



Unit Information Form (UIF)

(The UIF provides the definitive record of the designated Unit)

SECTION A

General Unit Information

Unit Name	Hydrology & Water Processes
Unit Code	STI019-3
Level	FHEQ 6
Credit Value	15
Location(s) of Delivery	Off Campus, STI Myanmar University (Yangon and Mandalay campus)
Period(s) of delivery	Semester 2
Pre-requisites or Restrictions	
Aims and Relevance	<p>Life on this planet is possible due to the presence of water, although 70% of the planet is covered in water, the shortage of fresh water is the problem faced by many countries. Hydrology is the study of the water cycle and its actions, how to improve the cycle and reduce the impact on the environment is at the core of this unit. Hydrological science has both basic and applied aspects, such as shaping the surface of the earth, the water cycle and impact of the water on society, whilst the applied hydrology relates to the use of scientific knowledge as the basis for making informed decisions concerning water allocation and protection of natural resources. This unit covers both pure and applied uses of hydrology, with a special emphasis on the interfaces between hydrology and environmental sciences. It also looks at flood risk analysis, dam safety and security.</p>
Syllabus Content	<p>Engineering Hydrology</p> <ol style="list-style-type: none"> 1. The Hydrological cycle 2. Impact of urbanization 3. Unit hydrograph methods 4. Hydrological routing-reservoir and river routing 5. Fundamentals of hydraulic routing in rivers <p>Environmental Science</p> <ol style="list-style-type: none"> 6. Environmental water cycle 7. Fresh and salt water 8. Salt water intrusion, silt and sand filters, sedimentation, flocculation/coagulation, other physio-chemical water treatment 9. Impact of water on shaping the landscape. 10. Integrated preliminary, primary and secondary treatment

	<p>processes</p> <p>Interface of hydrology with other environmental sciences</p> <ol style="list-style-type: none"> 11. Economic and political impact of water 12. Dams and water reservoirs 13. Sewerage design, construction and maintenance 14. Sewage treatment 15. World problems
--	---

Learning outcomes

On completion of this unit you should be able to:

1. Demonstrate the following knowledge and understanding

- Explain principles of hydrology and their impact on the global environment and explore the design of treatment systems based on concepts in water and wastewater treatment technologies.

1. Demonstrate the following skills and abilities

- Evaluate the impact of the hydrological cycle on the local/regional/continental/global environment and design the basic treatment systems and produce a progress file on the effect and impact of environmental and other risk factors in civil engineering.

PSRB outcomes

Indicate any specific Professional, Statutory or Regulatory Body (PSRB) requirements met by this unit.

UK Standard for Professional Engineering Competence (UK-SPEC): AHEP3 IEng Learning Outcomes:

SM1i, SM2i, EA1i, EL4i, D1i, D2i, D3i, EL4i, EL6i,

Joint Board of Moderators (JBM) Core Threads - Primary Outcomes (assessed and evidenced):

Sustainability, Health and Safety Risk Management

Summary learning hours

	Scheduled	Guided	Independent	Autonomous	Placement	Total
Hours	53	27	60	10	0	150
Percentage	35.3%	18.0%	40.0%	6.7%	0%	100%

Approach to learning

This unit focuses the engineering student on the importance of water conveyance, storage and treatment, the role of hydrological cycle and impact on the environment by urbanisation. The students will have the opportunity to use the hydrological labs for theoretical and scientific experimentation and learning, and will be encouraged to consider the local/seasonal issues in Myanmar and address the means of controlling the fresh water resources.

Learner development

This Unit particularly focuses on the development of your abilities in the following areas:

Enquiry	You will tackle analyses (mathematical and computer aided) of assessing the hydrological cycle from rainfall to runoff, river flow and reservoir storage, analyse steady and unsteady flows in river channels.
Contextual understanding	You will examine various methods for assessing the rainfall run off characteristics for different terrain using standard meteorological data and methodologies.
Collaboration	You will work in class with other students and in groups to arrive at solutions to design conveying, catchment and treatment systems.
Enterprise	You will present your ideas through developmental portfolios for formative assessment, which demonstrates the broad principles of hydraulic cycle and the water and wastewater treatment.

Assessment summary

No	Assessment Method Code ¹	Learning outcome(s)	Weight %	Submission week	Length (of exam)	Exemption from Simplified Marking Scheme approved ²
1	CW-OT	1&2	40	-		
2	Ex	1&2	60	18	2 hrs	

¹ See the UIF Guide for permissible codes

² Exemptions can only be granted by TQSC. The types of assessment task that can request an exemption are detailed in Chapter 8 of the Quality Handbook

Assessment details

Assessment 1. Coursework. This is a cumulative assessment. Participate in class discussions, group presentations and quizzes relating to the project demonstrating how hydrological cycles are important in climate change and in civil engineering designs and how environmental science is applied in civil engineering.

Assessment 2. Exam (2 hrs). An invigilated exam which looks at hydrological impact on the environment and society, the means of use and conservation of water also need to analyse the input data for design of hydraulic structures.

Threshold expectations

In order to pass Assessment 1 you will need to:

- Understand the requirement for engineering activities to promote sustainable development by demonstrating sustainability issues in relation to the hydrologic cycle (contributing to EL4i)
- Monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement by evaluating processes associated with a number of wastewater catchment/treatment systems and processes. (contributing to SM1i, EA1i)
- Identify the impact of new concepts in design on efficiency, sustainability and risk in each phase of design, construction and operation. (contributing to EA4i, D2i, D3i, EL6i, Sustainability, Health & Safety and Risk Assessment)
- Identify the sources and typical composition of sewerage and wastewater. (contributing to SM1i, D1i)
- Assess the knowledge and understanding of rainfall runoff characteristics for different terrain using standard meteorological data and methodologies. (contributing to SM1i)
- Demonstrate how environmental factors are considered in civil engineering designs and how environmental engineering intersects civil engineering in practice to promote sustainable development. (contributing to D1i, EL4i)

In order to pass Assessment 2 you will need to:

- Analyse steady and unsteady flows in channels and apply the results to catchment. (contributing to EA1i)
- Employ basic analytical tools for assessing the hydrological cycle from rainfall to runoff, river flow, reservoir storage and management techniques. (contributing to SM1i, SM2i)

SECTION B

Recommended Reading

Core text – this unit is supported by the following core text:

- Bedient, P. B. (2019). *Hydrology and Floodplain Analysis, 6th Edition*. Harlow: Pearson Education Limited. ASIN: B00XWX4TUE

Guided reading – the following is expected reading for this unit. Details of what to read and when will be provide in the BREO site.

- Braham, A. (2017). *Fundamentals of Sustainability in Civil Engineering*. 1st ed. Boca Raton, FL: CRC Press.
- Bedient P. B. (2009). *Study guide for Hydrology and Floodplain Analysis*. Academic Internet Publishers. ISBN: 9780131745896.
- Kiely, G. (2007). *Environmental Engineering*. New York, NY: McGraw-Hill. ISBN: 0070634297
- McCuen, R.H. (2016). R. H. *Hydrologic Analysis and Design*. 4th Edition. Harlow: Pearson. ISBN-10: 0134313127
- Metcalf & Eddy/ AECOM. (2013). *Wastewater Engineering: Treatment and Resource Recovery*, 5th Edition. Volume 1 and 2. New York, NY: McGraw-Hill. ISBN 978-0-07-3401 18-8
- Naaman, E. (2012). *Prestressed Concrete Analysis and Design*, 3rd ed. Techno Press 2000. ISBN: 0967493927
- Shaw, E.M., & Keith, J. B., Nick, A. C. (2010). *Hydrology in Practice*. 4th Edition. New York, NY: Spon Press. ISBN-10:0415370426

Independent study – to receive high grades you will need to demonstrate your wider reading. The following resources provide useful background reading for the material in this unit. This is not an exhaustive list and students should read widely from the variety of journals available in the Learning Resources Centre

- Asbury, S. (2018). *Health and Safety, Environment and Quality Audits. A Risk-based Approach*. 3rd ed. London: Routledge.
- Grinnell, S. (2016). *Renewable Energy & Sustainable Design*. 1st ed. Boston, MA: Cengage.
- Illman, S. % Wilson, S. (2017). *Guidance on the construction of SuDS*. London: CIRIA.
- Twidell, J. & Weir, T. (2005) *Renewable Energy Resources*. 2nd ed. London: Routledge.
- The SuDS Manual (C753) *Site handbook for the construction of SuDS (C698)*. London: CIRIA ISBN: 978-0-86017-783-8

- <http://www.angelfire.com/nh/cpkumar/journals.html>
- <http://www.journals.elsevier.com/journal-of-hydrology>

Other Useful Links

- <http://www.omicsonline.org/hydrology-current-research.php>
 - <http://www.environmentalscience.org/career/hydrologist>
 - <http://geosciences.conferenceseries.com/events-list/hydrology>
 - <http://www.conferenceseries.com/hydrology.php>
 - <http://www.conference-service.com/conferences/hydrology.html>
 - <https://www.the-ies.org/sector/hydrology>
 - <http://www.wreconf.org/Committee.html>
- <http://www.environmentalscience.org/careers>

Equality Impact Assessment

Question	Y/N/NA	Additional anticipatory adjustments/actions if necessary
Learning materials will be made available in advance of sessions for students to adapt as appropriate?	Y	As new materials are developed, they may be the only ones that may not appear earlier than the session or the materials developed during the sessions, like sun charts, etc.
The approach to teaching and learning is sufficiently flexible to enable all students to succeed?	Y	
The approach to group work takes account of the needs of students with disabilities and from diverse backgrounds?	Y	
The approach to practical work takes account of the needs of students with disabilities?	Y	
Students with a protected characteristic ³ have an equal opportunity to achieve the learning outcomes?	Y	
The assessment tasks provide all students with an equal opportunity to succeed?	Y	
Any other aspects of the unit that might pose potential challenges from an equality or diversity perspective have been considered?	NA	

³ Age, Gender reassignment, Marriage and civil partnership, Pregnancy and maternity, Race, Religion and belief, Sex, Sexual orientation

SECTION C

Administrative Information – Faculty completion	
Faculty	Engineering
Portfolio	
School/Department	School of Computer Science and Engineering
Unit Co-ordinator	Dr. Toe Toe Aung
Version Number	1/2020
Approved by	
Date of approval (dd/mm/yyyy)	

Shared Units – Indicate below all courses which include this Unit in their diet
BEng Hons Civil engineering
BEng Hons Civil & Architectural Engineering

	Name	Date
Form completed by	Dr. Toe Toe Aung	February 2020
Signature of Chair of Faculty TQSC to confirm the accuracy of information presented		

Unit Updates – ensure that the revised UIF is given a new version number each time a change is made		
Date	Nature of Update	FTQSC Minute Ref:

Administrative Information – Academic Registry completion	
JACS / HECoS code (KIS)	