General Sir John Kotelawala
Defence University

FACULTY OF GRADUATE STUDIES

STUDENT'S HANDBOOK

MASTER OF SCIENCE IN CIVIL AND STRUCTURAL ENGINEERING

General Sir John Kotelawala
Defence University

P.O. Box 32, Ratmalana, Sri Lanka | www.kdu.ac.lk

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General Sir John Kotelawala Defence University


KDU

Key Appointments

a. Chancellor
General SHS Kottegoda (Retired) WWV, RWP, RSP, VSV, USP

b. Vice Chancellor
Rear Admiral HGU Dammika Kumara VSV USP psc MMaritimePol, BSc(DS)

c. Deputy Vice Chancellor (Defence & Administration)
Brigadier DCA Wickramasinghe USP USACGSC

d. Deputy Vice Chancellor (Academic)
Prof. KAS Dhammika
PhD (Northern University of Malaysia), M.Com (Kelaniya), PGD in Business Statistics (USJP), B.B.Mgt.(HR) (Kelaniya)

e. Dean, Faculty of Graduate Studies
Prof. CL Goonasekara
Post-doctoral (Canada), PhD (Canada), BSc (Colombo)

f. Registrar (Acting)
Ms SDKC Sandanayake
MBA in HRM (UoC), BSc (Hons) Applied Sciences (SUSL), Dep NIBM

“Change is the end
result of all true learning.”

General Sir John Kotelawala Defence University

Contents

Master of Science in Civil and Structural Engineering

Introduction

Faculty of Graduate Studies in collaboration with the Department of Civil Engineering offers MSc in Civil and Structural Engineering programme. It was designed for graduates and professionals involved in the civil engineering, structural engineering and construction sectors who wish to deepen and broaden their technical knowledge and understanding in specialized areas of civil and structural engineering. The MSc in Civil and Structural Engineering programme provides the opportunity to practicing engineering professionals/academics to enhance their career prospects.

The programme includes advanced structural analysis and design as well as modules on advanced water and wastewater engineering; water resources engineering; highway and transportation engineering; geotechnical engineering; survey engineering and construction project management. It is also underpinned by research to expose graduate to a diverse range of areas related to civil and structural engineering.

Objectives

To produce high quality professional Civil Engineers who are capable of;

a. Applying advanced engineering knowledge in the real-world problems within their chosen area.

b. Planning and utilizing resources in an efficient, economical and environment friendly manner leading to sustainable development.

c. Formulating optimum solutions for complex civil engineering problems with the use of mathematical models.

d. Applying a broad range of multidisciplinary skills necessary to accomplish professional objectives in the dynamic technological world.

e. Fostering the acquisition and implementation of a broad range of research and analytical skills related to Civil and Structural Engineering with the safety and sustainability of the structures as primary concerns.

f. Evaluating the outcomes and impacts of complex civil engineering projects in order to adhere to the national, economic, social and environmental requirements.

Intended Learning Outcomes

On successful completion of this degree programme, the students will be able to,

a. Analyze and solve complex problems in Civil Engineering by applying engineering fundamentals, appropriate techniques and modern engineering tools.

b. Formulate and investigate engineering problems using research based knowledge and methods.

c. Design systems or components to solve complex engineering problems as an individual or a member / leader in diverse teams.

d. Assess societal, health, safety, legal, economic and environmental impacts of civil engineering projects with the aim of achieving sustainable development.

e. Engage in independent and lifelong learning in order to effectively function as a professional in the dynamic environment of engineering and technology.

Eligibility Criteria

Applicants satisfying ONE of the following requirements are eligible for admission:

a. Degree of Bachelor of Science in Engineering of four-year duration of

General Sir John Kotelawala Defence University (KDU) in a relevant field, or

b. Degree of Bachelor of Science (Defence Studies) in a relevant field with a minimum of three years of appropriate experience as an Engineer as approved by the Dean, Faculty of Engineering, KDU, or

c. A Bachelor of Science Degree (SLQF 6) in a relevant field from a recognized University; or

d. Associate Membership or above of Institution of Engineers Sri Lanka (IESL) AND a minimum of one year of appropriate experience after obtaining such membership as approved by the Dean, Faculty of Engineering, KDU, or

e. Associate Membership or above of a professional Engineering Institute recognized by Institution of Engineers Sri Lanka (IESL) AND a minimum of one year of appropriate experience after obtaining such membership as approved by the Dean, Faculty of Engineering, KDU.

f. Any other Engineering Degree (SLQF 5) from a recognized university AND a minimum of one year of appropriate experience in relevant field after obtaining such a degree, as may be approved by the Senate.

g. A Higher Diploma (SLQF 4) in a relevant field with a minimum of three years of appropriate experience in a relevant field after obtaining such a higher diploma, as may be approved by the Senate.

Programme Structure

The programme is designed with 40 credits for the PG diploma in the first two semesters which includes a design component. An additional 20 credits are allocated for research project leading to MSc in third and fourth semesters. The classes are conducted on every other weekend from 0830 hrs to 1730 hrs.

Continuous Assessments

Instructions for Submission of Continuous Assessments

a. FGS expects the highest professional, academic and scholarly standards in student assignments. Therefore, haphazard, incomplete or hurried assignments will not qualify for marking.

b. Marks obtained for assignments will be added to the examination marks; FGS expects the students to work hard, consider these assignments seriously and concentrate on them. Assignments are potentially powerful learning resources for communication.

c. Assignments call for a significant degree of knowledge, analysis and critique. Therefore, the students must prepare in advance for their assignments thoroughly and well. Assignments should not be completed in a rush.

d. Students must try out different drafts and work hard on them.

e. There are no extensions on assignment submission dates. Students are responsible for submitting their assignments on due date.

Master of Science in Civil and Structural Engineering

Do's

a. Always enclose every single assignment in a separate folder.
b. Fill in the following details on the first page of the folder.

- Registration Number
- Name
- Course Code and Title
- Semester
- Name of the Resource Person

c. Always submit your assignment to the Staff at the Faculty of Graduate Studies.
d. Always submit your assignment on or before the last date of submission.
e. You may have your assignment handed over by someone else on your behalf.

Don'ts

a. Never hand over any assignment to unauthorized staff members at KDU personally known or unknown to you.
b. Never mail assignments, unless specified.
c. Never use one folder for more than one assignment.

Examination Offences and Punishments as indicated in the By-Laws

Specifications for Assignments

a. Students must always use only A4 size paper to compliance their assignments.

b. Leave a 1" Margin on all four sides.

c. Students must type or word process their assignment answers. If a student is unable to do so, he / she must write the answer very neatly and legibly. Assignments with illegible handwriting will not be marked.

d. We recommend the 11/2" line spacing formats.

e. Students must be creative in approaching and answering questions.

f. If a student uses another author's idea, he / she must cite that author / publication with references.

Specimen of Assignment Cover Page

ADVANCED WATER AND WASTEWATER TREATMENT

CE9013

TOPIC OF THE ASSIGNMENT

NAME OF THE STUDENT

REGISTRATION NO: KDU/…….

LECTURER: …….

NAME OF THE DEGREE

PROGRAMME NO…. – YEAR …. – SEMESTER ….

Master of Science in Civil and Structural Engineering

Declaration Form

1. I declare that this assignment is my own work.
2. I have acknowledged ideas of other authors (if any) following the standard acknowledgement practice.
3. I am aware of the consequences of cheating and malpractice.
4. I am willing to answer any query raised by any Academic Staff Member in relation to this report at any time during the course.
5. I understand that the decision relating to mark on this report is purely based on my performance and that it is first and final.

Date: D D M M Y Y Y Y

_____
Signature

_____
Name

Specimen Letter for handing over Assignments

(Address)

_____

_____

(*Your Ref*) _____

DEAN
FGS
KDU

SUBMISSION OF _____ (*Subject Name*)

1. Assignment of _____ *(Module)* or *(Research)* is forwarded herewith for (making / approval) please.

_____
(Signature)

_____
(Name in upper case)

_____
(Rank)

_____
(Registration No)

Course Syllabus

The programme includes twelve (12) mandatory subject modules and eight (08) optional subject modules. A credit is defined as having 15 hours of interactive class room sessions or 30 to 45 hours of practical and other time work including assignments. A take home assignment of 3000 words on a research question from all subject modules will be given. A candidate is required to complete all 12 compulsory subject modules, the dissertation and 4 optional subject modules out of 8 subject modules.

MSc in Civil & Structural Engineering Programme – Summary of the Course Delivery Plan

MSc in Civil & Structural Engineering Programme					
Code	Course Unit	Core Credits	Elective Credits	Evaluation	
				Assignment	Final Exam
Year 1 – Semester I					
CE9013	Advanced Water and Wastewater Treatment	03		30	70
CE9024	Advanced Reinforced Concrete Design	04		40	60
CE9033	Construction Project Management	03		40	60
CE9043	Water Resources Engineering	03		30	70
CE9053	Advanced Engineering Mathematics	03		30	70
CE9062	Advanced Bridge Engineering	02		30	70
CE9072	Introduction to Finite Element Methods		02	30	70
CE9082	Environmental Impact Assessment			30	70
CE9092	Introduction to Nonlinear Analysis of Structures			30	70
CE9102	Advanced Pre-stressed Concrete Design			40	60
Year 1 – Semester II					
CE9113	Advanced Survey Engineering	03		30	70
CE9123	Advanced Steel Design	03		30	70
CE9133	Research Methodology	03		100	
CE9144	Highway Design & Transportation Engineering	04		30	70
CE9153	Advanced Foundation Engineering	03		50	50
CE9162	Advanced Structural Dynamics	02		30	70
CE9172	Design of Hydraulic Structures		02	30	70
CE9182	Municipal Solid Waste Management			30	70
CE9192	Very Long Base Informatory (VLBI)			30	70
CE9202	Advanced Cost Management			50	50
	Total	**36**	**04**		
Semester III & IV					
CE9900	**Dissertation (for MSc)**	**20**		100	

Master of Science in Civil and Structural Engineering

Lecturer Panel

Prof SS Wickramasuriya

PhD (UNSW), BSc Eng (Moratuwa), CEng, MIE (Sri Lanka)

Prof I De Silva

PhD (ANU), MA (ANU), BDevS (Hons) (Colombo)

Dr (Mrs) WDCK Fernando

PhD (Moratuwa), M. Eng (Moratuwa), BSc Eng (First Class Honours) (Moratuwa), AMIE (Sri Lanka), SEDA (UK), CTHE (Colombo)

Dr HLDMAJ Samaranayake

PhD (Moratuwa), M. Eng in Highway and Traffic, BSc Eng (Moratuwa)

Dr AH Lakmal

PhD (LNTU, China), MSc in GIS & RS (Peradeniya), BSc (Hons) in Surveying Sciences (ISMD), MSISL, MIEEE

Dr (Ms) TWKIM Dias

PhD (Kansas, USA), MSc (Moratuwa), BSc Eng (Hons) (Moratuwa)

Dr (Mrs) N Sirirsoma

PhD (Moratuwa), BSc Eng (Hons) (Moratuwa), C. Eng, CMILT (UK), MITE (US), MIE (Sri Lanka)

Dr S Lewangamage

PhD (Tokyo), BSc Eng (Hons) (Moratuwa), M. Eng (Tokyo), C.Eng, MIE (Sri Lanka)

Dr PAK Karunananda

Dr Eng (Ehime), MPhil (Peradeniya), BSc Eng (Hons) (Peradeniya), M. Eng (Ehime)

Dr RU Halwatura

PhD (Moratuwa), BSc Eng (First Class Honours) (Moratuwa)

Dr TMRMB Samarakoon

PhD (Japan), M. Eng (AIT, Bangkok), BSc Eng (Civil Engineering) (Peradeniya)

Dr GGT Chaminda

PhD (Tokyo), M. Eng (AIT, Bangkok), BSc Eng (Hons) (Peradeniya)

Dr C Mallikaracchchi

PhD (Cambridge), BSc Eng (Moratuwa)

Eng R Sugathadasa

M. Eng (Moratuwa), MBA (Colombo), BSc Eng (Hons) (Moratuwa), MIE (SL), MILT (UK), CEng, PMP (USA)

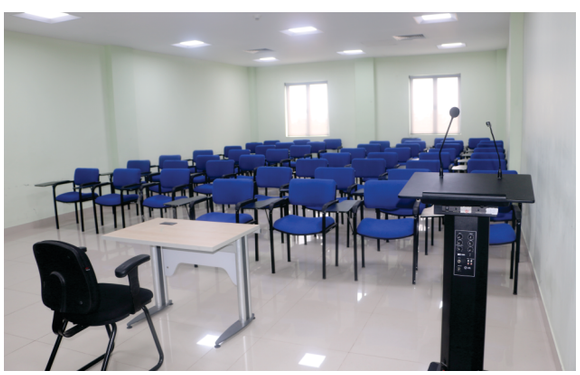
Dr AJ Dammika

PhD (Japan), M. Eng (AIT, Bangkok), BSc Eng (Civil Engineering) (Peradeniya)

Eng BHJ Pushpakumara

MPhil Structural Eng (Ruhuna), MSc Eng (Ruhuna), MBA (Colombo), BSc Eng (Hons) (Moratuwa), MIE (Sri Lanka), MILT (UK), CEng, PMP (USA)

Note: Lecturer panel subject to change as per the University requirements.



Lecturer Room

Computer Lab

“Education
is not preparation for life;
education is life itself.”

Reference Reading

Subject	Recommended Readings
Advanced Water and Wastewater Treatment	Wastewater Engineering, Treatment and Reuse 4th Edition - Metcalf & Eddy Water Supply and Pollution Control 6th Edition - Viessman, W. & Hammer, M.J. Water Supply 5th Edition - Twort A.C., Ratnayaka D.D. & Brandt M.J. Fundamentals of Water Treatment Unit Processes - Hendricks D. Chemistry for Environmental Engineering and Science - Sawyer C.N
Advanced Reinforced Concrete Design	Design of Concrete Structures. 13th ed - Nilson, A. H., D. Darwin, and C. W. Dolan.
Construction Project Management	Construction Project Management: Planning, Scheduling and Controlling, 2nd ed - Chitkara, K.K. ISBN: 978-0-07-068075-3, 2011 Modern Construction Management, 6th ed - Harris, F., McCaffer, R. ISBN: 978-1-4051-3325-8 , 2006 Total Construction Project Management 2nd ed - Ritz, G.J., Levy, S.M ISBN: 978-0-07-180137-9, 2013 Construction Project Management, 4th ed - Gould, F., Joyce, N. ISBN: 978-0-132-87724-4, 2013 Construction Project Management, 5th ed - Sears, S.K., Sears, G.A., Clough, R.H. ISBN: 978-0-471-74588-4, 2008 Project Management for Engineering and Construction, 3rd ed - Oberlender, G.D.ISBN: 978-0-07-182231-2, 2014 Construction Project Scheduling and Control, 2nd ed - Mubarak, S. ISBN: 978-0-470-50533-5, 2010
Water Resources Engineering	Water resources Engineering - Mays, L. W. Water Resources Engineering: Handbook of Essential Methods & Design - Prakash, A Hydrology in Practice,4th Edition - Shaw, E. M., Beven, K. J., Chappell, N. A. & Lamb, R. Ground and Surface Water Hydrology - Mays, L. W. McCuen, R. H. Hydrologic Analysis & Design,3rd edition, Prentice Hall Publisher

Reference Reading

Subject	Recommended Readings
Advanced Engineering Mathematics	Advanced Engineering Mathematics - R.K.Jain, 2005, Narosa Publishing House Mathematical Techniques for Engineers & Scientists, Andrews, 2003, Prentice Hall of India Pvt Ltd, Elementary Numerical Analysis, Atkinson, 2004, John Wiley & Sons Pvt Ltd, Matlab Applications in Engineering, Bansal, 2010, Pearson Education, Finite Element Analysis, Bathe, 2010, Prentice Hall of India, Numerical Methods for Mathematics, Science and Engineering, 1992,Mathews, Prentice-Hall Numerical Methods of Partial Differential Equations, Ames, 1984, Nelson Numerical Methods for Engineers, Hamming, 2002, McGraw-Hill Numerical Methods for Engineers, Chapra, 2005, 6th ed., McGraw-Hill Operations Research, Taha, 2002, 7th ed. Pearson Education An Introduction to Management Science, Quantitative Approach to Decision Making, Anderson, 1999, Western College Publishing House Operations Research Applications and Algorithms, Wayne H., 2003, Thomas Statistics Concepts and Applications, Aczel,1995, IrwinFreund, John E., 'Mathematical Statistics', 1994, 3rd. ed, Prentice-Hall of India Probability & Statistics for Scientists & Engineers, Walpole, 2007, 8 th ed., Pearson Education Applied Statistics for Engineers and Scientists, Devor, 1996, Brooks/Cole
Advanced Bridge Engineering	Fatigue of materials, Second edition - Suresh, S. Application of Structural Systems Reliability Theory, Christensen, P.T. and Murotsu, Y
Introduction to finite element method	Finite Element Procedures - Bathe KJ The Finite Element Method – Linear Static and Dynamic Finite Element Analysis - Hughes TJR

Reference Reading

Subject	Recommended Readings
Environmental Impact Assessment	Environmental Impact Assessment - Canter L.W Environmental Impact Statements - Eccleston, H.C. Environmental Impact Evaluation Division. Office of Environmental Policy and Planning. 1998. Environmental Impact Assessment in Thailand. Bangkok. Environment impact assessment in practice - Hutacharoen R., L. Thong - Nop and S. Choowaew Environmental Assessment in Developing and Transitional Countries - Lee, N. and C.
Introduction to nonlinear analysis of structures	Linear and Nonlinear Structural Mechanics - Ali H. Nayfea, P. Frank Pai
Advanced Pre-Stressed Concrete Design	Pre stressed Concrete Design, Second edition - Hurst MK Pre stressed Concrete – A Fundamental Approach, Fourth edition - Edward G.
Advanced Survey Engineering	Surveying for Construction - Irvine, W. H., and Maclennan, F.
Advanced Steel Design	Steel Design, fourth edition - William T. Segui Stability of structures – principles and applications - Chai H. Yoo, Sung C.
Research Methodology	Research Methods for Engineers - Thiel, D. V Research Methodology: Methods & Techniques - Kothari C. V
Highway Design and Transportation Engineering	Transportation Systems Engineering: Theory And Methods – Enni Cascetta ISBN: 9780792367925, ISBN13: 9780792367925 Modelling Transport, Fourth Edition - Juan de Dios Ortúzar, Luis G. Willumse ISBN: 9780470760390 Highway Engineering Handbook - Roger Brockenbrough ISBN-13: 978-0071597630 Transportation Engineering and Planning Third Edition - C.S. Papacostas, P.D.Prevedouros ISBN-13: 978-0130814197
Advanced Foundation Engineering	Principles of geotechnical engineering - Das, Braja, and Khaled Sobhan Earth Pressure and Earth-retaining Structures – Clayton and Chris RI Foundation Analysis and Design – Bowles and Joseph E. Soil mechanics - Craig, Robert F. Foundation Design: Principles and Practices - Coduto, Donald P

Reference Reading

Subject	Recommended Readings
Advanced Structural Dynamics	Dynamics of Structures, third edition - Ray W. Clough and Joseph Penzien Dynamics of Structures, fourth edition - Anil K. Chopra
Design of Hydraulic Structures	Hydraulic Structures, 4th Edition - Novak, P., Moffat, A. I. B., Nalluri, C. Irrigation Engineering & Hydraulic Structures, 19th Edition - Garg, S. K. Hydraulic Modelling: An Introduction: Principles, Methods & Applications - Novak, P., Guinot, V., Jeffrey, A. & Reeve, D. E. Open Channel Hydraulics - Akan, A. O
Municipal Solid Waste Management	Municipal Solid Wastes – problems and Solutions - R.E.Landreth and P.A.Rebers Solid Waste Management in Developing Countries - Bhide A.D. and Sundaresan, B.B
Very Long Base I nformatory (VLBI)	High Sensitivity VLBI Study of the Quasar - Luca, P
Advanced Cost Management	Cost Studies of Buildings – Ashworth. A Property Development, 4th ed - Cadman, D. & Topping, R. E Cost Planning of Buildings - Ferry, D.J., Brandon, P.S. & Ferry, J.D RICS Quantity Surveying and Construction Professional Group: RICS New Rules of Measurement, Order of Cost Estimating and Elemental Cost Planning, RICS Books Commercial Management in Construction - Walker, I., and Wilkie R

Master of Science in Civil and Structural Engineering

Course Fee Structure

Item	Amount	
	Military/Police/MOD	Civil
Tuition Fee	Rs. 400,000.00	Rs. 400,000.00
Registration Fee - 3 Years (Initial Registration)	Rs. 4,000.00	Rs. 5,000.00
Library Fees	Rs. 2,000.00	Rs. 2,000.00
Refundable Library Deposit	Rs. 10,000.00	Rs. 10,000.00
Refundable Mess Deposit	Rs. 2,000.00	Rs. 2,000.00
Study Pack	Rs 2,500.00	Rs 2,500.00
Total	**Rs. 420,500.00**	**Rs. 421,500.00**

Registration Renewal Fee

1st Year after initial registration - Rs. 12,500/=
2nd Year after initial registration period - Rs. 25,000/=
Continuation to another additional year under any circumstances - Rs. 100,000/=

Repeat Examination Fee

For entire semester - Rs. 2,500/=
For one subject - Rs. 1,000/=
Repeat Thesis Defence
Viva-Voce Fee - Rs. 11,500/=

Selected candidates may opt to pay programme fee in two equal installment, first of which should be paid at the time of registration, together with all other cost components.

2nd instalment – Before 1st semester examination of the 2nd year.

NOTE

1. **FGS will be compelled to not permit the students who are unable to pay the course fee to sit for semester examinations.**
2. **Course fee and other payments mentioned in above subject to change as per the University Board of Management decision.**

How to Apply

A commissioned officer / gazetted police officer shall make an application to respective service commander/ Inspector General of Police/ Head of Department who will submit these applications to the Registrar with their recommendatons.

Any other person shall include a letter of recommendation from a University Professor in Civil Engineering or a Chartered Civil Engineer with the application.

Contact Persons:

Programme Coordinator (Academic)

Dr RP Kumanayake
Ph.D. in Engineering (School of Civil Engineering and Mechanics – Huazhong, Uni. of Science & Technology, China), MBA (Colombo), BSc. Eng (Hons) in Civil Engineering (Moratuwa)
Tel : 0718126568
E-mail : ramyak@kdu.ac.lk

Programme Coordinator (Admin)

Lieutenant Commander (ND) JPCJ De Silva psc
MSc (D&SS)
Tel : 0710219325
E-mail : soiifgs@kdu.ac.lk

Annex A

E- Library Policy

1. Only visit approved Internet sites.
2. Never give out your personal information.
3. Inform the authority if you see something uncomfortable or inappropriate.
4. Never download irrelevant anything without permission.
5. Leave your workspace as you found it.
6. Print only if you have permission.
7. Never change any settings without permission.
8. Touch the mouse and keyboard gently.
9. Do not eat or drink near devices.