital Logic Design
ELE5032	Synthesis and Optimization of Digital Circuits

POSTGRADUATE DIPLOMA IN ELECTRICAL ENGINEERING (Power)

The compulsory course and core course sections are the same as above for the light current option.

Optional Course Section 3B (Electrical Power Engineering): *Select one course from –*

ELE5033	Analysis of Multi-conductor Transmission Lines
ELE5034	Analysis of Electrical Machinery
ELE6035	Analysis of Faulted Power Systems

Course Completion - Compulsory Units:

EMR4002	Research Methodology
EMR4003	Research Methods

Course Completion: Thesis/project

Award: DTMS – International Advance Diploma Postgraduate studies in Technology

Membership: Eligible for membership at the grade of Member within the Technological Chapter (MDTechMS) and admission within the International Institute of Engineers at the grade of Fellow (FIIEng), or depending on the nature of the studies, admission within the International Institute of Scientists at the grade of Fellow (FIIInstSc)

**POSTGRADUATE Diploma awarded by DTMSI or
Master of Engineering (M Eng) Degree in Mechanical Engineering**

Awarded by affiliated universities

Compulsory Course Section

MST5001 Advanced Mathematics

ELE5021 Simulation of Industrial Processes and Control

MLM5001 Advanced Strength and Applied Stress Analysis

Optional Course Section 1: *Select one course from –*

MLM5002 Operations Management

MLM5003 Reliability Engineering

MLM5004 Probability and Statistics for Engineers

Optional Course Section 2: *Select one course from –*

MLM5005 Computational Fluid Dynamics

MLM5006 Compressible Fluid Flow

MLM5007 Intermediate Mechanics of Materials

Optional Course Section 3: *Select one course from –*

MLM5008 Quality Process Design

MLM5009 Quality Planning and Analysis

MLM5010 Engineering Economy

Optional Course Section 4: *Select one course from –*

MLM5011 Applied Dynamics

MLM5012 Mechanical Metallurgy

MLM5013 Structural Reliability Analysis

Course Completion - Compulsory Units:

EMR4002 Research Methodology

EMR4003 Research Methods

Course Completion: Thesis/project

Award: DTMS – International Advance Diploma Postgraduate studies in Technology

Membership: Eligible for membership at the grade of Member within the Technological Chapter (MDTechMS)

and admission within the International Institute of Engineers at the grade of Fellow (FIIEng), or depending on the nature of the studies, admission within the International Institute of Scientists at the grade of Fellow (FIIInstSc)

**POSTGRADUATE Diploma awarded by DTMSI or
Master of Engineering (M Eng) Degree in Civil Engineering**

Awarded by affiliated universities

Building on the advanced diploma or bachelors degree level this course aim is to provide the graduate student with the knowledge in a senior civil engineering capacity by taking charge of civil design or research work, site work and to advice project managers and engineers especially in design office or engineering consulting projects. The course equips individuals to work independently on projects or to work as part of a team and as consultants on engineering projects.

Common Courses

Compulsory Course Section

MST5001	Advanced Mathematics
MLM5001	Advanced Strength and Applied Stress Analysis
MLM5004	Probability and Statistics for Engineers

Optional Course Section 1: Select one course from –

MST5092	Equipment Planning for Engineers
MST5091	Fundamental Principles of Systems Analysis and Decision Making
MST5093	Professional Construction Management

Optional Course Section 2: Select one course from –

MCT5001	Hydraulic Structure Design
MCT5002	Design of Modern Steel Bridges
MST5094	Transportation Planning and Design

Optional Course Section 3: Select one course from –

MLM5010	Engineering Economy
MCT5004	Earth Quake Engineering and Protection
MCT5005	Civil Structural Reliability Analysis

Course Completion - Compulsory Units:

EMR4002	Research Methodology
EMR4003	Research Methods

Course Completion: Thesis/project

Award: DTMS – International Advance Diploma Postgraduate studies in Technology

Membership: Eligible for membership at the grade of Member within the Technological Chapter (MDTechMS) and admission within the International Institute of Engineers at the grade of Fellow (FIIEng), or depending on the nature of the studies, admission within the International Institute of Scientists at the grade of Fellow (FIInstSc)

Bridge or Fluid Science Major

Building on the advanced diploma or bachelors degree level this course aim is to provide the graduate student with the knowledge in a senior civil engineering capacity by taking charge of civil design or research work, site work and to advice project managers and engineers especially in design office or engineering consulting projects. The course equips individuals to work independently on projects or to work as part of a team and as consultants on engineering projects.

Compulsory Course Section

MST5001	Advanced Mathematics	3 credits
MLM5001	Advanced Strength and Applied Stress Analysis	3 credits

Optional Course Section 1: Select one course from (6 credits per course)

MST5092	Construction Planning for Engineers	3 credits
MST5091	Fundamental Principles of Systems Analysis and Decision Making	3 credits
MST5093	Professional Construction Management	3 credits

Bridge Engineering Major

BCT5001	Bridge Design Part I & Part II	3 credits
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Optional Course Section 2: Select one course from (6 credits per course)

BCT5003	Bridge Seismic Design	3 credits
BCT5002	Bridge Substructure and Foundation Design Part I & II	3 credits
BCT5004	Bridge Rehabilitation and Maintenance	3 credits
BCT5005	Structural Vibration	3 credits

Optional Course Section 3: Select one course from (6 credits per course)

MLM5010	Engineering Economy	3 credits
MCT5004	Earth Quake Engineering and Protection	3 credits
MCT5005	Civil Structural Reliability Analysis	3 credits

Course Completion - Compulsory Units:

EMR4002	Research Methodology	3 credits
EMR4003	Research Methods	6 credits
Course Completion:	Thesis/project	9 credits

Fluid Science Major

Compulsory Section with electives choices as above 15 credits

Optional Course Section 2: Select two courses from (6 credits per course)

FCT5001	Fluid-Structure Interactions	3 credits
FCT5002	Water Hammer	3 credits
FCT5003	Pumping Station Design	3 credits
FCT5004	Dam Hydraulics	3 credits
FCT5005	Hydraulic Structures	3 credits
FCT5006	Irrigation Engineering	3 credits

Optional Course Section 3: Select one course from (6 credits per course)

MLM5010	Engineering Economy	3 credits
MCT5004	Earth Quake Engineering and Protection	3 credits
MCT5005	Civil Structural Reliability Analysis	3 credits

Course Completion - Compulsory Units:

EMR4002	Research Methodology	6 credits
EMR4003	Research Methods	6 credits
Course Completion:	Thesis/project	9 credits

Award: DTMS – International Advance Diploma Postgraduate studies in Technology

Membership: Eligible for membership at the grade of Member within the Technological Chapter (MDTechMS) and admission within the International Institute of Engineers at the grade of Fellow (FIIEng), or depending on the nature of the studies, admission within the International Institute of Scientists at the grade of Fellow (FIInstSc)

**POSTGRADUATE Diploma awarded by DTMSI or
Master of Engineering (M Eng) Degree in Transportation Engineering**
Awarded by affiliated universities

Building on the advanced diploma or bachelors degree level this course aim is to provide the graduate student with the knowledge in a senior civil engineer specializing in transportation engineering by taking charge of transportation engineering design or research work, site work and to advice project managers and engineers especially in design office or engineering consulting projects. The course equips individuals to work independently on projects or to work as part of a team and as consultants on engineering projects.

Compulsory Courses

MST5011	Advanced Mathematics	3 credits
MLM5004	Probability, Reliability and Statistics	3 credits

Core Course Section: Select any 1 course –

MST5090	Construction Planning for Engineers	3 credits
MST5091	Fundamental Principles of Systems Analysis and Decision Making	3 credits
MST5093	Professional Construction Management	3 credits

General Electives: Section 1; select any two from:

MST5094	Transportation Planning and Design	3 credits
MST5095	Transportation Network Analysis	3 credits
MST5097	Urban Transportation Systems	3 credits
MST5098	Principles of Pavement Design	3 credits

Electives: Section 2; select one course from:

MST5099	Highway Engineering	3 credits
MST5100	Traffic Engineering	3 credits
MST5101	Road Management	3 credits
MST5106	Railroad Engineering	3 credits
MST5108	Airport Engineering	3 credits

Electives: Section 3; select one course from:

MCT5002	Design of Modern Steel Bridges	3 credits
MST5103	Design of Highway Bridges	3 credits
MST5104	Movable Bridge Design	3 credits
MST5105	Bridge Maintenance Management	3 credits
MST5107	Environmental Impact of Railway Systems	3 credits

Course Completion - Compulsory Units:

EMR4003	Research Methods	6 credits
Course Completion:	Thesis/project	9 credits

Award: DTMS – International Advance Diploma Postgraduate studies in Technology

Membership: Eligible for membership at the grade of Member within the Technological Chapter (MDTechMS) and admission within the International Institute of Engineers at the grade of Fellow (FIIEng), or depending on the nature of the studies, admission within the International Institute of Scientists at the grade of Fellow (FIIInstSc)

**POSTGRADUATE Diploma awarded by DTMSI or
Master of Engineering (M Eng) Degree in Engineering Management**

Awarded by affiliated universities

Building on the advanced diploma or bachelors degree level this course aim is to provide the graduate student with the technical knowledge in a senior management engineering capacity of taking charge of project, design or research work and to advice project managers and engineers especially in project management or engineering consulting projects. The course equip individuals to work independently on projects or to work as part of a team and as consultants on engineering projects.

Entry Requirements: A Bachelors Degree in a Technical/Engineering Environment or the equivalent with mathematics.

Core Courses:

EMT5001	Production Management	3 credits
EMT5002	Engineering Statistics and Probability	3 credits
EMT5003	Operations Management and Modeling	3 credits
EMT5004	Engineering Economy and Decision Making	3 credits
EMT5005	Engineering Management	3 credits

Business courses: (2 courses)

EMT5001	Management of Business Process and Development	3 credits
EMT5002	Business Planning and Simulation	3 credits

Technology development courses: (2 courses)

EMT5001	Logistics Engineering and Management	3 credits
EMT5004	Project Management	3 credits

Elective courses: *Select one course from -*

EMT6001	Aerospace Engineering, or	3 credits
EMT6002	Civil Environmental Engineering, or	3 credits
EMT6003	Chemical Engineering, or	3 credits
EMT6004	Computer Engineering, or	3 credits
EMT6005	Electrical Engineering, or	3 credits
EMT6006	Mechanical Engineering, or	3 credits
EMT6007	Industrial Engineering	3 credits

Course Completion - Compulsory Units:

EMR4003	Research Methods	6 credits
Course Completion:	Thesis/project	9 credits

**For details about unlisted available programs, kindly apply to the DTMSI for more information
The above is only a listing of few of our programs study options available for professional development.**

Postgraduate Diploma or Master of Science (M Sc) in Aviation Technology

Building on the bachelor's degree programs this course is aimed to provide the graduate student with the knowledge in a senior aviation or aeronautical engineering capacity of taking charge of design or research work, site work and to advice project managers and engineers especially in design office or engineering consulting projects. The course equips individuals to work independently on projects or to work as part of a team and as consultants on engineering projects.

Common Courses:

1MST1001	Advanced Mathematics	3 credits
1MST1000	Advanced Structural Analysis	3 credits
1MST2000	Analysis of Aircraft Structures	3 credits
1MST3000	Engineering Economy	3 credits

Aviation Technology Major:

Electives 1: *select 1 from:*

1MST5100	Space Dynamics	3 credits
1MST6600	Spacecraft Systems Engineering	3 credits

Electives 2: *select 2 from:*

1MST5200	Analysis of Aircraft Performance and Control	3 credits
1MST6500	Low Speed Wind Tunnel Testing	3 credits
1MST3100	Aircraft Control and Simulation	3 credits

Electives 3: *select 1 from:*

1MST5400	Foundations of Helicopter Flight	3 credits
1MST6100	Helicopter Dynamics	3 credits
1MST6400	Helicopter Test and Evaluation	3 credits

Compulsory Course Section:

EMR4003	Research Methods	6 credits
Course Completion:	Project/thesis	9 credits

Postgraduate Diploma or Master of Science (M Sc) in Aeronautical Engineering

Building on the bachelor's degree programs this course is aimed to provide the graduate student with the knowledge in a senior aviation or aeronautical engineering capacity of taking charge of design or research work, site work and to advice project managers and engineers especially in design office or engineering consulting projects. The course equips individuals to work independently on projects or to work as part of a team and as consultants on engineering projects.

Common Courses:

1MST1001	Advanced Mathematics	3 credits
1MLM1005	Computational Fluid Mechanics	3 credits
1MLM1006	Compressive Fluid Flow	3 credits
1MST57 00	Aircraft Structural Analysis	3 credits

Electives 1: *select 2 from:*

1MST6600	Spacecraft Systems Engineering	3 credits
1MST6700	Space Vehicle Mechanisms	3 credits
1MST5800	Space Propulsion Systems	3 credits
1MST5900	Space Dynamics	3 credits

Electives 2: *select 2 from:*

1MST5200	Aircraft Performance: Theory and Practice	3 credits
1MST6100	Helicopter Dynamics	3 credits
1MST64 00	Helicopter Test Evaluation	3 credits

Compulsory Course Section:

EMR4003	Research Methods	6 credits
Course Completion:	Project/thesis	9 credits

Postgraduate Diploma in Construction Management
or
MS in Construction Management

Building on the advanced diploma or bachelors degree level this course aim is to provide the graduate student with the knowledge in a senior construction technology capacity by taking charge of construction, civil, design, project or research work, site work and to advise project managers and engineers especially in managerial, design office or engineering consulting projects. The course equips individuals to work independently on projects or to work as part of a team and as consultants on engineering projects.

SEMESTER 1

A minimum of 18 credit units (6 courses) must be selected from the following courses:

CNE 5110	Project Management for Construction	3 credits
CNE 5111	Construction Cost Estimating	3 credits
CNE 5112	Contracts and Specifications	3 credits
CNE 5113	Risk Analysis	3 credits
CNE 5114	Construction Operation Analysis	3 credits
CNE 5115	Information Systems in Project Management	3 credits
CNE 5116	Engineering for Construction: Methods and Technologies	3 credits
CNE 5117	Decision and Risk Analysis for Project Management	3 credits
CBM 5210	Organizational Behavior	3 credits
Semester Total		18 credits

SEMESTER 2

Students may select three courses from the list below: -

CEM 5710	Construction and the Law	3 credits
CEM 5730	Infrastructure Financing	3 credits
CEM 5760	Capital Program Management/ Program Development	3 credits
CEM 5770	Dispute Avoidance and Resolution	3 credits
CEM 5780	Construction Management and Planning	3 credits
MGM 5200	Project Assessment & Management	3 credits
Section Total		9 credits

Select any one course below: -

MGM 5240	Organization Development; or	3 credits
MGM 5310	Organization Theory & Design	3 credits
Total		3 credits

Select any one course below: -

MGM 5300	Operations Management; or	3 credits
MGM 5350	Managing for Quality	3 credits
Section Total		6 credits

COURSE COMPLETION

RES 4003	Research Methods	3 credits
REA 5900A	Integrated Project	3 credits
REA 5900B	Construction Management Project/Thesis	9 credits
Section total		15 credits
Degree Total		48 credits

Postgraduate Diploma in Facilities Management or MS in Facilities Management

These programs have been developed to fulfill the needs for those who are seeking a diploma at the master's degree level and whom wish to specialize as facilities managerial executives in the management environment. The main scope of this program is to emphasize the usual administrative aspects of facilities, operations, procurement and contract management at the appropriate master's degree level. These particular masters of science degrees are academic degrees and amongst the popular degree programs in this field of endeavor. Our programs have been designed to focus on those aspects most common to the study areas of facilities management applicable to managerial executives. The core courses forming the basis of the degree program equips the student with the usual fundamental aspects of planning, contracts, operations, assets, Risk, finance, management and administration applicable to the master's degree level.

FMA5114	Planning Procedures	3 credits
CNE 5114	Construction Operation Analysis	3 credits
FMA5115	Strategic Facility Management	3 credits
CEM5760	Capital Program Management/ Program Development	3 credits
FMA5021	Financial and Managerial Accounting	3 credits
FMA5310	Organizational Analysis & Behavior	3 credits
FMA5311	Operational Facility Management	3 credits
FMA5340	Project and Contract Management	3 credits
CNE5113	Risk Management	3 credits
FMA5116	Building Asset Management	3 credits
FMA5702	Building Construction Technology	3 credits
Elective: select any one course below -		
MGM5200	Project Assessment & Management	3 credits
CEM5730	Infrastructure Financing	3 credits
FMA5701	Energy Management in Buildings	3 credits
CNE5701	Computer Aided Facility Management	3 credits
FMA5703	Conservation Methods & Practices	3 credits
Total Credits		34 credits
 Course Completion - Compulsory Units:		
EMR4003	Research Methods	3 credits
Course Completion:	Thesis/project	9 credits
Degree Total		46 credits

Course Description Business Diploma Programs

PG Diploma Environmental Science

1MST5101 Statistical and Quantitative Methods

Applied probability theory; Discrete and continuous random variables and their probability distributions; Waiting time processes; Sampling theory; Point and interval estimation; Hypothesis testing; Simple linear and non-linear regression and correlation analysis.

1MST5202 Environmental Science and Legal Requirements

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST5303 Science and Economics

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The

presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST5404 Science and Development

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST6101 Environmental International Standards

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST6202 Environmental Science and Industry

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST6303 Applied Science and the Environment

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST6404 Environmental and Health Sciences

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST6505 Environmental Science and Management

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

Industrial Technology Diploma Programs

1MST5001 Advanced Mathematics

Review of fundamental concepts; Ordinary differential equations; Linear differential equations; Laplace transforms; Vector analysis; Multiple, line and surface integrals and integral theorems; Fourier series; Fourier integrals; Gamma, Beta and other special functions; Bessel functions; Legendre functions and other orthogonal functions; Complex variables and conformal mapping; Complex inversion formula for Laplace transforms; Matrices; Calculus of variations.

1MST5002 Technology and Industry

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST5003 Technology and Economics

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST5004 Technology and Development

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST6041 Technology and Engineering

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST6042 Technology and Manufacturing

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST6043 Technology and Applied Science

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST1044 Technology and Health Sciences

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

1MST6045 Technology and Management

Research: The focus of the coursework for this subject is in an area encompassing the study area of the student's final thesis. The information studied in the two prescribed textbooks is used as the foundation to formulate the research required for the preparation of the mini thesis. The presentation of the thesis must be of such nature that it can be used as a reference source for the other subjects as well as serving as an additional source for the preparation of the final thesis. Students will follow the usual methods for collecting data and information required at the masters degree level.

EM5004 Statistical Probability and Related Analysis

Applied probability theory; Discrete and continuous random variables and their probability distributions; Waiting time processes; Sampling theory; Point and interval estimation; Hypothesis testing; Simple linear and non-linear regression and correlation analysis.

PG Diploma Forensic Science

FSR4021 Vehicle Crash Mechanics

Introduction; Crash pulse and kinematics; Crash pulse characterization; Crash pulse prediction – the convolution method; Basics of impact and excitation modeling; Response prediction by numerical methods; Impulse, momentum and energy; Crash severity and reconstruction; References.

FSR3041 Forensic Detection

Introduction; The art of detection rhymes of mariners; Method reasoning backward analytically; Case studies using the following techniques: Reading signs; Chance – probability and serendipity; Elimination – inductivism, best explanations and testing alternatives; Explanation – natural signs and statistical inferences; Diagnosis – natural signs and logics of discovery; Confirmation – logical testing; Proof – causal explanation and formal deduction; Error – fallacious appeals to medical authority; Displacement – an open verdict, opinion and conflicting facts.

FSR4061 Fingerprint Forensics

Structure of the skin; Morphogenesis of friction ridge skin – primary dermal ridge development factors affecting the general pattern and the configuration of multi-layers; Morphogenesis of friction ridge skin – secondary dermal ridge development papillae; Friction ridge identification process – analysis, comparison, evaluation and verification; Chemistry, light and photograph – standard weights and measures, chemical theory, light theory, forensic light sources and their application, photograph and digital imaging; Fingerprint detection techniques – types of fingerprint evidence, Surface characteristics; Optical detection techniques; Detection techniques for porous surfaces and non-porous surfaces; Miscellaneous techniques for latent fingerprint detection; Fingerprint detection on semi-porous surfaces, human hair, adhesive surfaces, firearms and cartridges cases; Enhancement of finger-marks in blood; Fingerprint detection at the crime scene; Effect of fingerprint detection techniques on subsequent DNA profiling laboratory safety; Issues related to the exploitation of fingerprint evidence terminology; Use of finger impressions; Relevance; Age estimation of latent marks; References.

FSR4022 Forensic Engineering

What is forensic engineering; Learning from failures; Fire investigation; Industrial accidents; Product liability engineering; Traffic accident reconstruction; Transportation disaster investigation; Civil engineering investigation; Investigation report; Forensic photogrammetry; The engineer as an expert witness; References.

FSR4042 Cyber Forensics

Introduction; Client site investigation; Evidence collection procedures; Evidence collection and analysis tools; Accessdata's forensic tool kit; Guidance software encase; Ilook investigations; Password recovery; Questions and answers related to subject area

FSR4062 Bloodstain Forensics

Introduction; Medical and anatomical aspects of bloodshed; Biological and physical properties of human blood; Passive bloodstains; Physical properties of bloodstains; Formation of spatter and spatter associated with a secondary mechanism; Impact spatter and spatter mechanisms; Spatter associated with a projection mechanism; Altered bloodstain patterns; Determination of area of convergence and area of origin of bloodstain patterns; Directional analysis of bloodstain patterns with a computer; Documentation and examination of bloodstain evidence; Evaluation of bloodstain patterns at the scene; Presumptive testing and species determination of blood and bloodstains; The detection of blood using Luminol; Chemical enhancement of latent bloodstain impressions; Approaching the bloodstain pattern evidence; Bloodstain pattern analysis – post-conviction pattern evidence; Report writing; Legal and ethical bloodstain pattern evidence; References.

FSR5023 Geological and Soil Forensics

Introduction; Types of logical and soil evidence; Color analysis; Particle analysis; Mineralogical analysis; Major and trace element composition; Size and type analysis; Analysis of individual particles; Pollen analysis; Diatom analysis; Other microfossils; Water and air samples; Procedures for soil and sediment sampling and storage; General evaluation of the significance of geological evidence.

FSR4043 Forensic Radiology

Introduction; Definitions in forensic radiology; Forensic radiology in historical perspective; The scope of forensic radiology; Identification of the dead; Radiological anthropological parameters and applications in forensic dentistry, bite marks, the perpetrator, individual remains and in mass casualty situations; Gunshot wounds and its radiology; Pitfalls in the radiology of gunshot wounds; Radiology in non-violent crimes; Smuggling and larceny; The radiology of fakes and forgery in art; The radiology of abuse, child abuse, spousal abuse, civil rights abuse and abuse of the aged; Research and new modalities and its applications; Use of post-mortem cranial MRI in evaluation of suspected child abuse; Stereolithography as a useful tool in forensic radiology; Courts and expert witnessing.

FSR5063 Forensic Entomology

Forensic Entomology: The Utility of Arthropods in Legal Investigations, J H Byrd, ISBN 0849381207, CRC Press
Introduction; Perceptions and status of forensic entomology; General entomology and arthropod biology; Insects of forensic importance; Collection of entomological evidence; Laboratory reading of forensic insects; Insect succession on carrion and its relationship to determining time of death; The role of aquatic insects in forensic investigations; Recovering buried bodies and surface scatter: the associated anthropological, botanical and entomological evidence; Estimating the post-mortem interval; Insect development and forensic entomology; Computer modeling of insect growth and its application to forensic entomology; Entomology-toxicology: insects as toxicological indicators and the impact of drugs and toxins on insect development; DNA techniques for forensic entomology; Entomological alteration of bloodstain evidence; The forensic entomologist as expert witness.

FSR5024 Forensic Materials Engineering

Introduction; Materials in distress; Establishing the load transfer path; Engineering forensic tools; Failure due to manufacturing fault; Fluid transport; Failure of storage vessels; Accidents in the workplace; Failure of medical implements; Component failure in road accidents; Fraudulent insurance claims; Criminal cases; Intellectual property cases.

FSR1044 Fire and Arson Forensics

Arson; Arson motives and pathology; Building construction – fire problems and precautions; Chemical and behavior of fire; Determining origin and cause; Eliminating accidental causes; Investigating fatal fires; Investigating vehicular fires; Incendiary fire evidence; Documenting the fire or crime scene; Surveillance; Interviewing and interrogation; Court qualification and testimony; Legal aspects.

FSR5064 Forensic Art Illustration

Forensic art – the foundation; Introduction to forensic art illustration; History of forensic art; The human face; Drawing the face; Finding and identifying the living; The interview; Composite imagery; Age progression and aging; Image assessment and modification; Postmortem drawing; Skull protection and preparation for reconstruction; Two-and-three dimensional facial reconstruction on the skull; Methods of superimposition; Additional responsibilities; Professional ethics and conduct; Printing and graphics reproduction; Dealing with the news media; The forensic artist in court; References.

FSR5025 Vehicular Accident Forensics

Introduction; Simple skills; Simple falls; Acceleration and performance; Some aspects of motorcycle accidents; Photographic documentation; Interpreting lamp filament damages; Sudden acceleration incidents; Momentum methods; Energy methods; Curves and turns; Scene examination and solution strategies; References.

FSR4045 Document Forensics

Introduction; Preliminary considerations; Definitions of terms; What examination of a document may reveal; Illustrations and materials used to prepare documents; Alterations in documents; Damaged documents; Accidental markings and impressions on a document; Additional clues for

the investigator; Discovery of facts by comparison with known material; Identification of handwriting; Identification of signatures and detection of forgery; Identification of hand-lettering and numerals; Typewriting identification; Other mechanical impressions, including check writes and printing identifications; Age of a document; The attorney-investigator's role in questioned document problem; Prevention and collection of handwriting standards; Typewriting standards; Care, handling and preservation of documents; Reproduction of documents; The document problem goes to court; Preparation for trial; Court procedures; References.

FSR4065 Fatality Forensics

Introduction; Cause, manner and characteristics of death; RTF investigation versus RTF reconstruction; Jurisdictional and statutory considerations; Basic events; General classification of RTFs; Common questions to be answered during RTF investigations; Injuries caused by safety/restraint devices; Basic injury mechanisms; Common but critical investigative mistakes; Factors that raise suspicion for suicide; Typical road traffic fatality injuries; Artificial injuries; Preparing to investigate initial procedures at the scene; Primary investigative tasks; Overall goals of the investigation; The autopsy and toxicology testing; References.

FSR4026 Engineering Catastrophes

The historical record – industry, transport and general; How big is a catastrophe? Fatalities in industry and transport; Comparisons; Historical record – energy and process plant and oil industry; Oil and gas exploration and production; Chemical, petroleum and petrochemical processing; Power generation industry; Super-catastrophes; Shipping accidents; Catastrophes in the oil and gas production industry; Catastrophes involving air travel; Chemical industry; Rail accidents, generalizations, mechanical failures; Catastrophes resulting from the brittle failure of steel and other types of fracture; Theoretical aspects of explosions; How technological change affects safety; Role of materials in air transport and shipping; Natural catastrophes; Effects of natural disasters; Earthquakes; The human error; External factors and accident rate; Hazardous factors and accident rate; The loss rate and economic growth; References.

FSR5046 Computer Crime Forensics

Fundamentals of computer security; Risk assessment and mitigation; Developing secure computer systems; Security models; User and information flow controls; Auditing and intrusion detection; Damage control and assessment; Database security; Network security; World wide web security; Firewalls; Cryptography; Malicious code; Security standards; Case studies; References.

FSR4066 Forensic Pathology

Medico-legal investigative systems; Time of death; Deaths due to natural disease; Wounds due to natural disease; Blunt trauma injuries of the trunk and extremities; Trauma to the skull and brain: cranio-cerebral injuries; Wounds due to pointed and sharp edged weapons; Asphyxia; Deaths due to motor vehicles; Airplane crashes; Sudden infant death syndrome; Neonaticide, infanticide and child homicide; Deaths due to fire; Carbon monoxide poisoning; Drowning; Electrification; The effects of heat and cold: hyperthermia and hypothermia; Emboli due to gas and amniotic fluid; Topics in forensic pathology; Deaths in forensic pathology; Sudden death during or immediately after a violent struggle; Interpretative toxicology: drug abuse and drug deaths.

FSR5027 Analysis of Shooting Incidents

The theory and practice of shooting reconstruction; The mathematics of shooting reconstruction; Review of firearms and ammunition as related to shooting reconstruction; Shooting reconstruction equipment; Ejector pattern testing; Shot pattern testing; Function testing; Determination of accuracy; Gunshot residue testing; Bullet entry characteristics in tissue and clothing; Blood spatter interpretation at shooting scenes; Blood on or in weapons; Ricochet phenomena; Bullet penetration phenomena; Protocol for the forensic examination of police-involved shooting; Reconciling bullet holes in clothing with the autopsy findings; Ballistics and shooting reconstruction; Databases and software for shooting reconstruction; Preparation of written reports and demonstrative evidence; Putting it together: courtroom presentations; References.

FSR5047 Footwear Forensics

Awareness, Detection and treatment of footwear impression evidence; Photography of footwear impressions; Casting three-dimensional footwear impressions; Treatment of two-dimensional footwear impressions; The enhancement of footwear impressions; Footwear sizing; Manufacturing processes of synthetic soled shoes; known shoes of suspects and the preparation of known impressions; wear characteristics; Class and identifying characteristics; Comparison of the questioned impression with known shoes; the footwear impression examiner in court; Impressions of the foot; Some case applications; The footwear impression evidence in typical cases; References.

FSR5067 Forensic Toxicology

Measuring toxicology and assessing risk; Toxicokinetics; Bio-transformation; Cellular sites of action; Carcinogenesis; Reproductive toxicology and teratology; Respiratory toxicology; Cardiovascular toxicology; Hepatic toxicology; Renal toxicology; Immunotoxicology; Ecological Toxicology; Air pollution; Toxic wastes; References.

FSR5028 Forensic Science Experiments

General safety rules; Equipment list; Forensic laboratory experiment instructions; Experiments: ranging from measurements, error determination, identification, density, detection, finger prints, hair, trace collections, sample preparation, measurement with microscopes, footwear evidence, imprints, synthetic materials, basic photography, tool marks, glass fractures, crime scene investigations, classifying, set-up and alignments of equipment, etc; Reports; References.

FSR4048 Tire Imprint Forensics

History of the tire; Mechanics of the tire tread; Tire sales; Tires have distinctive wear patterns; Tire sidewalls; The crime scene; Recording tire imprints; Wheelbase and tire tread stance measurements; A tire imprint identification system; What can be learned without a suspect's vehicle; Test tire impressions; Tire noise treatments; Using tire tread drawings; What can be learned when you do have a suspect's tire; Handling a case from beginning to end; Traffic accident investigation; Future trends and considerations; Preparation for trial; Obtaining a consultant; Tire imprint identification training; References.

FSR4068 Crime Scene Forensics

Introduction; First officer at the crime scene; Specialized personnel at the crime scene; Processing the crime scene; Establishing identity; Trace evidence and miscellaneous material; Blood and other biological evidence; Impression evidence; Firearms examination; Arson and explosives; Investigating sexual assault and domestic abuse crimes; Burglary investigation; Homicide investigation; References.

POSTGRADUATE DIPLOMA DESCRIPTIONS

Electrical Engineering

MST5001 Advanced Mathematics

Review of fundamental concepts; Ordinary differential equations; Linear differential equations; Laplace transforms; Vector analysis; Multiple, line and surface integrals and integral theorems; Fourier series; Fourier integrals; Gamma, Beta and other special functions; Bessel functions; Legendre functions and other orthogonal functions; Complex variables and conformal mapping; Complex inversion formula for Laplace transforms; Matrices; Calculus of variations.

ELE5020 Advanced Modern Control

Linear control-system compensation; Modern control-system design using state-space, pole placement; Ackermann's formula; Estimation; Robust control; Digital control-system analysis and design; Nonlinear control-system design; Introduction to optimal control theory and its applications; Control-system design – case studies; References.

ELE5021 Simulation of Industrial Processes and Control

Introduction to engineering design and decision making; Design options; Fundamentals of probability theory; Monte Carlo modeling; Optimization; Engineering Microeconomics; Utility theory; Forecasting; Engineering systems modeling; Analysis of systems reliability; Cost and benefit analysis; Methods of decision analysis; State transition matrix models; Modeling the research and development process; Information; System life-cycle modeling and optimization; Game theory; Management of engineering systems design and operation; Case studies

ELE5022 Electronic Devices and Process Simulation

Modeling and simulation; The circuit equations; Transistors and semiconductors; Numerical integration of circuit ODEs; Ion implantation; Single species diffusion; Multiple species diffusion; Integrating reaction-diffusion systems; Technology computer aided design; References.

ELE5023 Solid State Device Failure Mechanics

Modeling and simulation; The circuit equations; Transistors and semiconductors; Numerical integration of circuit ODEs; Ion implantation; Single species diffusion; Multiple species diffusion; Integrating reaction-diffusion systems; Technology computer aided design; References.

ELE1024 Linear State Space Systems

Feedback control; State-space representation of dynamic systems; Dynamics of linear systems; Frequency-domain analysis; Controllability and observability; Shaping the dynamic response; Linear observers; Compensator design by the separation principle; Linear, quadratic optimum control; Random processors; Kalman filters – optimum observers; References.

ELE5025 Control System Technology and Automation

Introduction and parallel distributed compensation; LMI control performance conditions and designs; Fuzzy observer design; Optimal fuzzy control; Robust fuzzy control; Robust-optimal fuzzy control; Trajectory control of a vehicle with multiple trailers; Fuzzy modeling and control of chaotic systems; Fuzzy descriptor systems and control; Nonlinear following control; New stability conditions and dynamic feedback designs; Multi objective control via dynamic feedback design; T-S fuzzy model as universal approximator; Fuzzy control of nonlinear time-delay systems; References.

ELE5026 Satellite Communication

Overview of satellite systems; Orbits and launching methods; The geo-stationary orbit; Radio wave propagation; Polarization; Antennas; The space segment; The earth segment; Analog signals; Digital signals; Error control coding; The space link; Interference; Satellite access; Satellite services and the Internet; Direct broadcast satellite services; Satellite services.

ELE5027 Radio Antenna Technology

Antennas; Fundamental parameters of antennas; Radiation integrals and auxiliary potential functions; Linear wire antennas; Loop antennas; Arrays – linear, planar and circular; Antenna synthesis and continuous sources; Integral equations, moment method and self and mutual impedances; Broadband dipoles and matching techniques; Traveling wave and broadband antennas; Frequency independent antennas and antenna miniaturization; Aperture antennas; Horn antennas; Micro-strip antennas; Reflector antennas; Antenna measurements.

ELE5028 Radio Networks, Planning and Optimization

Antennas; Fundamental parameters of antennas; Radiation integrals and auxiliary potential functions; Linear wire antennas; Loop antennas; Arrays – linear, planar and circular; Antenna synthesis and continuous sources; Integral equations, moment method and self and mutual impedances; Broadband dipoles and matching techniques; Traveling wave and broadband antennas; Frequency independent antennas and antenna miniaturization; Aperture antennas; Horn antennas; Micro-strip antennas; Reflector antennas; Antenna measurements.

ELE5029 Cellular Mobile Radio Systems

Introduction; Radio network planning and optimization; Transmission network planning and optimization; Core network planning and optimization; GPRS – network planning and optimization; EDGE – network planning and optimization; 3G radio network planning and optimization; 3G transmission network planning and optimization; 3G Core network planning and optimization; 4G network planning; Integrated network planning; MMS network planning; Location-based services; End-to-end system performance measurement; References.

ELE5030 Advanced Computer Architecture Design

Digital logic; Integrated circuits and logic families; Basic computer architecture; Memory; Serial communications; Basic microprocessors and microprocessor elements; Advanced microprocessor concepts; High-performance memory technologies; Networking; Logic design and logic devices; Programmable logic devices; Clock distribution; Voltage regulation in practice; Signal integrity; Designing for success.

ELE5031 Advanced Digital Logic Design

Structured design concepts; Design tools; Basic features of VHDL; Lexical description character set; Basic VHDL modeling techniques; Algorithmic level design; Register level design; Gate level and ASIC library modeling; HDL-based design techniques; ASICs and the ASIC design process; Modeling for Synthesis; Integration of VHDL into top-down design methodology; References.

ELE5032 Synthesis and Optimization of Digital Circuits

Introduction; Background; Hardware modeling; Architectural synthesis; Scheduling algorithms; Resource sharing and binding; Two-level computational logic optimization; Multi-level computational logic optimization; Sequential logic optimization; Cell-library binding; State-of-the-art and future trends; References.

ELE5033 Analysis of Multi-conductor Transmission Lines

The multi-conductor transmission line equations; The per-unit length parameters; Frequency-domain analysis; Time-domain analysis; Literal (symbolic) solutions for three-conductor lines; Incident-field excitation of the line; Transmission-line networks; References.

ELE5034 Analysis of Electrical Machinery

Basic principles of electric machine analysis; Theory of direct-current machines; Reference-frame theory; Theory of symmetrical induction machines; Theory of synchronous machines; Operational impedance's and time constants of synchronous machines; Linearized equations of induction and synchronous machines; Reduced-order equations of induction and synchronous machines; Unbalanced operation of symmetrical induction machines; Asynchronous and unbalanced operation of synchronous machines; Theory of symmetrical and unsymmetrical two-phase induction machines; Computer simulation of induction and synchronous machines; Reference-frame theory used in the analysis and simulation of power and electric drives; Theory of brushless DC machines; References

ELE5035 Analysis of Faulted Power Systems

General considerations; Symmetrical components; Analysis of unsymmetrical faults – three-component method; Sequence impedance of transmission lines; Sequence capacitance of transmission lines; Sequence impedance of machines; Sequence impedance of transformers; Changes in symmetry; Simultaneous simplifications; Computer solution methods using the admittance matrix; Computer solution methods using the impedance matrix; References.

Mechanical Engineering

MST5001 Advanced Mathematics

Review of fundamental concepts; Ordinary differential equations; Linear differential equations; Laplace transforms; Vector analysis; Multiple, line and surface integrals and integral theorems; Fourier series; Fourier integrals; Gamma, Beta and other special functions; Bessel functions; Legendre functions and other orthogonal functions; Complex variables and conformal mapping; Complex inversion formula for Laplace transforms; Matrices; Calculus of variations.

ELE5021 Simulation of Industrial Processes and Control

Introduction to engineering design and decision making; Design options; Fundamentals of probability theory; Monte Carlo modeling; Optimization; Engineering Microeconomics; Utility theory; Forecasting; Engineering systems modeling; Analysis of systems reliability; Cost and benefit analysis; Methods of decision analysis; State transition matrix models; Modeling the research and development process; Information; System life-cycle modeling and optimization; Game theory; Management of engineering systems design and operation; Case studies

MLM5001 Advanced Strength and Applied Stress Analysis

Basic concepts of force, stress, strain and displacement; Stress and strain, Transformations, equilibrium and compatibility; Review of the fundamental formulations of stress, strain and deflection; Concepts from the theory of elasticity; Topics from advanced mechanics; Energy techniques in stress analysis; Strength, failure modes and design considerations; Experimental stress analysis; Introduction to the finite element method; Finite element modeling techniques; References.

MLM5002 Operations Management

Introduction to operations management; What is operations management; Operations strategy; Planning the product; Decisions about the process; Planning and scheduling resources; Materials management; references.

MLM5003 Reliability Engineering

Introduction; The failure distribution; Constant failure rate model; Time-dependent failure models; Reliability of systems; State-dependent systems; Physical reliability models; Design for reliability; Maintainability; Design for maintainability; Availability; Data collection and empirical methods; reliability testing; Reliability growth testing; Identifying and repair distribution; Goodness-of-fit tests; Reliability estimation and application; Implementation

MLM5004 Probability and Statistics for Engineers

Applied probability theory; Discrete and continuous random variables and their probability distributions; Waiting time processes; Sampling theory; Point and interval estimation; Hypothesis testing; Simple linear and non-linear regression and correlation analysis.

MLM5008 Quality Process Design

The basics of production systems; Systems thinking – concepts and development; Process fundamentals; Process characterization; Process exploration; Process response modeling; Process definition/redefinition – output perspectives; Process definition/redefinition – transformation and input perspectives; Process control – concepts and options; Process monitoring – variables control charts for grouped measurements, variables control charts for individual measurements and related topics, attributes control charts for classification measurements and non-traditional SPC concepts and models; Process adjustment – Introduction to automatic process control, conventional models and un-conventional models; Process improvement – questioning perspectives, analysis and implementation perspectives; Process based transformations; Process-compatible initiatives; Process-compatible tools; Process cases – description and data

MLM5006 Compressible Fluid Flow

Introduction; The equations of steady one-dimensional compressible fluid flow; One-dimensional isentropic flow; Normal shock waves; Oblique shock waves; Expansion waves – Prandtl-Meyer flow; Variable area flow; Adiabatic flow in a duct with friction; Flow heat addition or removal; Generalized Quasi-one-dimensional flow; Numerical analysis of one-dimensional flow; An introduction to two-dimensional compressible flow; High temperature flows; Low density flows; References.

MLM5007 Intermediate Mechanics of Materials

Introduction; Material behavior and failure; Energy methods; Unsymmetrical bending; Nonlinear and elastic-plastic bending; Shear and torsion of thin-walled beams; Beams on elastic foundations; Membrane stresses in Axis-symmetric shells; Axis-symmetric bending of cylindrical shells; Thick-walled cylinders and disks; Curved beams; Elastic stability; The finite element method; References.

MLM5009 Quality Planning and Analysis

Operational quality planning and sales income; Quality control; Process management; Strategic quality management; Organization for quality; Developing a quality culture; Basic concepts of statistic and probability; Statistical tools for analyzing data; Understanding customer needs; Designing for quality; Designing for quality – statistical tools; Supply management; Operations manufacturing sector; Operations – service sector; Statistical process control; Inspection, test and management; Marketing, field performance and customer service; administrative and support operations; Quality information systems; Quality assurance – quality audit.

MLM5011 Applied Dynamics

Design modeling and formulation of equations of motion; Kinematics; Momentum formulation for systems of particles; Variational formulation for systems of particles; Dynamics of systems containing rigid bodies; Dynamics of electrical and electro-mechanical systems; Vibration of linear lumped-parameter systems

MLM5012 Mechanical Metallurgy

Introduction; Stress and strain relationships for elastic behavior; Elements of the theory of plasticity; Plastic deformation of single crystals; Dislocation theory; Strengthening mechanisms; Fracture; The tension test; The hardness test; The torsion test; Fracture mechanics; Fatigue metals; Creep and stress rupture; Brittle fracture and impact testing; Fundamentals of metalworking; Forging; Rolling of metals; Extrusion; Drawing of rods, wires and tubes; Sheet-metal forming; Machining of metals; References.

MLM5013 Structural Reliability Analysis

Measures of structural reliability; Structural reliability assessment; Integration and simulation methods; Second-moment and transformations methods; Reliability of structural systems; Time dependent reliability; Load and load effect modeling; Resistance modeling; Codes and structural reliability; Probabilistic evaluation of existing structures; References.

Civil Engineering (bridge and fluid majors) and Transportation Engineering

MST5001 Advanced Mathematics

Review of fundamental concepts; Ordinary differential equations; Linear differential equations; Laplace transforms; Vector analysis; Multiple, line and surface integrals and integral theorems; Fourier series; Fourier integrals; Gamma, Beta and other special functions; Bessel functions; Legendre functions and other orthogonal functions; Complex variables and conformal mapping; Complex inversion formula for Laplace transforms; Matrices; Calculus of variations.

MLM5001 Advanced Strength and Applied Stress Analysis

Basic concepts of force, stress, strain and displacement; Stress and strain, Transformations, equilibrium and compatibility; Review of the fundamental formulations of stress, strain and deflection; Concepts from the theory of elasticity; Topics from advanced mechanics; Energy techniques in stress analysis; Strength, failure modes and design considerations; Experimental stress analysis; Introduction to the finite element method; Finite element modeling techniques; References.

MLM5004 Probability and Statistics for Engineers

Applied probability theory; Discrete and continuous random variables and their probability distributions; Waiting time processes; Sampling theory; Point and interval estimation; Hypothesis testing; Simple linear and non-linear regression and correlation analysis.

MST5092 Construction Planning for Engineers

Introduction to program planning; The planning process; Decision making; Introduction to project planning; Critical path methods; Stochastic networks; Resource analysis; Introduction to activity planning; Planning for equipment-driven activities; Planning for labor-driven activities

MST5091 Fundamental Principles of Systems Analysis and Decision

The systems approach; The principles of linear programming; Linear and network models; Capital investment analysis; Risk; System performance; Variability; Model calibration

MST5093 Professional Construction Management

Management in the engineering and construction industry; Development and organization of projects; Applications and requirements for management organizations; Introduction to an example project; Pre-construction site investigation, planning, scheduling, estimating and design; Bidding and award; Construction; Application of controls; Selecting a construction manager; Concepts of project planning and control; Estimating and control of operations and resources; Cost engineering; Procurement; Value engineering; Quality assurance; Safety and health in construction; Risk management, insurance, bonding, liens and licensing; Industrial relations; Current state of art of professional construction management.

MCT5001 Hydraulic Structure Design

Introduction; Elements of dam engineering; Embankment dam engineering; Concrete dam engineering; Dam outlet works; Energy dissipation; Gates and valves; Dam safety; Other hydraulic structures; River engineering; Diversion works; Cross-drainage and drop structures; Inland waterways; Hydroelectric power development; Pumping stations; Waves and offshore engineering; Coastal engineering; Models in hydraulic engineering.

MCT5002 Design of Modern Steel Bridges

Types and history of steel bridges; Types and properties of steel; Loads on bridges; Aims of design; Rolled beam and plate girder design; Stiffened compression flanges of box and plate girders; Cable-stayed bridges; References.

MST5094 Transportation Planning and Design

The transport system; Administrative structure and finance; Operational and vehicular characteristics; Human factors in transportation; An introduction to transportation planning; Transportation modeling; Development and evaluation of transportation planning options; Design roadways, railways and guide-way systems – location and route layout; Airport planning and layout; The airport passenger terminal area; Introduction to water transportation; Planning and design of harbors; References.

MLM5010 Engineering Economy

Foundations of engineering economy; Factors – how time and interest affect money; Combining factors; Present worth analysis; Annual worth analysis; Rate of return analysis – single alternative; Rate of return analysis – multiple alternatives; Benefit/cost analysis and public sector economics; Making choices – the method, MARR and multiple attributes; Making decisions on real-world projects; Selection from independent projects under budget limitation; Breakeven analysis; Effects of inflation; Cost estimation and indirect cost allocation; Depreciation methods; After-tax economic analysis; Formalized sensitivity analysis and expected value decisions; More on variation and decision making under risk; References.

MCT5004 Earth Quake Engineering and Protection

Single-degree of freedom systems: Equations of motion, problem statement and solution methods; Free vibration; Response to harmonic and periodic excitation; Multi-degrees of freedom Systems: Equations of motion, problem; Free vibrations; Earthquake response of linearly elastic buildings; Earthquake response of inelastic buildings; Earthquake response of base-isolated buildings; Structural dynamics in building codes; References

MCT5005 Civil Structural Reliability Analysis

Measures of structural reliability; Structural reliability assessment; Integration and simulation methods; Second-moment and transformations methods; Reliability of structural systems; Time dependent reliability; Load and load effect modeling; Resistance modeling; Codes and structural reliability; Probabilistic evaluation of existing structures; References.

BCT5001 Bridge Design Part I & Part II

Part I

Introduction to bridge design; Aesthetics and bridge types; General design considerations; Loads; Influence functions and girder-line analysis; System analysis; Concrete bridges; Steel bridges; Wood bridges; Substructure design; References.

Part II

Types and history of steel bridges; Types and properties of steel; Loads on bridges; Aims of design; Rolled beam and plate girder design; Stiffened compression flanges of box and plate girders; Cable-stayed bridges; References.

BCT5003 Bridge Seismic Design

Introduction; Principles of seismic design; Geo-technical and dynamic analysis; Seismic isolation and dissipation; Active control; Retrofit technology; Bridge and earthquake considerations; Earthquake case studies; Earthquake damage and structural performance; Seismic design practices; Damage control of highway bridges; Typical retrofit cases studies; References.

BCT5002 Bridge Substructure and Foundation Design Part I & II

Part I

Introduction; Types and methods; Bearings and columns; Towers; Abutments and retaining structures; Footings and foundations; Bridge hydraulics; Design criteria; Geo-technical considerations; Exploration techniques; Site characterization; Bridge design and damage control; Damage control from vessels; references.

Part II

Introduction and general principles; Loads and loading groups; Methods of analysis and design; Piers for conventional bridges; Piers for special bridges; Wall systems; Abutments; Footings; Driver piles; Drilled shaft foundations; Prismatic and linear foundations; Strengthening and rehabilitation; References.

BCT5004 Bridge Rehabilitation and Maintenance

Overview; Maintenance policy principles; Types of distress usually in various types of bridges; Cracks in concrete: types, Causes and repair; Bridge inspection; Bridge structure repair; Bridge structure strengthening; Strengthening of concrete bridges by external pre-stressing;

Strengthening; Strengthening of concrete structures by external pre-stressing, Externally bonded steel plates; Rehabilitation of bridge foundation; Structure deficiencies, remedies and preventions; Load capacity evaluation of existing bridges; Bridges for emergency applications; Diagnostic testing; Load testing; Bridge disasters – case studies.

BCT5005 Structural Vibration

Vibration of structures having one degree of freedom; free un-damped vibration; forced vibration; the vibration of structures with more than one degree of freedom; the vibration of structures with more two degrees of freedom; modal analysis techniques; the vibration of continuous structures – longitudinal vibration of a thin uniform beam; transverse vibration of a thin uniform beam; the analysis of continuous structures by Rayleigh's energy method; transverse vibration of thin uniform plates; the finite element method; the vibration of beams fabricated from more than one material; damping in structures – sources of vibration excitation and isolation; vibration isolation; structural vibration limits; structural damage; effects of damping on vibration response of structures; the measurement of structural damping; sources of damping; active damping systems; energy dissipation in non-linear structures; references.

FCT5001 Fluid-Structure Interactions

Axial flow; Fluid structure interactions; Flow induced vibration; Slender structures; Shells; Plates; Cylinder clusters; Annular flow; Collapsible tubes; Haemodynamics; Pulmonary dynamics; Acoustic arrays; Heat exchangers; Nuclear reactors; Traveling web; Spinning disks; Coaxial cylinders; Coaxial shells; Coaxial shells; CFD; Engineering applications.

FCT5002 Water Hammer

The valve; the pump; the booster; machine inertia; an optimum pump location; the non-return valve; non-return valve as a protection method; the complex system; the separation problem; the non-elastic conduit; the high-point; fire protection; the plumbing problem; structural interaction; the open surge tank; the one-way surge tank; the present-regulating-valve; the resonance problem; series pumping; impact of ocean waves; compound pipes; air-vessel protection; a hydro-electric example; explosion loops; the dead end; cooling water systems; sewage pumps; references.

FCT5003 Pumping Station Design

Introduction; Flow in conduits; piping; valves; fundamentals of hydraulic transients; control of hydraulic transients; electrical fundamentals and power system principles; electrical design; performance of centrifugal pumps; types of pumps; pumps selection, inspection installation and intakes; electric motors; engines; variable-speed pumping; pump-driver specifications; System design for wastewater pumping; system design for water pumping; system design for sludge pumping; instrumentation and control devices; instrumentation and control applications; vibration and noise; heating, ventilating and cooling; designing for easy operation and maintenance; summary of design considerations; station layout; avoiding blunders; contract documents; costs and costing; references.

FCT5004 Dam Hydraulics

Overview; Overflow structures; Diversion structures; Outlet structures; Dissipation structures; Bottom outlets; Intake structures; Reservoir sedimentation; Impulse waves from shore instabilities; Dam-break waves.

FCT5005 Hydraulic Structures

Introduction; Elements of dam engineering; Embankment dam engineering; Concrete dam engineering; Dam outlet works; Energy dissipation; Gates and valves; Dam safety; Other hydraulic structures; River engineering; Diversion works; Cross-drainage and drop structures; Inland waterways; Hydroelectric power development; Pumping stations; Waves and offshore engineering; Coastal engineering; Models in hydraulic engineering.

FCT5006 Irrigation Engineering

Introduction; Irrigation water requirements and crops; Irrigation systems; methods of irrigation; unlined channels; lined channels; drainage engineering; river mechanics; river training; head-works; control structures; cross drainage works; bridge and culverts; canal outlets; hydrology; reservoirs and dam planning; earth and rockfill dams; irrigation water requirement and crops; arch buttress dams; discharge facilities; water power engineering; dam safety; design problems; references.

MST5095 Transportation Network Analysis

Introduction; Statistical and data system analysis; Transportation networks; Optimality; Cost functions; Deterministic user equilibrium assignment; Stochastic user equilibrium assignment; Trip table estimation; Network reliability; Network design; Network testing and implementation; Summaries; References.

MST5097 Urban Transportation Systems

Overview – criteria for selecting modes; walking; Bicycles; Motorcycles and scooters; Automobiles; Para-transit; Taxis; Busses; Bus rapid transit; Trolley-busses; Streetcars and rail transit; Monorails; Heavy rail transit; Commuter rail; Automated guide-way transit; Waterborne modes; Special modes; Inter-modal terminals; References.

MST5098 Principles of Pavement Design

Pavement types – wheel loads and design factors; Stresses in flexible pavements; Stresses in rigid pavements; Vehicle and traffic considerations; Climate and environment; The economic factor design strategies and systems analysis; Soil classification; Materials characterization; Sub-grades; Bases and sub-bases; Bituminous surfaces; Material variability; Design of flexible airport pavements; Design of flexible highway pavements; Design of rigid airport pavements; Design of rigid highway pavements; Pavement distress; Condition surveys; Strengthening existing pavements.

MST5099 Highway Engineering

The profession of highway engineering; Transportation systems and organizations; Characteristics of the driver – the pedestrian, the vehicle and the road; Traffic engineering studies; Highway safety; Fundamental principles of traffic flow; Intersection design; Capacity and level of service of two-lane highways and freeway segments; Capacity and level of service at signalized intersections; The transportation planning process;

Forecasting travel demand; Evaluating transportation alternatives; Transportation system management; Highway surveys and location; Geometric design of highway facilities; Highway drainage; Soil engineering for highway design; Bituminous materials; Design of flexible pavements; Design of rigid pavements; Pavement management.

MST5100 Traffic Engineering

Traffic surveys; Parking surveys; Estimating travel demand; Capacity analysis; Traffic management and control; Highway layout and intersection design; Signal control; Parking design and control; Road safety engineering; Traffic calming; Public transport priority; The transport engineer and the development process; Designs for sustainable development; Transport telematics; Statutory requirements; References.

MST5101 Road Management

Overview; Overflow structures; Diversion structures; Outlet structures; Dissipation structures; Bottom outlets; Intake structures; Reservoir sedimentation; Impulse waves from shore instabilities; Dam-break waves.

MST5106 Railroad Engineering

The railroad industry; The nature of railroad traffic; Revenues and costs; The location process; Effects of distance; Propulsive resistance; Motive power; Electrification; Grades and curve resistance acceleration and deceleration; Velocity profiles; Problems in grades; Tonnage ratings; Location procedure; Track analysis; Sub-grade materials, design, construction and stability problems; Drainage; Ballast; Cross ties; Concrete and other artificial ties; Rail fastenings and other track material; Track geometry; Turnouts and crossings; Track-train dynamics; Conduct of work; Railroad right of way; References.

MST5108 Airport Engineering

The structure and organization of airports; Forecasting of air transport demand using both traditional and new methods; Airport systems planning; Airport master planning; Air traffic control, lighting and signing; Airport capacity and configuration; Passenger terminal; Air cargo terminal; Designing for safety; Environmental impact of airports; References.

MST5103 Design of Highway Bridges

Introduction to bridges engineering; Aesthetics and bridge types; General design considerations; Loads; Influence functions and girder-line analysis; Systems analysis; Concrete bridges; Steel bridges; Wood bridges; Sub-structure design; References.

MST5104 Movable Bridge Design

Bridges vs bridges; Movable vs fixed bridges; Bascule bridges; Vertical lift bridges; Swing bridges; Application of types; Bridges replacement; Design – preliminary aspects; Structural issues; Detailing – bascule bridges, vertical lift bridges, swing bridges; Machinery – bascule bridges, vertical lift bridges, swing bridges, general and control power; Rehabilitation; Construction management; Structure; Fabrication and installation; Balancing; Replacement and repair of existing bridges; Maintenance – sub-structure and super-structure; Machinery and control systems; Maintenance particulars; Inspection – structure, Machinery – bascule, vertical lift and swing bridges; Machinery – general, electrical and inspection reporting; Evaluation of existing bridges; Bridge management; Structure and machinery; Electrical systems; Traffic control systems and operator's houses; Failure and bridge functionality analysis; References.

MST5105 Bridge Maintenance Management

Bridge inspection; Concrete super-structures and box girders; Steel structures; Suspension bridges; Cable-stayed bridges; Movable bridges; Sub-structures; Bearings; Deck reconstruction and joints; Seismic retrofitting of highway bridges; Maintenance of traffic during inspection and rehabilitation; Environmental controls related to bridge rehabilitation; References.

MST5107 Environmental Impact of Railway Systems

Environmental planning; Passenger planning; Passenger traffic; Freight; Social impacts and public perception; Noise and vibration; Pollution; Visual impacts; Construction; Resources use and route selection; Residential, commercial and productive land; Nature conservation; Heritage and amenity; Railways scenic landscape; References.

Engineering Management

EMT5001 Production Management

Forecasting: production demand, quantitative and qualitative methods using forecasting, forecasting errors and control, forecasting and its relationship to capacity planning; Aggregate Planning: capacity measurement, aggregate units, manual mathematical methods for aggregate planning; Inventory Control: development vs independent inventory, order quantities, including quantity discounts, continuous review and periodic review systems, ABC analysis; Materials Requirements Planning (MRP): Master production scheduling, MRP concepts and principles, Lot sizing; Operations Scheduling: Gantt charts, single-machine scheduling, parallel scheduling, flow shop scheduling, job-shop scheduling, personnel scheduling; Just-in-time and Lean Manufacturing: advantages and limitations, set-up and changeover times and their reduction, push and pull advantages and limitations, use of Kanban, effect on inventory, issues of implementation.

EMT5002 Engineering Statistics and Probability

Data analysis; Probability theory; Discrete random variables and their distribution functions; Continuous random variables and their distribution functions; Multivariable probability distributions; Sampling distribution theory; Point and interval estimation; Inferences about population means; Inferences about population proportions; Linear regression and correlation; Multiple linear regression; Single-factor experiments: analysis of variance; Design and analysis of multifactor experiments; Statistical quality control.

EMT5003 Operations Management and Modeling

Introduction, What is operations management, Operations strategy, Product planning, Quality management, Forecasting product demand, Designing the process, Layout of facilities, Managing capacity, Controlling quality, Aggregate planning, Material requirements planning, Just-in-

time operations, Short-term scheduling, Job design and work measurement, Project management, Managing the supply chain, Independent demand inventory systems, Facilities location.

EMT5004 Engineering Economy and Decision Making

Introduction to engineering economy, Demand and supply analysis, Demand forecasting, The law of supply, Cost analysis, Break-even analysis, Pricing concepts, Pricing methods and problems, Market structure – conduct and performance, Classification of markets, Manufacturing practices, National income accounting, Unemployment inflation and deflation, Value of money, Commercial banking-structure and functions, Central banking, Economic systems, New economic environment, Project feasibility, Cost-benefit analysis, Sources of finance, Accounting system, Financial statements, Ratio analysis.

EMT5005 Engineering Management

Introduction – The flow-roll manufacturing company, definitions of management; The business environment – the organization, legal and ethical considerations; Strategy and decision making – strategy formulation, decision-making, information presentation, mathematical models in decision-making; Financial management – the financial environment; control through costing; Project and operations management – project planning and control, manufacturing operations; Marketing and sales management – marketing and markets, product management, sales and distribution; Management skills – leadership and motivation, team building, effective communications, time management.

EMT5001 Management of Business Process and Development

Process Management and Strategy – products, processes and performance, operations strategy and management; Process Flow Measurement – process flows measures, flow-time analysis, flow-rate and capacity analysis, inventory analysis; Process Flow Variability – managing flow variability: safety inventory, safety capacity and process control and capacity; Process Integration – process synchronization and implementation.

EMT5002 Business Planning and Simulation

Introduction to business process design; Process management and process oriented improvement programs; A simulation based methodology for designing business processes; Basic tools for process design; Managing process flows; Introduction to queuing and simulation; Introduction to extend; Modeling and simulating business processes; Input and output data analysis; Optimizing business process performance; Process benchmarking with data envelopment analysis.

EMT5001 Logistics Engineering and Management

Introduction to logistics; Reliability, maintainability and availability measures; The measures of logistics and system support; The system engineering process; Logistics and supportability analysis; Logistics in the system design and development; Logistics in the production/construction phase; Logistics in the utilization, sustaining support and retirement phases; Logistics management.

EMT5004 Project Management

Principles of project management; Project planning – the systematic approach, the concept phase, the study phase, the design phase, the implementation phase, the project plan; Project optimization; Project scheduling; Resource allocation; Project control; Project modeling and optimization; Financial and economic analysis; Decision analysis for project selection; Computers and project management; Relevant analytical techniques; Case study: reconstruction project management at Tinker Air Base.

- EMT6001 Aerospace Engineering, or**
- EMT6002 Civil Environmental Engineering, or**
- EMT6003 Chemical Engineering, or**
- EMT6004 Computer Engineering, or**
- EMT6005 Electrical Engineering, or**
- EMT6006 Mechanical Engineering, or**
- EMT6007 Industrial Engineering**

The syllabuses in each case for the above courses will be based on the nature of the specialization in each case. It focuses on the subject nature of the entire program with an emphasis on a topic in engineering management related on planning, design, development, maintenance, research, etc directed in the study area of the student. It uses case studies or a particular case as its foundation to enhance and motivate the course of study. The nature of the study area will direct the student to the application and use of managerial principles and techniques mastered during the completion of the courses prescribed for the program.

Facilities Management and Construction Management

FMA5114 Planning Procedures

The role of specifications; Relationship between drawings and specifications; Organization of specifications; Concept of the technical section; Arrangements of the technical section; Types of specifications; Systems building performance specifications; Specifications writing techniques; Bidding procedures; Bidding requirements; Bonds; Guarantees; Warranties; Conditions of contract; General conditions and supplements; General requirements; Procedures; Specifying materials; Specification language; Specification reference sources; Master texts and systems; Physical format and style; References.

CNE 5114 Construction Operation Analysis

Systematic approach; The conception phase; The study phase; The design phase; The implementation phase; Project management; The project phase; Specifications and reports; Modeling and system design; References.

FMA5115 Strategic Facility Management

Complying with the Law; Health & Safety Law; Employment Law; Property Law; Managing Your Business Effectively; Finance Management; Risk Management; Business Continuity; Outsourcing; Transport; IT and Communications; The Built Environment; Workplace Facilities; Space Design and Management; Access, Safety and Security; Maintenance and Repair

CEM5760 Capital Program Management/ Program Development

The Construction Industry; Project Participants; Organizing and Leading the Construction Project; Project Delivery Methods; Project Chronology; Construction Services During Design; Bidding and Procurement; Construction and Closeout; Estimating Project Costs; Project Planning and Scheduling; Controlling Project Cost, Time, and Quality; Job Site Administration; Construction Law; Construction Safety and Health.

FMA5021 Financial and Managerial Accounting

Introduction to engineering economy; Demand and supply analysis; Demand forecasting; The law of supply; Cost analysis; Break0even analysis; Pricing concepts; Pricing methods and problems; Market: structuring, conduct and performances; Classification of markets; Manufacturing processes; National income accounting; Unemployment, inflation and deflation; Value of money; Commercial banking: Structure and functioning; central banking; Economic systems; New economic environment; Project feasibility; Cost-benefit analysis; Sources of finances; Accounting systems; Financial statements; Ratio analysis

FMA5310 Organizational Analysis & Behavior

Managers and management; Managing today's world; Foundations of planning and decision making; Basic organization designs; Staffing and human resources management; Managing change and innovation; Foundations of individual and group behavior; Motivation and rewarding employees; Leadership and trust; Communication and inter-personal skills; Foundations of control; Technology and operations

FMA5311 Operational Facility Management

Complying with the Law; Health & Safety Law; Employment Law; Property Law; Managing Your Business Effectively; Finance Management; Risk Management; Business Continuity; Outsourcing; Transport; IT and Communications; The Built Environment; Workplace Facilities; Space Design and Management; Access, Safety and Security; Maintenance and Repair

FMA5340 Project and Contract Management

Introduction to business process design; Process management and process oriented improvement programs; A simulation based methodology for designing business processes; Basic tools for process design; Managing process flows; Introduction to queuing and simulation; Introduction to extend; Modeling and simulating business processes; Input and output data analysis; Optimizing business process performance; Process benchmarking with data envelopment analysis.

CNE5113 Risk Management

Part I: Fundamentals of Whole Life Cycle Costing; Towards an understanding of whole life cycle costing; Whole life cycle costing risk management; Key decisions in the whole life cycle costing process; Fundamentals of whole life cycle cost analysis; Whole life risk analysis techniques; Part II: Whole Life Cycle Costing: The design stage; Design service life planning; Design environmental life cycle assessment; Whole life cycle cost planning at the design stage; Whole life risk and risk responses at design stage; Whole life cycle costing of mechanical and electrical services: A case study. Part III: Whole Life Cycle Costing: Construction and occupancy stages; Whole life risk and risk responses in the construction stage; Whole life risk and risk responses at operation stage; Whole life cycle costing in the operation stage; Whole life costing of building assets occupancy: A case study

FMA5114 Building Asset Management

Process Management and Strategy – products, processes and performance, operations strategy and management; Process Flow Measurement – process flows measures, flow-time analysis, flow-rate and capacity analysis, inventory analysis; Process Flow Variability – managing flow viability: safety inventory, safety capacity and process control and capacity; Process Integration – process synchronization and implementation.

FMA5702 Building Construction Technology

Making buildings; Foundations; Wood; Heavy timber frame construction; Wood light frame construction; Exterior finishes for wood light frame construction; Interior finishes for wood light frame construction; Brick masonry; Stone and concrete masonry; Masonry load bearing wall construction; Steel frame construction; Concrete construction; Site-cast concrete framing systems; Pre-cast concrete framing systems; Roofing; Glass and glazing; Windows and doors; Designing cladding systems; Cladding with masonry and concrete; cladding with metal and glass; Selecting interior finishes; Interior walls and partitions; Finish ceilings and floors.

MGM5200 Project Assessment & Management

The construction industry; Business ownership; Company organization; Drawings and specifications; Cost estimation and bidding; Construction contracts; Contract survey bonds; Construction insurance; Business methods; Project management and administration; Project cost management; Project time management; Labor law; Labor relations; Project safety.

CEM5730 Infrastructure Financing

Construction Practices; The management system; Project estimation; Project planning; Project scheduling; Production planning; Project time reduction; Resource management; Project time management; Project cost management; Financial management; Schedule applications; References.

FMA5701 Energy Management in Buildings

Heat and human comfort; Thermal balance of buildings; Hydronic heating; Electric heating; Air systems; Heating and cooling; Testing, adjusting and balancing; Principles of plumbing; Water supply; Distribution and fire suppression; Drainage and wastewater disposal; Introduction to electricity; Branch circuits and outlets; Building electric circuits; How to light behaves; Residential electric work; Non-residential electric work

CNE5701 Computer Aided Facility Management

The AutoCAD display, File management Graphic objects, Co-ordinates and lines, Absolute and relative co-ordinates. Drawing lines, arcs, circles, polygons, donuts, rectangles, ellipses and poly-lines., Selection sets and editing, Moving, stretching, rotating, mirroring, scaling and copying objects, Adding text to a drawing, Setting and working with units and limits, Calculating scale factor and text height, Creating and using permanent points, Setting and using a grid, Using a snap increment, Defining a co-ordinates system, Construction techniques, Dividing and measuring an entity, Creating advanced selection sets, Trimming, breaking, extending and stretching objects, Applying chamfers and fillets, Modifying objects, Composing a drawing, Plotting a drawing, Intro to layers, Creating layers, Drawing objects with: color, line-types, Changing an objects properties, Advanced text techniques, Hatching, Adding linear, diameter, radius, chain, baseline, ordinate, angular and limit dimensions, Using alternate units, Tolerance dimensions, Working with areas, Blocks Attributes

FMA5703 Conservation Methods & Practices

The changing context within which Building Maintenance operates. The Maintenance Dimension. Maintenance Organizations. The Design/Maintenance Relationship. The Nature of Maintenance Work. Information Management. Maintenance Planning. Maintenance Contracts. The Execution of Building Maintenance.

CNE 5110 Project Management for Construction

Construction Practices; The management system; Project estimation; Project planning; Project scheduling; Production planning; Project time reduction; Resource management; Project time management; Project cost management; Financial management; Schedule applications; References.

CNE 5111 Construction Cost Estimating

PART I: The Art of Estimating Overview of the Estimating and Bidding Process Introduction to Excel; PART II: Fundamentals of the Quantity Takeoff Concrete Masonry Metals; Woods, Plastics, and Composites Thermal and Moisture Protection Openings Finishes Fire Suppression; Plumbing HVAC Electrical Earthwork Exterior Improvements Utilities; PART III: Material Pricing Labor Productivity and Hours Labor Rates; Equipment Costs Crew Rates Subcontract Pricing Markups Pricing Extensions Avoiding Errors in Estimates; PART IV: Submitting the Bid Project Buyout The Estimate as the Basis of the Schedule; Ethics; PART V: Converting Existing Forms Creating New Forms Proposals and Beyond.

CNE 5112 Contracts and Specifications

The construction industry; Business ownership; Company organization; Drawings and specifications; Cost estimation and bidding; Construction contracts; Contract survey bonds; Construction insurance; Business methods; Project management and administration; Project cost management; Project time management; Labor law; Labor relations; Project safety.

CNE 5113 Risk Analysis

Part I: Fundamentals of Whole Life Cycle Costing; Towards an understanding of whole life cycle costing; Whole life cycle costing risk management; Key decisions in the whole life cycle costing process; Fundamentals of whole life cycle cost analysis; Whole life risk analysis techniques; Part II: Whole Life Cycle Costing: The design stage; Design service life planning; Design environmental life cycle assessment; Whole life cycle cost planning at the design stage; Whole life risk and risk responses at design stage; Whole life cycle costing of mechanical and electrical services: A case study. Part III: Whole Life Cycle Costing: Construction and occupancy stages; Whole life risk and risk responses in the construction stage; Whole life risk and risk responses at operation stage; Whole life cycle costing in the operation stage; Whole life costing of building assets occupancy: A case study

CNE 5114 Construction Operation Analysis

Process Management and Strategy – products, processes and performance, operations strategy and management; Process Flow Measurement – process flows measures, flow-time analysis, flow-rate and capacity analysis, inventory analysis; Process Flow Variability – managing flow viability: safety inventory, safety capacity and process control and capacity; Process Integration – process synchronization and implementation.

CNE 5115 Information Systems in Project Management

This course puts emphasis on the differences between PM fundamentals and the requirements for IT project management, and does not cover the basics. This course has a strong focuses on project success factors; components of IT projects; relationship to systems engineering techniques; applicability of standards; risk management; schedule management and controlling scope; configuration management; testing techniques; specification and prototyping; selecting and using 3rd party software; and intellectual property rights

CNE 5116 Engineering for Construction: Methods and Technologies

Earthmoving materials and operations; Excavating and lifting; Loading and hauling; Compacting and finishing; Mixes; Paving and surface treatments; Rock excavation; Compressed air and water systems; Foundations; Concrete construction; Concrete form design; Wood construction;

Steel construction; Masonry construction; Planning and scheduling; Construction economics; Control construction; Construction safety and health and equipment maintenance; Improving productivity and performance.

CNE 5117 Decision and Risk Analysis for Project Management

This course is an introduction to identifying, analyzing, assessing, and managing risks inherent to engineering projects. Students will learn about probability modeling, choice and value theory, schedule and cost risk, risk mitigation and transfer, and contract considerations of project risk. Examples are drawn from construction, software development, systems integration, and other large engineering projects, and cover probability basics, subjective probability, statistical data analysis, introduction to decision theory, Monte Carlo simulation, value of information, and risk-based decision making.

CBM 5210 Organizational Behavior

Managers and management; Managing today's world; Foundations of planning and decision making; Basic organization designs; Staffing and human resources management; Managing change and innovation; Foundations of individual and group behavior; Motivation and rewarding employees; Leadership and trust; Communication and inter-personal skills; Foundations of control; Technology and operations

CEM 5710 Construction and the Law

Interface of the Law with the Construction Industry; Contract Formation, Privity of Contract, and Other Contract Relationships; The Prime Contract—An Overview. Prime Contract—Format and Major Components. Owner-Construction Contractor Prime Contract “Red Flag” Clauses. Labor Agreements; Purchase Order and Subcontract Agreements. Insurance Contracts; Surety Bonds; Joint-Venture Agreements; Bid and Proposals. Mistakes in Bids; Breach of Contract; Contract Changes; Differing Site Conditions; Delays, Suspensions, and Terminations; Liquidated Damages; Force and Time Extensions; Allocating Responsibility for Delays; Constructive Acceleration; Common Rules of Contract Interpretation; Documentation and Records; Construction Contract Claims; Dispute Resolution.

CEM 5730 Infrastructure Financing

Construction Financial Management; Construction Accounting Systems; Accounting Transactions; More Construction Accounting; Depreciation; Analysis of Financial Statements; Managing Costs; Determining Labor Burden; Managing General Overhead Costs; Setting Profit Margins for Bidding. Profit Center Analysis; Cash Flows For Construction Projects; Projecting Income Taxes; Cash Flows for Construction Companies; Time Value of Money; Financing a Company's Financial Needs; Tools for Making Financial Decisions; Income Taxes and Financial Decisions; List of Variables.

CEM 5760 Capital Program Management/ Program Development

The Construction Industry; Project Participants; Organizing and Leading the Construction Project; Project Delivery Methods; Project Chronology; Construction Services During Design; Bidding and Procurement; Construction and Closeout; Estimating Project Costs; Project Planning and Scheduling; Controlling Project Cost, Time, and Quality; Job Site Administration; Construction Law; Construction Safety and Health.

CEM 5770 Dispute Avoidance and Resolution

Time is money; Planning the project; During the works; Completion dates; Claim preparations – preliminary considerations; Legal considerations; Analyzing the causes of delay; Presentation; Proceedings – arbitration, litigation and alternative dispute resolution; Appendices; Notes; Table of Cases; Table of Statutes

CEM 5780 Construction Management and Planning

Introduction to business process design; Process management and process oriented improvement programs; A simulation based methodology for designing business processes; Basic tools for process design; Managing process flows; Introduction to queuing and simulation; Introduction to extend; Modeling and simulating business processes; Input and output data analysis; Optimizing business process performance; Process benchmarking with data envelopment analysis.

MGM 5200 Project Assessment & Management

Introduction; Pre-Project Phase; Planning and Design Phase; Contractor Selection Phase; Project Mobilization Phase; Project Operations Phase; Project Closeout and Termination Phase

MGM 5240 Organization Development

Introduction; Foundations of industrial behavior; Personality and emotions; Basic concepts; Motivation from concepts to applications; Individual decision making; Foundations of group behavior; Understanding work teams; Communication; Leadership and creating trust; Conflict and negotiation; Foundations of organization structure; Human resource policies and practices; Organizational culture; Organizational change and development.

MGM 5310 Organization Theory & Design

Innovation and commercialization; Recognizing and screening technology opportunities; Developing and testing a technology business concept; High-technology product development strategies; The concept of intellectual property; Licensing intellectual property; Intellectual property strategy; Building and valuing the business model; Funding growth; Moving from R&D to opportunity; Marketing high technology; Growing the high-tech venture; Entrepreneurial venturing inside a corporation; Developing a business plan for sustained innovation.

MGM 5300 Operations Management

Operations as a competitive weapon - Decision making; Operations strategy; Process design strategy; Process analysis – simulation; Process performance and quality; Process capacity – waiting lines; Process layer; Planning and managing projects; Supply-chain management; Location; Lean systems; Information technology and value chains; Forecasting; Aggregate planning – linear planning; Inventory management – special inventory models; Resource planning; Scheduling; References.

MGM 5350 Managing for Quality

Organizational effectiveness; Organizational philosophy; Quality systems; Creating a customer focus; Organizational leadership; Strategic planning; Human resource development and management; Measures of organizational success; Process management; Problem-solving tools and techniques; Project management; Business results; References.

PG Aeronautical and Aviation Science

1MST1001 Advanced Mathematics

Review of fundamental concepts; Ordinary differential equations; Linear differential equations; Laplace transforms; Vector analysis; Multiple, line and surface integrals and integral theorems; Fourier series; Fourier integrals; Gamma, Beta and other special functions; Bessel functions; Legendre functions and other orthogonal functions; Complex variables and conformal mapping; Complex inversion formula for Laplace transforms; Matrices; Calculus of variations.

1MLM1005 Computational Fluid Mechanics

Philosophy of computational fluid dynamics; Equations of fluid dynamics and their derivation and physical meaning; Mathematical behavior of partial differentiation equations the impact on computational dynamics; Basic aspects of discretization; Grids and meshes with appropriate transformations; Simple CFD techniques; Solutions of quasi-dimensional nozzle flows; Solution of a two-dimensional supersonic flow Prandtl-Meyer expansion wave; Incompressible Couette flow numerical solution by means of an implicit method and the pressure correction method; Incompressible inviscid flow over a circular cylinder solution by the technique relaxation; Advanced topics in modern CFD; Future CFD developments; References.

1MLM1006 Compressive Fluid Flow

Introduction; Equations of steady one-dimensional compressible flow; Fundamental aspects of compressible flow; One-dimensional isentropic flow; Normal shock waves; Oblique shock waves; Expansion waves Prandtl-Meyer flow; Variable area flow; Adiabatic flow in a duct with friction; Flow with heat addition or removal; Generalized quasi-one-dimensional flow; Numerical analysis of one-dimensional compressible flow; Hypersonic flow; High-temperature flows; Low density flows; References.

1MST5700 Aircraft Structural Analysis

A historical perspective; Statically determinate structures; Applied elasticity – fundamental concepts; Box beam stress analysis; Load transfer in stiffened panel structures; Energy work principle; Force method – trusses, beams and frames; Forced method – idealized thin-walled structures; The matrix displacement methods – trusses, beams and frames; Matrix displacement method – thin walled structures; Structural stability; Reference information.

1MST6600 Spacecraft Systems Engineering

Introduction; Vector analysis of kinematics; Geodesy, Earth's gravitation and terrestrial navigation; Rigid-body dynamics; Aircraft forces and moments; Static analysis; The nonlinear aircraft model; Linear models and stability derivatives; Modeling, design and simulation – state-space models, transfer function models, numerical solution of the equations, aircraft models for simulation, steady-state flight, numerical Linearization, aircraft dynamic behavior and feedback analysis; Aircraft dynamics and classical control – aircraft rigid-body modes, the handling-qualities requirements, stability augmentation, control augmentation systems, autopilots and nonlinear simulation; Modern design techniques – assignment of closed-loop dynamics, linear quadratic regulator with output feedback, tracking a command, modifying the performance index, model-following design, linear quadratic design with full state feedback and dynamic inversion design; Robustness and Multivariable Frequency Domain Techniques; multivariable frequency-domain analysis, robust output-feedback design, observers and the Kalman filter and LOG/Loop-transfer recovery; Digital control – simulation of digital controllers, discretization of continuous controllers, modified continuous design, implementation considerations; References.

1MST6700 Space Vehicle Mechanisms

Partial dynamics; The two body problem; Earth satellite operations; Rigid body dynamics; Satellite attitude dynamics; Gyroscopic instruments; Rocket performance; Reentry dynamics; The space environment; The restricted three body problem; Interplanetary trajectories; Reference information.

1MST5800 Space Propulsion Systems

Rocket fundamentals; The design process; Keplerian orbits; Orbit perturbations, maintenance and maneuvering; Launch windows; Earth to orbit; Mass transfer; Thermodynamic relations; Thrust equations; Heat addition and transfer; Design example-cold-gas energy; Thermo-chemistry; The chemical heat source – bond theory; Thermodynamic basics; Products of combustion; Flame temperature – the available-heat methods; Chemical kinetics – the speed of the chemical reactions; Combustion of liquids vs. solids; Propellant characteristics and their implications; Key thermo-chemical parameters – the bottom line; Liquid rocket propulsion – history, preliminary design decisions, design process, system sizing design and trade-off and case studies; Solid liquid rocket motors – background, design process, preliminary sizing, solid rocket propellants, performance prediction and case studies; Hybrid rocket propulsion systems – history, hybrid-motor ballistics, design process, preliminary design decisions, performance estimates, preliminary component design and case studies; Nuclear rocket propulsion systems – introduction, design process, preliminary design decisions, size the reactor, size the radiation shield, evaluate vehicle operation and case studies; Electric rocket propulsion

systems; history and status, design process, specify the mission, select an electric thruster, select space power, assess system performance, evaluate the system and case studies; Mission design study – define mission requirements, develop criteria to evaluate and select a system, develop alternative mission concepts, define the vehicle system and select potential technologies, develop preliminary designs for the propulsion system, assess designs and configurations, compare designs and choose the best option; Advanced propulsion systems – air-augmented rockets, rocket advancements, non-rocket advancements and interstellar flight; References.

1MST5900 Space Dynamics

Partial dynamics; The two body problem; Earth satellite operations; Rigid body dynamics; Satellite attitude dynamics; Gyroscopic instruments; Rocket performance; Reentry dynamics; The space environment; The restricted three body problem; Interplanetary trajectories; Reference information.

1MST5200 Aircraft Performance: Theory and Practice

An introduction to the performance of fixed wing aircraft; The atmosphere and air data measurement; The force system of the aircraft and the equations of motion; Cruising performance; Climb and descent performance; Take-off-and landing performance; Aircraft manoeuvre performance; Aircraft performance measurement and data handling; Scheduled performance; The application of performance data; Performance cases and examples; Reference information.

1MST6100 Helicopter Dynamics

Introduction to rotorcraft; Technical background; Introduction to helicopter dynamics; Rotors in practice; The tail; Engines and transmissions; Other types of rotorcraft; Flight instruments; Control and stability; Helicopter performance.

1MST64 00 Helicopter Test Evaluation

Partial dynamics; The two body problem; Earth satellite operations; Rigid body dynamics; Satellite attitude dynamics; Gyroscopic instruments; Rocket performance; Reentry dynamics; The space environment; The restricted three body problem; Interplanetary trajectories; Reference information.

EMR4003 Research Methods

Application of research; Usage of tools; The stated problem of your thesis; Review of the related literature; Planning your research project; Collecting data and information; Writing your research project; Qualitative research; Historical research, descriptive research; Experimental and Ex post facto designs; Statistical techniques for analyzing and technical details, style and format

Project/Thesis (applicable to all bachelor's degree programs)

Students are required to focus on the following aspects to prepare and complete their projects:

Insight	As evidenced by an ability to understand and appreciate issues relating to the project.
Drive	As evidenced by diligence and tenacity.
Creativity	As evidenced by ingenuity and imagination
Organization	As evidenced by ability to plan and to allocate priorities
Communication	As evidenced by an ability to express ideas clearly and successfully

The project plan will be assessed by the examination panel. The final report will be assessed by the faculty advisor.

Objectives: It is impractical to specify in advance the exact objectives which are to be met during the examination of the project, however these should afford students the following opportunities:

- 1 Assessment of the understanding of a phenomenon and or the procedure available to achieve a desired objective.
- 2 Relevant to his particular understanding thus to be able to select the knowledge or procedures most appropriate to his specific purpose so as to make it applicable. To define one problem from a given situation, thereafter to decide which (if there are more than one) are to be pursued to assign them relative priorities and to develop strategies by which the problem may be solved.
- 3 To implement these strategies to re-define each problem as more is learned of its true nature.
- 4 To work with time and financial constraints, to take decisions on the basis of incomplete information, to prepare, submit and defend a coherent ordered report.

Outcomes: To provide students with:

To understand the role and value of the subject matter in practice.

To introduce students to elementary methods, their limitations and application.

To provide students with skills in the use of scientific methods in the analysis in solving practical investigation methods and to enable them to make decisions based on investigations