PROGRAM OF STUDY

Type of Program: Vocational and professional education
Faculty: Faculty of Hydrology and Water Resources Engineering
Specialty: Water and Environmental Engineering
Level: 6 (Engineer's Degree) for 5 years program

1. Objective of the Program

Water and Environment Engineering program is designed to provide students with both theoretical and practical knowledge on planning, calculation, consulting, and processes related to network and system of water treatment, wastewater treatment, plumbing and various environmental solutions.

2. Job Opportunity after Graduation

After obtaining a degree in water and environmental engineering, students can get the following job opportunities:

- Design and construction of water supply and plumbing engineers in buildings
- Public Institution: MoE, MPWT, MOWRAM, MIST, TSA, CNMC, APSARA Authority,
- Private Institution: Engineering company (GRET, Lotus Green, CE&P, Comin Khmere, SOMA, ET&S Engineering, etc.), Water Supply Authority, Water Operators…
- Research Center, University and colleges
- NGOs/DP: Cambodia Water Supply Association, Conservation International (CI), World Wildlife Fund (WWF), Borda, Mekong River Commission (MRC), Flora and Fauna International (FFI), International Union Conservation of Nature (IUCN), Asian Development Bank (ADB), World Bank (WB), World Health Organization (WHO), AFD and etc

3. Program Learning Outcomes: PLO

After graduating with a degree in Water and Environmental Engineering, students will be able to:

A. Knowledge

PLO1. Acquire and apply new knowledge in accordance with the needs of society by combining theory with practical application in environmental engineering, in which students understand the theory of engineering and environmental science, including the principles of environmental management.

B. Cognitive Skills

PLO2. Analyze and interpret environmental data by observing current and future environmental issues in the region and the world

PLO3. Calculate water and wastewater treatment systems, indoor plumbing and process management

PLO4. Participate in solving environmental problems by following legal principles and using scientific theories, tools, technologies and innovative ideas to improve, maintain and manage water and the environment

C. Interpersonal Skills and Responsibility

PLO5. Work and collaborate effectively with different professionals

PLO6. Present scientific references on the ideas of other authors that students support in their work and demonstrate professional and social ethics.

PLO7. Participate in critical thinking and pursue lifelong learning for skills development.

PLO8. Value environmental support activities and sustainable development

D. Numerical Skills, Information Technology and Communication

PLO9. Use all forms of information such as statistics, numbers, texts, videos and voice messages in context to analyze and interpret and share with the community on environmental issues.

PLO10. Search for scientific references and information through IT systems and use IT tools for work and good personal data management

PLO11. Develop and present effective scientific results by translating complex engineering issues into information that is easy to agree on topics and audience needs.

E. Psychomotor Skills

PLO12. Use of laboratory and technical equipment in water and environmental engineering

PLO13. Implement training programs for others.

4. Admission Condition

The applicant must have complied any condition as listed below:

- High school certificate (Bac II) or equivalent certificate and pass entrance exam to the first year at ITC or
- Certificate of foundation year from other universities then pass the qualified exam to enter second year at ITC or
- Certificate of associate degree of engineer or any equivalent certificate then pass the qualified exam to enter third year at ITC or
- Certificate of Bachelor of science or any equivalent certificate then pass the qualified exam to enter third year at ITC.

5. Number of Credits and Number Hours

In order to get this engineer's degree of Water and Environment, the student need to study 5 years with the total number of credits is 157,5. 1 credit is equal to 16 hours of lecture or equal 32 hours of tutorial or practical work in the lab.

6. Subjects in the program

Basic Major Course	Core Major Course	Course for General Education
1. MATLAB 2. Statistics 3. Fluid Mechanics 4. Soil Mechanics and Foundations 5. Soil Science 6. Strength of Materials 7. Vibration and Wave 8. Meteorology 9. Hydrometeorology 10. Geology and Hydrogeology 11. Computer-aided Design (AutoCAD) 12. Introduction to Environmental Engineering 13. Introduction to IWRM 14. Hydrology 15. Environmental Hydraulics	1. Surveying 2. GIS and Remote Sensing 3. Sustainable and Green Energy Systems 4. Chemistry for Environmental Engineering 5. Biology for Environmental Engineering 6. Environmental Engineering Laboratory 7. Water Supply Engineering 8. Building Sanitation/ Plumbing Design 9. Unit Operations and Processes for Environmental Engineering 10. Water Treatment Processes and Design 11. Urban Drainage and Sewage System 12. Design of Wastewater Treatment and Collection System 13. Water Quality Analysis and Management 14. Hydro-informatics 15. Environmental Impact Assessment 16. Solid Waste Management 17. Environmental Pollution Control	1. Geometry 2. Probability 3. Calculus 4. Linear Algebra 5. Differential equations 6. Mechanics 7. Thermodynamics 8. Electricity 9. Chemistry 10. Technical drawing 11. Environment 12. Management and Finance 13. Marketing 14. Philosophy 15. Historical study 16. ICT 17. Work Safety 18. Project management 19. English 20. French

7. Course Structure of the Program

Year 1, Semester 1

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial- TD	Practical- TP		
1	ភាសាបារាំង	French			96	96	3
2	ធរណីមាត្រ	Geometry	16	32		48	2
3	មេកានិកវគ្គ១	Mechanics I	32	24	8	64	3
4	គ្រប់គ្រងនិងគណនេយ្យ	Management and Accounting	48			48	3
5	ទស្សនវិជ្ជា	Philosophy	32			32	2
6	បរិស្ថាន	Environment	32			32	2
Total in Semester 1			**160**	**56**	**104**	**320**	**15**

Note៖ Lecture: 1 credit = 16 hours, Tutorial or Practical: 1 credit= 32 hours

Year1, Semester 2

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial- TD	Practical- TP		
1	ភាសាបារាំង	French			96	96	3
2	គណិតគណនាវគ្គ១	Calculus 1	32	32		64	3
3	ទែរម៉ូឌីណាមិក	Thermodynamic	32	24	8	64	3
4	គំនូរបច្ចេកទេស	Technical Drawing	16		32	48	2
5	ទីផ្សារ	Marketing	32			32	2
6	ពត៌មានវិទ្យា	Informatic	16		32	48	2
7	ប្រវត្តិវិទ្យា	History	32			32	2
Total in Semester 2			**160**	**56**	**168**	**384**	**17**

Year 2, Semester 1

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial- TD	Practical- TP		
1	ភាសាបារាំង	French			96	96	3
2	អង់គ្លេស	English			64	64	2
3	គណិតគណនាវគ្គ២	Calculus 2	32	32		64	3
4	មេកានិចវគ្គ២	Mechanics II	32	32		64	3
5	អគ្គិសនី	Electricity	32	24	8	64	3
6	គីមីវិទ្យា	Chemistry	32	32		64	3
Total in Semester 1			**128**	**120**	**168**	**416**	**17**

Year 2, Semester 2

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial-TD	Practical-TP		
1	ភាសាបារាំង	French			64	64	2
2	អង់គ្លេស	English			96	96	3
3	ប្រូបាប៊ីលីតេ	Probability	32	32		64	3
4	សមីការឌីហ្វេរ៉ង់ស្យែល	Differential Equations	32	32		64	3
5	រំញ័រនិងរលក	Vibration and Wave	32	24	8	64	3
Total in Semester 2			**96**	**88**	**168**	**352**	**14**

Year 3, Semester 1

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial-TD	Practical-TP		
1	ភាសាបារាំង	French		64		64	2
2	ភាសាអង់គ្លេស	English		32		32	1
3	ស្ថិតិវិទ្យា	Statistics	16	32		48	2
4	មេកានិកនៃសន្ទនីយ៍វត្ថុរាវ	Fluid Mechanics	32	16	16	64	3
5	វិទ្យាសាស្ត្រដី	Soil Science	16	16	16	48	2
6	ភាពធន់នៃសំភារៈ	Strength of Materials	16	32		48	2
7	ឧតុនិយម	Meteorology	16			16	1
8	វារីឧតុនិយម	Hydrometeorology	16	16		32	1.5
9	ភូគព្ភសាស្ត្រ និងវារីភូគព្ភសាស្ត្រ	Geology and Hydrogeology	16	16		32	1.5
Total in Semester 1			**128**	**224**	**32**	**384**	**16**

Year 3, Semester 2

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial-TD	Practical-TP		
1	ភាសាបារាំង	French		32		32	1
2	ភាសាអង់គ្លេស	English		64		64	2
3	គំនូសបច្ចេកទេសដោយកុំព្យូទ័រ	Computer-aided Design (AutoCAD)			32	32	1
4	ជលវិទ្យា	Hydrology	32	16	16	64	3
5	មេកានិចដី និងគ្រឹះ	Soil Mechanics and Foundations	32	16	16	64	3
6	មន្ទីរពិសោធន៍កុំព្យូទ័រម៉ាទ្រីស	MATLAB	16		16	32	1.5
8	ហានលេខា	Surveying	16	16	48	80	3

9	សេចក្តីផ្តើមនៃវិស្វកម្មបរិស្ថាន	Introduction to Environmental Engineering	16			16	1
Total in Semester 2			**112**	**144**	**128**	**384**	**15.5**

Year 4, Semester 1

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial-TD	Practical-TP		
1	ភាសាបារាំង	French		32		32	1
2	ភាសាអង់គ្លេស	English		32		32	1
3	គីមីវិទ្យាសម្រាប់វិស្វកម្មបរិស្ថាន	Chemistry for Environmental Engineering	16	32		48	2
4	ជីវៈវិទ្យាសម្រាប់វិស្វកម្មបរិស្ថាន	Biology for Environmental Engineering	48			48	3
5	ដំណើរការភ្នាងអាងប្រព្រឹត្តិកម្មសម្រាប់វិស្វកម្មបរិស្ថាន	Unit Operations and Processes for Environmental Engineering	32	32		64	3
7	មន្ទីរពិសោធន៍វិស្វកម្មបរិស្ថាន	Environmental Engineering Laboratory			32	32	1
8	ប្រព័ន្ធព័ត៌មានភូមិសាស្ត្រ និងទូរអង្កេតវិទ្យា	GIS and Remote Sensing	16		64	80	3
9	ជលគតិបរិស្ថាន	Environmental Hydraulics	16	16	16	48	2
Total in Semester 1			**128**	**144**	**112**	**384**	**16**

Year 4, Semester 2

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial-TD	Practical-TP		
1	ភាសាបារាំង	French		32		32	1
2	ភាសាអង់គ្លេស	English		32		32	1
3	ការវិភាគ និងការគ្រប់គ្រងគុណភាពទឹក	Water Quality Analysis and Management	32			32	2
4	ដំណើរការ និងការគណនាប្រព័ន្ធប្រព្រឹត្តិកម្មទឹកស្អាត	Water Treatment Processes and Design	32	32		64	3
5	វិស្វកម្មផ្គត់ផ្គង់ទឹកស្អាត	Water Supply Engineering	32	32		64	3
6	គណនាបណ្តាញទឹកក្នុងអាគារ	Building Sanitation/ Plumbing Design	48	16	16	80	4
7	វារីព័ត៌មានវិទ្យា	Hydro-informatics	32			32	2

8	សេចក្តីផ្តើមនៃការគ្រប់គ្រងធនធានទឹកចម្រុះ	Introduction to Integrated Water Resources Management	16			16	1
9	ការគ្រប់គ្រងការបំពុលបរិស្ថាន	Environmental Pollution Control	32			32	2
Total in Semester 2			**224**	**144**	**16**	**384**	**19**

Year 5, Semester 1

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial-TD	Practical-TP		
1	ភាសាបារាំង	French		32		32	1
2	ភាសាអង់គ្លេស	English		32		32	1
3	ការគណនាប្រព័ន្ធប្រមូលនិងប្រព្រឹត្តិកម្មទឹកកខ្វក់	Design of Wastewater Treatment and Collection System	48	32		80	4
4	ការគ្រប់គ្រងសំណល់រឹង	Solid Waste Management	32			32	2
5	ប្រព័ន្ធរំដោះទឹកភ្លៀងនិងទឹកកខ្វក់ក្នុងទីក្រុង	Urban Drainage and Sewage System	32	32		64	3
6	ការសិក្សាគម្រោងវិស្វកម្មបរិស្ថាន	Environmental Engineering Project	32			32	2
7	ការវាយតម្លៃផលប៉ះពាល់បរិស្ថាន	Environmental Impact Assessment	32			32	2
8	ប្រព័ន្ធថាមពលនិរន្តរភាពនិងបៃតង	Sustainable and Green Energy Systems	32			32	2
9	សុវត្ថិភាពការងារ	Work Safety	16			16	1
10	វិធីសាស្ត្រស្រាវជ្រាវ	Research Methodology	32			32	2
11	កម្មសិក្សាឆ្នាំទី៤	Internship I4					2
Total in Semester 1			**256**	**128**	**0**	**384**	**21**

Year 5, Semester 2

No.	Course name in Khmer	Course name in English	Number of hours			Total number of hours	Number of Credit
			Lecture - Course	Tutorial-TD	Practical-TP		
1	កម្មសិក្សាបញ្ចប់ឆ្នាំសិក្សា និងការពារសារណា	Final Year Internship				384	9
Total in Semester 2				32		384	9

Note: Foundation year covers year 1 and year 2 which under coordination by department of foundation year. From year 3 to year 5, the program is under faculty of Hydrology and Water Resources Engineering.

Number of credit and hours for each year:

Engineer ‘s Degree of Water and Environmental Engineering					
Year	Number of Credit	Number of hours	Lecture (hr)	Tutorials (hr)	Practical work (hr)
I1	32	704	320	112	272
I2	31	768	224	208	336
I3	31.5	768	240	368	160
I4	35	768	352	288	128
I5	28	768	256	128	384
Total	157.5	3776	1392	1104	1280

The total number of credits from year 1 to year 5 is 157.5 credits which equals to 3776 hours (lecture 1392 hours, Tutorials 1104 hours and practical work in laboratory 1280 hours)

8. Condition to Get the Certificate

In order to successfully complete the program and receive the certificate of Water and Environmental Engineering, the student have to:

- Complete and pass all subjects in the program successfully
- Pass all semester exams
- Complete internship 1 month in year 4 and complete final year internship for at least 3 months in year 5.
- Writing the final project from internship and defense successfully Infront of a committee