



# **INSTITUT DE TECHNOLOGIE DU CAMBODGE**

## **RÉUNION DU CONSEIL D'ADMINISTRATION**

**Document général et dossier pédagogique 2024-2025**



**27 juin 2024**

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## **PARTIE I: DOCUMENT GENERAL**

## 1 INTRODUCTION

Depuis sa création en 1964, l'Institut de technologie du Cambodge (ITC) a reçu une plus grande reconnaissance pour ses succès et ses réalisations au service du pays grâce au développement des ressources humaines, au renforcement des capacités institutionnelles et au travail intensif sur le développement économique et des infrastructures du Cambodge. L'ITC, depuis plus de quatre décennies, a établi un lien entre les réseaux francophones et anglophones de la région et du monde. Avec ses nombreux collaborateurs, administrateurs, étudiants, professeurs et anciens étudiants, cette institution offre un contexte multilatéral unique pour un échange de vues avec les ministères, les autorités locales, les ONG, le secteur privé et les institutions partenaires.

L'ITC a pour mission de former des étudiants ayant une formation de haute qualité dans les domaines de l'ingénierie, des sciences et des technologies et de développer des transferts de technologies innovants. Les étudiants disposent d'une base scientifique solide ainsi que d'un savoir-faire et de compétences techniques qui permettent leur intégration et leur évolution sur le marché du travail. Sur la base de la décision de la réunion annuelle du conseil d'administration, l'orientation future de l'ITC est d'élargir le domaine de la formation des ingénieurs et de développer des plateformes de recherche afin de soutenir le développement du pays. Cela nécessite de renforcer les connaissances scientifiques de base, de développer des programmes de recherche en relation avec le secteur privé et les parties prenantes nationales et internationales, de soutenir les communautés, de favoriser le développement économique grâce à des programmes d'entrepreneuriat et d'aider nos étudiants diplômés à intégrer l'économie mondiale. En fin de compte, il est important pour l'ITC de conserver sa propre identité d'institution multilingue, de maintenir et d'étendre un réseau avec des universités francophones et anglophones, de fournir une éducation qui motive le personnel enseignant et les étudiants, stimule la créativité et inspire les ambitions futures, et de développer une recherche reconnue internationalement en adéquation avec les besoins de la société.

La vision de l'Institut a été définie sur la base de la phase 4 de la stratégie rectangulaire du gouvernement royal de la 6<sup>e</sup> législature de l'Assemblée nationale **"pour améliorer le travail, l'équité et l'efficacité, pour former une base vers la réalisation de la vision du Cambodge pour 2050"**.

## 2 PERSPECTIVES ET STRATEGIES

### 2.1 Perspectives

**Devenir une institution phare avec efficacité et excellence offrant le transfert universitaire, de recherche, de science, de technologie, d'innovation et d'ingénierie à la communauté.**

L'ITC a développé le plan stratégique (2021-2030) basé sur la stratégie rectangulaire (phase IV) du gouvernement ainsi que le plan national de développement stratégique (2019-2023). Ce plan stratégique fournira des orientations pour la mise en œuvre efficace des plans d'action et abordera les défis afin d'améliorer la qualité de la formation des ingénieurs dans un environnement compétitif.

Deux objectifs principaux du Plan stratégique de l'ITC (2021-2030) à atteindre d'ici 2030 sont les suivants :

- 1- Former 17200 étudiants qualifiés vers la vision du Cambodge 2030
- 2- Mettre en place 175 projets qui transfèrent la technologie et Start-Ups pour l'harmonisation et le développement vers la vision du Cambodge 2030

## 2.2 Stratégie de l'ITC

L'ITC a développé 5 stratégies pour atteindre les objectifs :

- 1- Établir et appliquer un programme académique répondant aux besoins du marché avec une reconnaissance nationale et internationale
- 2- Développer les ressources humaines et moderniser la technologie pour la bonne gouvernance, la gestion et les affaires financières
- 3- Développer les infrastructures physiques et moderniser les laboratoires
- 4- Etablir les projets d'investissement et les projets de recherche appliquée ciblant le démarrage et le transfert de technologie
- 5- Moderniser le système d'information sur les données pour la diffusion des activités et des résultats à la communauté.

## 2.3 Cadre de Résultats

Le Cadre de Résultats pour 10 ans : 2021 à 2023 – Niveau Institutionnel est présenté dans le Tableau 1.

Tableau 1: Cadre de résultats sur 10 ans : 2021 à 2030 – Niveau institutionnel (institut)

Indicateurs		Base	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
1. Nombre d'étudiants diplômés d'un programme national avec une norme de qualité minimale	Etudiant de master et doctorat admis	0	0	0	20	100	180	260	340	440	540	640	640
	Etudiant de master et doctorat diplômés	0	0	0	0	18	90	162	234	306	396	486	486
	Etudiant d'ingénieur admis	0	0	140	1180	3760	6600	8090	9690	11450	13270	15090	15090
	Etudiant d'ingénieur diplômés	0	0	0	0	126	1070	3497	6138	7524	9012	10649	10649
	Etudiant de technicien admis	0	0	150	800	1500	2200	2900	3600	4300	5000	5700	5700
	Etudiant de technicien diplômés	0	0	0	135	731	1395	2046	2697	3348	3999	4650	4650
2. Nombre d'étudiants diplômés d'un programme international	Etudiant de master et doctorat admis	0	0	0	30	80	130	220	310	400	490	580	580
	Etudiant de master et doctorat diplômés	0	0	0	0	27	76	124	209	295	380	466	466
	Etudiant d'ingénieur admis	0	0	0	25	75	230	460	690	1000	1360	1720	1720

Indicateurs		Base	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
	Etudiant d'ingénieur diplômés	0	0	0	0	0	23	70	213	435	656	950	950
3. Nombre d'études de recherche en lien avec le développement		62	83	93	103	108	114	121	129	137	145	153	153
4. Nombre d'études de recherche sur le transfert de technologie		0	0	0	0	0	0	0	2	2	2	4	4
5. Nombre de projets de création d'entreprise		0	0	0	0	0	4	4	8	11	14	18	18
6. Nombre de programmes internationaux		0	0	0	1	2	7	9	9	14	15	15	15
7. Nombre de programmes nationaux avec des normes de qualité minimales		0	0	2	13	15	18	19	22	24	25	25	25
8. Nombre d'étudiants ayant reçu un revenu moyen (au moins cinq fois le salaire des travailleurs non qualifiés)		0	0	0	0	62	385	1089	1925	2487	3083	3753	3753
9. Nombre de centres d'excellence		0	0	0	0	1	1	2	2	3	3	4	4
10. Nombre de publications d'articles scientifiques internationaux		39	59	84	109	139	169	204	239	279	319	359	359

### 3 PROGRES GLOBALE DES PERSPECTIVES 2023-2024

Au cours de l'année universitaire 2023-2024, l'ITC a proposé 17 activités principales au total, dont 3 activités pour la modification et l'amélioration des programmes de technicien, 3 activités pour la mise à jour des programmes et 2 pour la nouvelle création de programmes d'ingénieur, 4 activités pour la création de programmes internationaux, 2 activités pour la création d'un laboratoire, 1 pour la mise en œuvre de tous les projets de recherche et 2 pour le renforcement des capacités du personnel de l'ITC. En conséquence, 9 activités principales (programmes d'ingénierie) ont été réalisées au cours de l'année universitaire. Tous les documents nécessaires aux programmes internationaux ont été techniquement préparés, mais seul le « génie logiciel » a pu être mis en œuvre à partir de l'année universitaire 2023-2024. Pour les autres programmes, exiger davantage d'activités de promotion pour attirer les inscriptions.



Les 2 laboratoires proposés ont été installés et leur mise en œuvre a commencé. Au total, 91 projets de recherche ont été mis en œuvre dans les 5 unités de recherche. 25 d'entre eux sont achevés et 66 autres projets continuent d'être mis en œuvre en 2023-2024. Tous les renforcements de capacités en enseignement & apprentissage et de compétences en recherche, tant entrants que sortants, du personnel de l'ITC ont été achevés dans les délais. Le résumé des activités d'avancement est illustré dans le tableau 2.

**Tableau 2:** Avancement global des activités proposées dans la perspective 2023-2024

No.	Principales activités proposées en 2023-2024	Unité	# Proposé	# Réalisé d'ici fév. 2024	Statut
<b>I Révision/Établissement de programmes de technicien</b>					
1	Proposer de modifier le programme de technicien « Systèmes de mécanique et de plomberie » d'une formation basée sur les matières à une formation axé sur les compétences	Programme	1	1	Complété
2	Proposer de changer le nom du programme de technicien de « Génie rural » à « Approvisionnement en eau et plomberie »	Programme	1	1	Complété
3	Proposer de changer le nom du programme de technicien de « Génie civil » à « Conception et supervision du génie civil et structurel (CSEDS) » et de passer d'une formation basée sur les matières à une formation axé sur les compétences	Programme	1	1	Complété
<b>II Révision/Établissement de programmes d'ingénieur</b>					
4	Proposer de modifier le programme d'ingénieur de génie chimique de la Faculté de génie chimique et alimentaire	Programme	1	1	Complété
5	Créer un nouveau programme sous la faculté de géo-ressources et géotechnique (GGG)	Programme	1	1	Complété
6	Créer un nouveau programme d'ingénieur de « Science et ingénierie des matériaux » sous la faculté GGG	Programme	1	1	Complété

No.	Principales activités proposées en 2023-2024	Unité	# Proposé	# Réalisé d'ici fév. 2024	Statut
7	Modifier/améliorer le programme d'ingénieur de génie architectural de la Faculté de génie civil	Programme	1	1	Complété
8	Modifier/améliorer le programme d'ingénieur en Data Science	Programme	1	1	Complété
<b>III</b>	<b>Révision/Établissement de programmes de master et de doctorat</b>				
	N/A				
<b>IV</b>	<b>Révision/Etablissement de Programmes Internationaux</b>				
9	Mise en place du programme international « Bachelor of Software Engineering »	Program	1	1	Complété
10	Mise en place du programme international « Bachelor of Construction Management and Infrastructure »	Program	1	1	Complété
11	Mise en place du programme international « Bachelor of Electronics and Smart Automation System »	Program	1	1	Complété
12	Mise en place du programme international « Bachelor Degree of Engineering and Sustainable Business (BESB) »	Program	1	1	Complété
<b>V</b>	<b>Mise en place de laboratoires/centres/plateformes</b>				
13	Création de deux laboratoires : 1) Digital-control Fabrication Lab or FABLAB (MIT) et 2) Electromagnetic Compatibility or EMC Lab	Laboratoire	2	2	Complété
<b>VI</b>	<b>Mise en œuvre de projets de recherche</b>				
14	Mise en œuvre de projets de recherche pour l'ensemble des 5 unités de recherche	Projet de recherche	91	25	- 25 projets sont achevés en 2023 - 66 projets se poursuivent en 2024.
<b>VII</b>	<b>Renforcement des capacités du personnel de l'ITC</b>				
15	Renforcement des capacités en enseignement &	Personne	113	133	Complété

No.	Principales activités proposées en 2023-2024	Unité	# Proposé	# Réalisé d'ici fév. 2024	Statut
	apprentissage, et en recherche du personnel de l'ITC (entrant)				
16	Renforcement des capacités en enseignement & apprentissage, et en recherche du personnel de l'IT (sortant)	Personne	32	32	Complété

#### 4 PERSPECTIVES ET PLAN D' ACTIONS 2024-2025

##### 4.1 Proposer les principales activités/résultats en perspective 2024-2025

Il existe 22 activités principales de perspective au cours de l'année universitaire 2024-2025. 2 activités pour la mise en place de nouveaux programmes de technicien ; 8 pour la modification/amélioration des programmes d'ingénieur ; 1 pour l'établissement d'un programme international ; 1 pour l'établissement d'un nouveau programme de master ; 1 pour modification du nom de l'unité de recherche ; 1 pour le plan des ressources humaines ; et 8 pour la mise en œuvre de nouveaux projets de développement institutionnel. Le résumé des activités proposées est présenté dans le tableau 3.

Tableau 3: Principales activités/résultats proposés dans le cadre de la perspective de l'ITC 2024-2025

No.	Principales activités proposées en 2024-2025	Unité	Faculté/ Département	Date d'achèvement estimée
<b>I</b>	<b>Révision/Établissement de programmes de diplôme d'associé</b>			
1	Proposer de créer le programme de diplôme d'associé « Réseau informatique et programmation » ( <i>voir Annexe 1</i> )	Programme	GIC	Août 2024
2	Proposer de créer le programme de diplôme d'associé « Génie industriel » ( <i>voir Annexe 2</i> )	Programme	GIM	Août 2024
3	Proposer de créer le programme de diplôme d'associé « Géotechnique » ( <i>voir annexe 3</i> )	Programme	GGG	Août 2024
<b>II</b>	<b>Révision/Établissement de programmes d'ingénieur</b>			
4	Modifier/améliorer le programme d'ingénieur de génie civil de la Faculté de génie civil ( <i>voir annexe 4</i> )	Programme	GCI	Août 2024
5	Modifier/améliorer le programme d'ingénieur de Génie des Transports et des	Programme	GTI	Août 2024

No.	Principales activités proposées en 2024-2025	Unité	Faculté/ Département	Date d'achèvement estimée
	Infrastructures de la Faculté de génie civil (voir annexe 5)			
6	Modifier/améliorer le programme d'ingénieur de génie de géo-ressources et géotechnique (voir annexe 6)	Programme	GGG	Août 2024
7	Modifier/améliorer le programme d'ingénieur de génie mécanique (voir annexe 7)	Programme	GIM	Août 2024
8	Modifier/améliorer le programme d'ingénieur de génie industriel (voir annexe 8)	Programme	GIM	Sept 2024
9	Modifier/améliorer le programme d'ingénieur de génie des ressources en eau et infrastructures rurales (voir annexe 9)	Programme	GRU	Sept 2024
10	Modifier/améliorer le programme d'ingénieur de Génie de l'Eau et de l'Environnement (voir annexe 10)	Programme	GRU	Sept 2024
11	Modifier/améliorer le programme d'ingénieur de génie chimique (voir annexe 11)	Programme	GCA	Sept 2024
<b>III</b>	<b>Révision/Etablissement de Programmes Internationaux</b>			
12	Mise en place du programme international « Artificial Intelligence Engineering and Cybersecurity (AIECS) » (voir annexe 12)	Programme	GIC	Jul 2024
13	Modification du programme de génie industriel et de gestion de la chaîne d'approvisionnement (voir annexe 13)	Programme	GIM	Nov 2024
<b>IV</b>	<b>Révision/Établissement de programmes de master et de doctorat</b>			
14	Proposer de créer un nouveau programme de master « Architectural Engineering » (voir annexe 14)	Programme	GS	Oct 2024
<b>V</b>	<b>Mise en place de laboratoires/centres/plateformes</b>			
15	Proposer de réviser le nom de l'unité de recherche de « Science et structure des matériaux » à « Matériaux et Aménagement de l'Environnement » (voir annexe 15)	Unité de recherche	RIC	Sept 2024
<b>VI</b>	<b>Renforcement des capacités du personnel de l'ITC</b>			

No.	Principales activités proposées en 2024-2025	Unité	Faculté/ Département	Date d'achèvement estimée
16	<ul style="list-style-type: none"> <li>- Augmenter le nombre de personnel ayant le grade de docteur de 95 à 107</li> <li>- Augmenter le nombre de personnel ayant le grade de master de 132 to 146</li> </ul>	Personne	ITC	Oct 2024
<b>VII</b>	<b>Mise en œuvre du projet de développement institutionnel</b>			
17	Mise en œuvre du projet: "SATREPS: Establishment of Risk Management Platform for Air Pollution in Cambodia" - JICA	Projet	ITC	Jul 2022 - 2027
18	"Appui institutionnel à l'Institut de technologie du Cambodge" – ARES-CCD	Projet	ITC	Sept 2022 - 2027
18	"Science and Technology Project in Upper Secondary Education (STEP UP)" - ADB	Projet	ITC	2023 - 2029
19	"Skills for Future Economy (SFE)" - ADB	Projet	ITC	2023 - 2029
20	"Plateforme de recherche et de formation sur les systèmes électriques" – EU/AFD	Projet	ITC	2023 - 2027
21	"Energy Transition Sector Development Program (ETSDP)" - ADB	Projet	ITC	2024
22	"Project for Enhancing Industry-Academic Networks for Engineering Research and Development in Cambodia - JICA	Projet	ITC	Possibilité de commencer d'oct. 2024 à 2029
23	"2 <sup>nd</sup> Higher Education Improvement Project" – 2 <sup>nd</sup> HEIP – World Bank	Projet	ITC	Possibilité de commencer d'oct. 2024 à 2029

#### 4.2 Données de référence et projetées sur le nombre d'étudiants, de personnel et de laboratoires

Le nombre d'étudiants, de personnel doctoral et de laboratoire pour la référence 2023-2024 et projeté pour 2024-2025 est indiqué dans le tableau 4.

**Tableau 4:** Nombre d'étudiants, de personnel et de laboratoires pour la période de référence 2023-24 et projeté pour 2024-2025

Faculty	Department/ Option	Baseline Academic Year 2023-2024								
		No. Technician Student	No. Eng. Student	No. Master Student	No. PhD Student	No. Master Staffs*	No. PhD Staffs*	No. Support Staffs	No. Lab (Teachning)	No. Lab (Research)
	Tronc Commun		2737			10	0	2	3	
Faculty of Civil Eng.	GCI	311	683			5	19	7	4	
	Arch		248			5	2			
	Transport		123			1	2			
Faculty of Electrical Eng.	GEE	344	447			21	6	4	8	4
	GTR	41	123			4	5	2	4	3
	GIM	108	387			24	8	5	10	3
	GIC		245			17	2	12	9	2
	AMS		184			4	3	1	2	
Faculty of Chemical and Food Eng.	Food	319	337			20	19	11	6	3
	Chemical		220							
Faculty of Hydrology and Water Resources Eng.	WRI	16	163			10	16	12	11	4
	WEE		102							
Faculty of Geo-resources and Geotechnical Eng.	GGG		194			11	13	3	6	2
Graudate School	GS			124	54					
<b>TOTAL</b>		<b>1139</b>	<b>6193</b>	<b>124</b>	<b>54</b>	<b>132</b>	<b>95</b>	<b>59</b>	<b>63</b>	<b>21</b>
Faculty	Department/ Option	Planned Academic Year 2024-2025								
		No. Technician Student	No. Eng. Student	No. Master Student	No. PhD Student	No. Master Staffs	No. PhD Staffs	No. Support Staffs	No. Lab (Teachning)	No. Lab (Research)
	Tronc Commun		2880			10	0	2	3	
Faculty of Civil Eng.	GCI	310	710			5	20	7	6	
	Arch		273			5	4			
	Transport		200			3	2			
Faculty of Electrical Eng.	GEE	320	494			21	7	4	8	4
	GTR	80	182			6	5	4	5	3
	GIM	120	404			25	9	7	16	4
	GIC		272			17	3	11	12	2
	AMS		272			7	3	2	2	
Faculty of Chemical and Food Eng.	Food	310	332			22	23	13	8	3
	Chemical		263							0
Faculty of Hydrology and Water Resources Eng.	WRI		189			10	18	12	11	2
	WEE		116							2
Faculty of Geo-resources and Geotechnical Eng.	GGG		257			15	13	3	6	2
Graudate School	GS			150	50					
<b>TOTAL</b>		<b>1140</b>	<b>6844</b>	<b>150</b>	<b>50</b>	<b>146</b>	<b>107</b>	<b>65</b>	<b>77</b>	<b>22</b>

### 4.3 Pédagogie

- Mettre en œuvre un Fab-lab (via le projet HEIP)
- Mettre en œuvre une formation en laboratoire LBE (par le biais du projet JICA)
- Mettre en œuvre une formation axée sur les compétences
- Mettre en œuvre un apprentissage par projet
- Augmenter la pratique pratique en laboratoire et sur le terrain
- Introduire des cours d'apprentissage en ligne (encourager le personnel à développer davantage de cours en ligne E-learning)

#### **4.4 Assurance qualité**

##### **➤ Renforcer le système d'assurance qualité interne**

- Coordonner avec les départements concernés pour organiser des séminaires/ateliers liés à l'assurance qualité, à l'apprentissage et à l'enseignement pour tous les professeurs quatre fois par an.
- Élaborer un plan d'action pour la ligne directrice sur l'assurance qualité interne (IQA), y compris des actions visant à renforcer et à développer les capacités du personnel de l'ITC.
- Assurer un parcours pédagogique cohérent : du diplôme d'associé, diplôme d'ingénieur, maîtrise au doctorat. degré.
- Gérer un séminaire/atelier lié à l'assurance qualité, à l'apprentissage et à l'enseignement

##### **➤ Renforcer les capacités des responsables internes de l'assurance qualité**

- Participer à des formations avec l'ACC, la DGHE et les EES concernés pour développer les compétences IQA.
- Assistez à toutes les réunions et activités liées à l'IQA à l'ITC

##### **➤ Préparer des mécanismes d'évaluation interne pour surveiller et évaluer la qualité de l'éducation**

- Réaliser des rapports d'auto-évaluation internes (SAR) pour les 15 programmes d'ingénierie (GCI, GAR, GIM (2), GCA (2), HRE (2), GGG, GIC, GEE (2), GTR, GTI, AMS) (niveau du programme).
- Réaliser une évaluation interne de l'Institution (niveau institutionnel).
- Réaliser des enquêtes de satisfaction auprès des étudiants deux fois par an.
- Créez une plateforme de réclamation des étudiants.
- Mener une étude de suivi pour les diplômés récents.

##### **➤ Demande d'accréditation ACC du Cambodge.**

#### **4.5 Promouvoir la Recherche et l'Innovation**

##### **➤ Activités/stratégie de la recherche pour 2024 - 2025**

- Renforcer la collaboration à triple hélice (université, industrie, gouvernement)
- Elargir la collaboration en matière de recherche avec des partenaires locaux et internationaux
- Augmenter le nombre de publications évaluées par des pairs
- Soumettre l'application du Techno-Journal de la Recherche Scientifique à l'ASEAN Citation Index (ACI)
- Augmenter le nombre de projets de recherche à soumettre pour un financement local et international
- Promouvoir les résultats de la recherche auprès des communautés et du public
- Continuer de renforcer les capacités des chercheurs et de les motiver
- Augmenter le nombre d'étudiants diplômés par le biais de projets
- Commercialiser les produits développés par le biais de projets
- Augmenter le service d'analyse en laboratoire et le service de formation courte
- Se préparer pour l'installation de laboratoires dans 5 unités de recherche au nouveau centre
- Se préparer pour un centre d'excellence

- Se préparer pour l'accréditation du laboratoire
- Encourager les chercheurs à en savoir plus sur la recherche et le dépôt de brevets

➤ **Renforcement de la capacité des chercheurs**

1. Formation à la rédaction de propositions de projets
2. Formation à la rédaction d'articles scientifiques
3. Formation à la gestion de projet et d'équipe
4. Formation à la recherche de brevets et à l'enregistrement de la propriété intellectuelle
5. Formation à la création d'entreprise et à l'esprit d'entreprise (Start up and entrepreneurship training)

## **Plan des actions pour 2023 – 2024**

➤ **Gestion des laboratoires**

- Organiser deux formations sur le principe des instruments analytiques pour les étudiants en recherche et les chercheurs au début des nouveaux semestres 1 et 2 (février et août).
- Organiser des séances d'orientation et des examens en laboratoire au moins deux fois par semestre.
- Élargir l'utilisation du laboratoire par le biais d'une collaboration et d'un service externe
- Préparer les plans de laboratoire et les nouveaux équipements nécessaires à la mise en place de nouveaux laboratoires afin d'améliorer la gestion des laboratoires dans le nouveau centre de recherche

➤ **Recherche, développement et dissémination**

- Demander des fonds de recherche auprès de 5 unités de recherche
- Participer à des projets de recherche avec des partenaires collaborateurs (e.g., AFRICAM)
- Participer et organiser des ateliers de diffusion de la recherche, des formations et des séminaires liés à 5 unités de recherche

➤ **Techno-Journal de la Recherche Scientifique vers l'ACI**

- Continuer d'améliorer la qualité des publications vers l'ASEAN Citation Index (ACI)
- Introduire la plateforme en ligne du journal Techno-Journal de la Recherche Scientifique pour les chercheurs et les étudiants - toutes les soumissions de manuscrits et le processus éditorial seront effectués en ligne en 2024.
- Organiser le 5<sup>ème</sup> atelier sur l'amélioration de la rédaction d'articles scientifiques pour les chercheurs juniors, les étudiants diplômés, et les étudiants en 5<sup>ème</sup> année d'études d'ingénieur.

### **4.6 Projets de recherche mis en œuvre en 2024-2025**

Au cours de l'année académique 2023-2024, 91 projets de recherche au total ont été mis en œuvre à l'ITC par les 5 unités de recherche. Parmi eux, 25 projets HEIP ont été achevés avec succès en novembre et décembre 2023. La mise en œuvre des 55 autres projets se poursuit en 2024-2025. 27 nouveaux



projets ont été approuvés et ont mené leurs activités de recherche. Les 27 nouveaux projets de recherche sont présentés dans le Tableau 5, et les 91 projets sont énumérés à l'Annexe 16.

Tableau 5 Détail de 27 nouveaux projets de recherche en 2024-2025

No.	Nom du responsable	Sexe	Titre de sujet de recherche	Période	Budget
1	Dr. OR Chanmoly	M	Accelerating Digital Transformation for Higher Education Institutions in Southeast Asia (DX.SEA)	2023-2025	Erasmus+
2	Dr. YOEU Sereyvath	M	Production of Organic-mineral Fertilizers from Local Raw Materials	2023-2024	MoEYS
3	Mrs. SIENG Sreyvich	F	Assessment of Air Quality and Impact in Potential Areas in Cambodia	2023-2026	JICA/JST
4	Dr. TAN Reasmey	F	Development of Oyster Sauce from Cambodian Oysters and Green Mussels for Commercialization	2023-2024	CAPFish-UNIDO-EU
5	Dr. MITH Hasika	M	Health Risk Assessment and Quality Improvement of Cambodian Smoked Fish	2023-2024	CAPFish-UNIDO-EU
6	Dr. IN Sokneang	F	Improvement on Quality, Safety, and Shelf-life (including packaging) of Fermented Pangasius Fish for Accessing to New Markets	2023-2024	CAPFish-UNIDO-EU
7	Dr. PENG Chanthol	F	Feasibility Study of Siem Reap's Prahok toward Geographical Indication: History, Technology, and quality	2023-2024	CAPFish-UNIDO-EU
8	Dr. IN Sokneang	F	Study on the Effect of Steam Conditions (Temperature, Time, and Green Mussel Size) on the Organoleptic Quality and Safety Quality of Green Mussels	2023-2024	CAPFish-UNIDO-EU
9	Dr. SUONG Malyna	F	Laboratory of Excellence in Co-Engineering for Sustainable Agrosystems (LMI-LEAD)	2024-2028	IRD
10	Dr. SUONG Malyna	F	Promoting Integrated Pest Management and Sustainability of the Fragrant Rice Quality in Cambodia by Valorization of Native Microbiota	2024-2026	Ministry of Europe and Foreign Affairs (via The Embassy of France)

No.	Nom du responsable	Sexe	Titre de sujet de recherche	Période	Budget
11	Dr. SUONG Malyna	F	Soil-Borne Legacy and Microbiota-Mediated Disease Resistance in Rice-Based Systems in Cambodia	2024	Agropolis Fondation
12	Dr. SUONG Malyna	F	Training in the Use of Molecular Tools for Diagnosis of Rice Diseases to Support the Transition towards Integrated Pest Management	2024-2026	IRD
13	Dr. VALY Dona	M	Integrated Decision Support System for Non-Communicable Ocular Diseases using Machine Intelligence	2023-2024	ASEAN IVO
14	Ms. OUM Sotheara	F	Development of Autonomous and Semi-Autonomous Mobile Robots to Participate in Robocon 2024	2023-2024	Takahashi Foundation
15	Dr. KAN Kuchvichea	M	Evaluation Technico-Socio-Economique des Infrastructures Routières au Cambodge	2023-2025	ARES
16	Mr. SOM Chansamng	M	Effect of the Addition of Natural Fibers on Shrinkage, Cracking Risk and Healing Capacity of Cementitious Materials	2023-2026	BGF-MoEYS
17	Dr. PROK Narith	M	Performance of Tyfo(R)FibrAnchor under Axial Load	2023-2024	Fyfe Asia
18	Dr. OEUNG Thaileng	M	Investigation of Steel-Concrete Composite Structural Elements under Various Loadings	2023-2024	TMU
19	Dr. YOS Phanny	M	FSPI-R: Metal-Related Skill and Create Link with Archeo-Metal Activities in Cambodia	2023-2024	Frenh Embassy
20	Mr. SOK Sereyvathana	M	Removal of Organic Micropollutants by Coupling Simultaneous Continuous Adsorption and Sedimentation for Drinking Water Production	2023-2026	BGF & MoEYS
21	Dr. THENG Vouchlay	F	Photoproduction of Radicals and their Effects on Carbon Dynamics in Tropical Lakes (JSPS-Photochem)	2023-2027	JST
22	Dr. SOK Ty	M	Development and Social Implementation of Greenhouse Gas Emission Reduction Technologies in Paddy Fields of West Tonle Sap Lake by Establishing a Large Paddy Area Water Management System	2024-2028	JST/JICA

No.	Nom du responsable	Sexe	Titre de sujet de recherche	Période	Budget
23	Dr. SOK Ty	M	Integrated River Basin Management of the Mekong Basin Tributary for Adaptation to Climate Change	2024-2027	Mekong Korea Cooperation Fund (MKCF)
24	Dr. BUN Saret	M	Stopping Macro- and Microplastic Pollutants by Installing Solar-Powered Air Bubble Screening (SBS) Device at Discharge Wastewater Canal to the Sea of Sihanoukville, Cambodia	2024	UNDP
25	Dr. BUN Saret	M	Rural Community Training on Safe Water Quality and its On-site Demonstration Testing	2024	SUMERNET
26	Dr. BUN Saret	M	Addressing Water Scarcity through Groundwater Use: Development of Solar-Powered Groundwater Treatment System for Remote Area of Cambodia	2024-2025	MTT-RRP
27	Dr. Ratha MUON	F	Réhabilitation et Gestion Durable de la Fertilité des Sols pour Uneagriculture Durable et Résiliente au Cambodge (ReaSol)	2023-2025	IRD

#### 4.7 Promotion de la Graduate School

##### Mission de la Graduate School pour 2021-2030

- Améliorer et développer **10 programmes de formation** diplômante en STEM pour s'aligner sur les normes nationales, régionales et internationales.
- Former **952 étudiants** diplômés avoir tout le potentiel et les compétences en STEM pour répondre aux exigences de la vision 2030 du Cambodge.

##### Stratégie de la Graduate School

- Améliorer et développer le cursus des programmes de master et de doctorat.
- Développer des laboratoires, des installations et du système TIC répondant aux besoins de formation de master et de doctorat.
- Internationaliser des programmes de master et de doctorat via des programmes de double diplôme et des échanges de mobilité.
- Renforcer les capacités des personnels administratifs et des enseignants.

##### Plan d'action 2024 – 2025

###### ➤ Mise en œuvre des programmes

- Gérer 8 programmes de master thématiques et 5 programmes de doctorat.
- Augmenter le nombre de sujets de recherche répondant aux besoins de la société grâce au soutien financier des institutions de la recherche.
- Augmenter le nombre de publications des étudiants dans des revues scientifique / conférences.

- Veiller à la satisfaction des étudiants pour les cours des programmes de master par des enquêtes.
- Préparation à l'AUN-QA pour 3 programmes (M-WEE, M-ETM, M-DAS).
- **Développement et amélioration des programmes**
  - Créer un nouveau programme de master en génie architectural (voir annexe 14).
  - Développer des cours en e-learning pour les programmes de master.
  - Initier le développement d'un nouveau programme de master en gestion de la technologie.
  - Initier l'amélioration du curriculum pour le programme doctoral.
- **Internationalisation**
  - Augmenter le nombre d'échanges entrants et sortants d'étudiants en master.
  - Augmenter la mobilité du personnel à l'étranger.
  - Augmenter le nombre de conférences invitées de partenaires internationaux.
- **Partenariats**
  - Renforcer les collaborations avec les partenaires existants : 21 institutions universitaires, 4 agences de développement et 3 institutions gouvernementales /secteurs privés/ONG.
  - Augmenter le nombre de partenaires via la convention de programme doctoral double diplôme.
- **Projets**
  - Mettre en œuvre le projet EDC-AFD-EU pour soutenir le programme de master et de doctorat en gestion de l'énergie et de la technologie 2023-2027.
  - Mettre en œuvre le projet Erasmus+ pour le programme de Master en matériaux et ingénierie des structures 2022-2025.
  - Mettre en œuvre le projet Erasmus+ « Smart City for ASEAN Learning Network (SCALE) » pour le développement de micro-cours et leur intégration dans les programmes de master pertinents.
  - Postuler pour un projet AUF pour soutenir le Master en matériaux et ingénierie des structures
- **Promotion**
  - Créer une vidéo promotionnelle contenant des témoignages de succès de diplômés de master et de doctorat.
  - Participer à des salons étudiants et à d'autres événements pour promouvoir les programmes de master et de doctorat.
  - Améliorer le site Internet de la Graduate School.
- **Enquête d'employabilité**
  - Mener une enquête sur l'emploi auprès des nouveaux diplômés.
  - Réaliser une enquête sur l'emploi auprès des anciens élèves diplômés des masters en 2019 (5 ans après l'obtention de leur diplôme)
- **Perfectionnement**
  - Organiser une formation sur l'encadrement des étudiants.
  - Organiser des formations sur l'utilisation de Moodle et du e-learning.
  - Créer un portfolio électronique pour les personnels et les enseignants.

- Participer aux formations AUN-QA.

#### 4.8 Promouvoir les liens université-industrie (UIL) 2023-2024

##### ➤ Mission de l'UIL

À partir de l'année universitaire 2022-2023, l'UIL réforme sa mission pour se concentrer davantage sur les résultats visés en vue d'améliorer la qualité des programmes universitaires, de la recherche et des services dans l'ensemble de l'ITC, y compris la gouvernance de l'UIL.

Les principales missions de l'UIL sont les suivantes :

- (1) Amélioration de la qualité et de la pertinence des programmes académiques à tous les niveaux
- (2) Amélioration des activités de recherche et de la collaboration, notamment en matière de diffusion et de commercialisation des produits de recherche
- (3) Améliorer les services de tous les secteurs de l'ITC, tels que les tests en laboratoire, la formation, le conseil et les services de location.

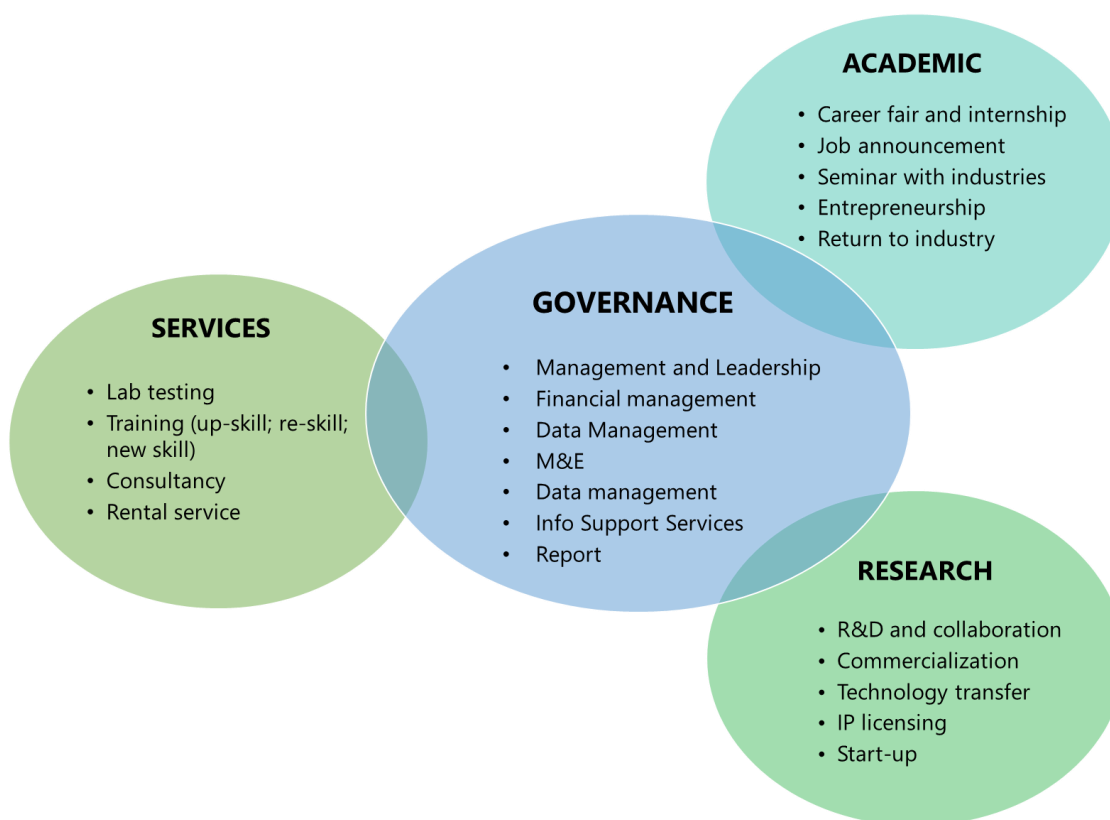


Figure 1 Résumé de la mission de l'UIL

Tableau 6: Objectif et mission de l'UIL

<b>But</b>	
L'UIL contribue à améliorer la qualité et la pertinence des programmes universitaires, de la recherche et des services pour la Vision du Cambodge 2030 et 2050.	
<b>Mission (résultat)</b>	<b>Activités principales</b>

<p>1. Soutenir les programmes académiques à tous les niveaux pour améliorer la qualité des diplômés pour de meilleurs emplois et de meilleurs salaires</p>	<p>Produire un mécanisme de coordination clair et des lignes directrices entre le bureau de l'UIL et tous les responsables des programmes pour un fonctionnement plus fluide. Initier et introduire le nouveau concept de programme de stages par le biais d'un apprentissage par projet avec l'industrie. Organiser un événement annuel sur le salon de l'emploi avec toutes les parties prenantes concernées. Coordonner les activités conjointes avec le corps enseignant/responsable des programmes et des industries pour améliorer le 21<sup>st</sup> compétences du siècle aux enseignants et aux étudiants.</p>
<p>2. Soutenir les activités de recherche en vue de la commercialisation des produits en établissant des liens étroits avec l'industrie</p>	<p>Créer une plate-forme de communication physique et en ligne pour l'accès à l'information entre l'ITC et les industries. Organiser des événements de promotion réguliers pour promouvoir le lien de collaboration en matière de recherche avec l'industrie vers le prototype/le démarrage/la commercialisation de produits.</p>
<p>3. Soutenir toutes les parties prenantes concernées pour améliorer la qualité des services</p>	<p>Produire la liste de tous les types de services, y compris les tests, la formation, la location d'équipement et les conseils des parties prenantes concernées. Développer du matériel de promotion marketing lié aux services de l'ITC. Soutenir la formation du personnel des facultés/départements sur le développement du contenu de la formation professionnelle/compétente. Produire un meilleur mécanisme et une meilleure réglementation pour les services de conseil en TIC.</p>

## Perspectives de l'UIL pour 2024-2025

Tableau 7 Principales activités/résultats proposés dans la perspective de l'UIL 2024-2025

Non.	Indicateurs de résultat pour l'UIL	Laps de temps	Responsable	Stratégie
1	Élaborer une stratégie et un cadre de résultats pour l'UIL 2024-2026	octobre 2024	<ul style="list-style-type: none"> <li>• Dr. Bun Kim Ngun</li> <li>• Siège social de l'UIL</li> <li>• Toutes les facultés/départements</li> <li>• RIC</li> </ul>	Rencontrer et échanger avec les parties prenantes
2	Développer un système de gestion de données (plateforme) pour le bureau principal et le département de l'UIL	décembre 2024	<ul style="list-style-type: none"> <li>• Siège social de l'UIL</li> <li>• Toutes les facultés/départements</li> <li>• RIC</li> </ul>	Besoin de budget pour construire la plateforme (HEIP et autres)
3	Visiter des industries pour discuter des besoins de l'industrie,	décembre 2024	<ul style="list-style-type: none"> <li>• Siège social de l'UIL</li> <li>• Toutes les facultés/départements</li> </ul>	<ul style="list-style-type: none"> <li>• Contactez des entreprises potentielles pour des opportunités de visite</li> </ul>

Non.	Indicateurs de résultat pour l'UIL	Laps de temps	Responsable	Stratégie
	promouvoir les services ITC et d'autres collaborations possibles		<ul style="list-style-type: none"> <li>• RIC</li> </ul>	
4	Organiser une réunion annuelle du consortium ITC-Industries pour obtenir les commentaires des industries en vue d'améliorer l'ITC.	décembre 2024	<ul style="list-style-type: none"> <li>• Toute personne concerné</li> </ul>	<ul style="list-style-type: none"> <li>• Organiser une réunion de consortium attractive</li> <li>Travailler avec des projets (LBE/ADB) pour impliquer davantage d'entreprises</li> </ul>
5	Élaborer une « politique de propriété intellectuelle » pour l'ITC	avril 2024	<ul style="list-style-type: none"> <li>• Dr. Davin</li> <li>• Dr. Faire du Molika</li> <li>• RIC</li> <li>• Toutes les facultés/départements</li> </ul>	<ul style="list-style-type: none"> <li>• Recueillir les projets de politique de propriété intellectuelle existants du projet concerné (CAPFISH, LBE et ERIA) pour rédiger la politique de propriété intellectuelle pour l'ITC.</li> </ul>

#### 4.9 Promouvoir le réseau de bibliothèque et de cyberuniversités cambodgiennes

##### ➤ Bibliothèque STEM

#### Perspective de la bibliothèque STEM sur deux années universitaires 2024-2026

Tableau 8 Principales activités/résultats proposés dans la perspective de la bibliothèque STEM 2024-2026

Non.	Résultats cibles pour la bibliothèque	Activités	Un éventuel soutien financier
1	L'équipement et les ressources de la bibliothèque sont modernisés	<p>1.1 Remplacer l'équipement de base dans la bibliothèque (nécessaire pour démarrer les activités)</p> <p>1.2 Acquisition de livres comme référence pour l'enseignement (avec la participation de l'ITC, 10%)</p> <p>1.3 "Migrer et améliorer le logiciel de catalogue de PMB vers Koha (pour renforcer la collaboration avec la bibliothèque d'autres EES)"</p> <p>1.4 Consommable de bibliothèque (conserver les matériaux utiles pour le fonctionnement quotidien et les accessoires matériels)</p>	<ul style="list-style-type: none"> <li>• ARES-CCD</li> <li>• Autres</li> </ul>

Non.	Résultats cibles pour la bibliothèque	Activités	Un éventuel soutien financier
2	Les compétences du personnel de la bibliothèque sont renforcées	2.1 Recruter un personnel compétent pour le service de référence (temps plein) 2.2 Renforcement des compétences du personnel (formation sud-sud) 2.3 Mission Nord-Sud sur le Libre Accès 2.4 Mission Sud-Nord pour OA et IR 2.5 Formation sur l'utilisation du système IR 2.6 Évaluation de la mission Nord-Sud	<ul style="list-style-type: none"> <li>• ARES-CCD</li> <li>• Autres</li> </ul>
3	Développer la culture de la science ouverte parmi les chercheurs et les enseignants de l'ITC, aider les enseignants et les chercheurs à publier en libre accès	3.1 Abonnement aux ressources électroniques 3.2 Renforcer les relations entre bibliothécaires et enseignants 3.3 Renforcement des compétences du personnel (formation sud-sud) 3.4 Créer une plateforme complète de bibliothèque numérique 3.5 Créer des lignes directrices, un didacticiel et une politique sur le libre accès. 3.6 Construire un référentiel institutionnel	<ul style="list-style-type: none"> <li>• ARES-CCD</li> <li>• Autres</li> </ul>

### ➤ Réseau des cyberuniversités cambodgiennes (CCUN)

En 2022, l'ITC soutient la Direction générale de l'enseignement supérieur du ministère de l'Éducation, de la Jeunesse et des Sports (DGHE/MoEYS) pour préparer la note conceptuelle du projet CCUN. Ce projet vise à améliorer la qualité de l'enseignement supérieur en utilisant du matériel d'enseignement et d'apprentissage (T&L) en ligne et numérique. Le projet connectera les établissements d'enseignement supérieur (EES) du Cambodge via une infrastructure de réseau commune et un LMS (Moodle). Et grâce à cette infrastructure et plateforme communes, les instituts membres (IM) peuvent partager leur contenu numérique entre eux. Le projet favorisera également le transfert de crédits entre les IM et leur permettra de se connecter au réseau mondial des cyberuniversités.

Dans la phase pilote de ce projet, le CCUN implique six EES en tant qu'IM

1. Institut de technologie du Cambodge (ITC)
2. Université royale de Phnom Penh (RUPP)
3. Université royale d'agriculture (RUA)
4. Université nationale de Battambang (NUBB)
5. Université Svay Rieng (SRU)
6. Université Heng Samrin Tbong Khmum (UHST)



Fort de l'expérience acquise par l'ITC dans le cadre du projet ACU, l'ITC jouera un rôle de responsable technique et soutiendra cinq autres établissements d'enseignement supérieur dans le développement de leurs activités d'apprentissage en ligne.

## Indicateurs, résultats et perspectives du CCUN 2023-2024

Tableau 9 Indicateurs, résultats et perspectives du CCUN 2023-2024

Indicateurs	Résultats attendus	Un soutien financier
<ul style="list-style-type: none"> <li>• Un certain nombre de programmes académiques sont développés et utilisés au CCUN</li> <li>• Nombre de contenus d'apprentissage en ligne développés et utilisés au CCUN</li> <li>• Nombre d'étudiants inscrits via CCUN</li> </ul>	<ol style="list-style-type: none"> <li>1. 6 universités sont connectées au CCUN</li> <li>2. Améliorer les capacités des établissements d'enseignement supérieur (6) en matière de développement et d'exploitation de contenus d'apprentissage en ligne</li> <li>3. créer des cours communs à utiliser entre les EES (6)</li> <li>4. transfert de crédits entre établissements d'enseignement supérieur (6)</li> <li>5. un étudiant poursuit ses études pendant le COVID-19</li> <li>6. se connecter au réseau éducatif mondial/régional</li> </ol>	<ul style="list-style-type: none"> <li>• programme d'investissement public du MoEYS</li> </ul>
<p><b>Perspectives du CCUN en 2023-2024 :</b></p> <ul style="list-style-type: none"> <li>• Infrastructure <ul style="list-style-type: none"> <li>• Améliorer la capacité de l'infrastructure CCUN pour prendre en charge davantage d'utilisateurs</li> <li>• Connectez les MI via une connexion DPLC</li> </ul> </li> <li>• Entraînement <ul style="list-style-type: none"> <li>• 2e formation sur le « Développement de contenu e-Learning » pour les IM à l'ITC</li> <li>• 2 formations sur « l'exploitation des contenus e-Learning » pour les IM à l'ITC</li> <li>• 3 formations sur « Conception et administration de réseaux » pour les MI à l'ITC et dans les MI en fonction de la nécessité</li> </ul> </li> <li>• Convertir 8 cours d'informatique en contenu e-learning (environ 100 contenus)</li> <li>• Gérer 5 cours développés sous CCUN</li> <li>• Accompagner les IM dans le développement d'activités e-learning à travers des missions d'accompagnement et de suivi</li> </ul>		

### 4.10 Promotion des des compétences transversales

Les compétences transversales sont une formation essentielle qui favorise les attributions personnelles qui se situent en dehors des qualifications professionnelles et de l'expérience professionnelle. Les compétences générales seront intégrées dans les programmes de techniciens et d'ingénierie de l'ITC afin de renforcer les capacités générales des étudiants. Parmi les autres compétences, le travail en équipe est l'une des principales compétences à considérer. Des formations sur le travail d'équipe seront dispensées chaque année aux étudiants de l'ITC.

Le travail d'équipe implique d'établir des relations et de travailler avec d'autres personnes utilisant un certain nombre de compétences et d'habitudes importantes :

- Gestion d'équipe
- Contribuer à des groupes avec des idées, des suggestions et des efforts
- Communication (à la fois donner et recevoir)
- Sens des responsabilités
- Respect sain des différentes opinions, coutumes et préférences individuelles
- Capacité à participer à la prise de décision en groupe

## 5 DÉFIS

- La gestion de projets de renforcement des capacités et de projets collaboratifs nécessite plus de temps et d'efforts, ce qui nécessite l'aide d'un personnel administratif plus compétent.
- Nombre limité de salles de classe par rapport au nombre total d'élèves inscrits.
- Faible nombre de bourses et de subventions de recherche disponibles pour les étudiants chercheurs, ce qui rend difficile la promotion des activités de recherche et l'attraction d'étudiants exceptionnels pour travailler et étudier à l'ITC.
- Les installations de recherche telles que les laboratoires ne sont pas suffisamment avancées pour établir des liens entre la recherche et les industries afin de développer des produits répondant aux besoins du marché.
- Promouvoir nos prototypes jusqu'à la commercialisation

## 6 CAPACITÉ D'ACCUEIL DE L'ITC

Pour l'année universitaire 2023-2024, nous prévoyons de recruter environ 1300 étudiants ingénieurs, et environ 1000 étudiants techniciens selon le besoin des ressources humaines du marché de travail en respectant l'évolution de la capacité d'accueil de l'institut et le renforcement de l'effectif d'enseignants. Le tableau ci-dessous indique la capacité d'accueil actuelle de l'ITC.

Type de salle	Quantité	Capacité
Grande salle de conférence	1	2000
Salle de conférence	1	350
Amphithéâtre (Bâtiment A)	2	200
Amphithéâtre (Bâtiment F)	2	380
Salle de cours ou de TD	11	100
	70	50
Salle d'apprentissage de la langue	5	25
Salle de TP spécialisé	91	25
Salle informatique (25 pc)	7	25

Pour les travaux pratiques, les salles ou les laboratoires de TP sont directement sous la responsabilité de chaque département. Le tableau ci-dessous indique le nombre des salles de TP dans chaque département.

Département	Nombre de salles de TP	Capacité
DTC	3	25
GCA	12	25
GCI	8	25
GAR	4	25
GEE	13	25
GGG	8	25
GIC	11	25
GIM	10	25
GRU	7	25
GTR	5	25
GTI	2	25
AMS	8	25
<b>Total</b>	<b>91</b>	

Actuellement, le nombre maximum d'étudiants dans une séance de cours, de TD et de TP est fixé par le bureau des études (Tableau ci-dessous).

Département	Cours	TD	TP	Langue
TC	180	50	25	50
Spécialité	180	50	25	50

A la rentrée 2024-2025, l'estimation de l'effectif d'étudiants est d'environ **7700**. Selon la répartition en groupe, nous pouvons estimer les besoins en termes de nombre de séances par semaine et la capacité de salle de cours, de TD et de TP de la façon suivante :

	<b>Cours (180 étudiants)</b>	<b>Cours spécialité et TD (50 étudiants)</b>	<b>TP (25 étudiants)</b>	<b>Cours de langue</b>	<b>Informatique</b>
Nombre de séances pour technicien		495	354		120
Nombre de séances pour Ingénieur	140	1365	717	1508	100
<b>Nombre de séances réel (Besoin)</b>	<b>140</b>	<b>1860</b>	<b>1071</b>	<b>1508</b>	<b>220</b>
<b>Nombre de Salles à l'ITC</b>	4	70	91	5	7
<b>Nombre de séances possibles sur 4,5 jours</b> (36 séances/semaine)	144	2520	3276	180	252
<b>Nombre de séances possibles sur 5 jours</b> (40 séances/semaine)	<b>160</b>	<b>2800</b>	<b>3640</b>	<b>200</b>	<b>280</b>

Ce tableau montre qu'au niveau de l'infrastructure d'accueil, nous avons la capacité d'accueillir le nombre d'étudiants proposé.

## **PARTIE 2: DOSSIER PEDAGOGIQUE**

## 7 PRÉPARATION POUR LA RENTRÉE 2024-2025

### 7.1 Calendrier universitaire 2024-2025

Le calendrier de l'année universitaire 2024-2025 est présenté à l'annexe 14.

### 7.2 Recrutement des étudiants en 2024-2025

#### a) Cycle de technicien

Le recrutement des étudiants du cycle de technicien est basé sur dossiers du candidat (Passé ou échoué l'examen national de baccalauréat). Les étudiants choisissent le département préféré pendant l'inscription. La sélection de ce choix est basée sur leurs dossiers.

Seuls les candidats (passé le baccalauréat) avec la mention du Bac II de A à E peuvent continuer leurs études au cycle d'ingénieur.

#### b) Cycle d'ingénieur

Tous les candidats (mention générale du baccalauréat de A à E) doivent déposer leur dossier pour un concours d'entrée. Le concours d'entrée sur place sera organisé pour les matières suivantes : mathématiques, physique-chimie et logique.

### 7.3 Proposition de droits de scolarité en 2024-2025

Les droits de scolarité seront proposés selon le tableau ci-dessous.

<i>Cycle d'ingénieurs</i>	<i>Cycle de techniciens</i>
800\$ pour les garçons 650\$ pour les filles	350\$ pour les garçons 250\$ pour les filles

### 7.4 Exonération

Comme chaque année, des bourses d'études ont été octroyées aux étudiants de 1<sup>ère</sup> année :

- 80 étudiants inscrits en 1<sup>ère</sup> année d'ingénieur à l'ITC de Phnom Penh seront exonérés de droits de scolarité.
- 120 étudiants inscrits en 1<sup>ère</sup> année d'ingénieur à l'ITC de Tbong Khmum seront exonérés de droits de scolarité.
- 15% des étudiants inscrits en 1<sup>ère</sup> année de technicien seront exonérés de droits de scolarité.

Pour être conforme aux critères du Ministère de l'Education, de la Jeunesse et des Sports, les exonérations seront réparties selon les catégories suivantes :

- Mérite (meilleurs du concours) : proposition 60%
- Inscrits en difficultés financières : proposition 20%
- Inscrits des provinces éloignées de Phnom Penh : proposition 5%
- Inscrits filles : proposition 15%

## 7.5 Proposition de places ouvertes en 2024-2025

### i. Entrée directe en 1ère année

Le nombre prévu d'étudiants à recruter en 2024-2025 est présenté ci-dessous :

	ITC-Phnom Penh	ITC-Tbong Khmum
I1	1300	120
T1	1000	-

### ii. Entrée normale en 3ème année d'Ingénieur (I2 → I3)

Le tableau suivant montre le nombre de places ouvertes en 3<sup>ème</sup> année (I3) dans chaque département pour l'année 2024-2025.

Tableau des places ouvertes I2 pour I3

Faculté/département	Places ouvertes I2 en I3
GCA	180
GCI	200
GAR	80
GEE	150
GGG	80
GIC	90
GIM	110
GRU	90
GTR	70
GTI	60
AMS	80
<b>Total</b>	<b>1190</b>

### iii. Possibilité de passer en I3 après le cycle de technicien

Pour l'année scolaire 2024-2025, 15% des étudiants de T2 peuvent passer en I3 s'ils réussissent un test des trois matières (mathématiques, physique et langue étrangère) qui sont conformes au programme d'ingénieur de 2<sup>ème</sup> année (I2) et un entretien par département concerné.

Pour s'assurer que les étudiants finissant le programme de technicien supérieur de 2 ans seront capables de poursuivre leurs études en 3<sup>ème</sup> année d'ingénieur, nous proposons un cours intensif de préparation sur les trois matières (mathématiques, physique et langue étrangère) pendant les vacances universitaires. Ce cours intensif est payant.

### iv. Concours externes

2 places par département pour les cambodgiens ayant un niveau BAC+2 et une connaissance suffisante de la langue étrangère ou une licence de science, et qui auront passé avec succès les épreuves d'un concours spécifique (épreuves écrites : mathématiques et physique et entretien par le département concerné) en septembre.

### v. Places ouvertes pour les I3 en 2024-2025

Le tableau suivant récapitule, pour chaque département, le nombre total de places ouvertes aux étudiants I3 en 2024-2025.

Département	Place ouverte I2 en I3	Place ouverte T2 en I3	Place ouverte Concours externe	TOTAL
GCA	180	15	2	197
GCI	200	17	2	219
GAR	80	-	-	80
GEE	150	15	2	167
GCG	80	-	-	80
GIC	90	-	-	90
GIM	110	6	2	118
GRU	90	-	-	90
GTR	70	3	-	73
GTI	60	-	-	60
AMS	80	-	-	80
<b>Total</b>	<b>1190</b>	<b>56</b>	<b>8</b>	<b>1254</b>



## **8 NOMINATION DE L'EQUIPE DE DIRECTION POUR L'ANNEE 2024-2025**

Le 32ème Conseil d'Administration propose de nommer l'équipe de Direction suivante pour l'année 2024-2025 :

# ANNEXES

## Annexe 1

### Detail of establishment of Associate Degree “IT Network and Programming (competency-based)” – 2 Years Program under department GIC

#### 1. BACKGROUND

Under the Workforce Development Project for Skills for Future Economic supported by the bank of ADB, GIC is going to open the Associate’s Degree Program in IT Network and Programming (expected) in 2024 base on the project implementation timeline. The program is designed as a competency-based by the consultant of ADB, which means learner can take some course/competency instead of taking the whole diploma program. This will provide GIC the opportunities to operate the course/competency as vocational training.

#### 2. PROGRAM OBJECTIVE

This program equips students with the skills to excel as network technicians, proficiently manage and maintain networks, and adeptly develop front-end websites. Upon completion, graduates will demonstrate the following competencies:

- Know how to design and set up a network in an organization
- Manage and monitor network traffic
- Know how to troubleshoot a network problem
- Create a website for the institution

#### 3. CURRICULUM

Below table show the course structure of the associate’s degree program in IT Network and Programming.

Subject	Competency Type	Code	Hours				Credit
			C	TD	TP	Total	
Semester 1			160	0	384	544	22
Computer Architecture	Core	ITNP1CA	32	0	96	128	5
Basic Computer Literacy	Core	ITNP1BCL	32	0	96	128	5
Windows Client	Core	ITNP1WC	32	0	96	128	5
Web Client Programming	Core	ITNP1WCP	32	0	96	128	5
Workplace Communication Skills	Basic	ITNP1CA	32	0	0	32	2
Semester 2			160	0	352	512	21

Network Administration	Core	ITNP2NA	32	0	96	128	5
System Administration	Core	ITNP2SA	32	0	96	128	5
Network Design	Core	ITNP2ND	32	0	96	128	5
Network and Information Security	Core	ITNP2NIS	32	0	64	96	4
Workplace Problem Solving Techniques	Basic	ITNP2WPST	32	0	0	32	2
<b>Semester 3</b>			<b>128</b>	<b>0</b>	<b>64</b>	<b>192</b>	<b>12</b>
Introduction to 4IR	Core	ITNP34IR	32	0	64	96	4
Math Discrete	Basic	ITNP3MD	16	0	0	16	1
Soft Skills	Basic	ITNP3SS	32	0	0	32	2
Environmental Sustainability Measures	Basic	ITNP3ESM	16	0	0	16	1
Business Concept	Basic	ITNP3BC	32	0	0	32	2
Year 1 internship	Core	ITNP3INT					2
<b>Semester 4</b>			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>
Final year internship	Core	ITNP4INT					9
<b>Total</b>			<b>448</b>	<b>0</b>	<b>800</b>	<b>1248</b>	<b>64</b>

## Annexe 2

### Detail of establishment of Associate' Degree "Industrial Engineering" – CBT, 2 Years Program under department GIM

#### 1. BACKGROUND

The Department of Industrial and Mechanical Engineering (GIM) propose to launch a new Associate's Degree program in Industrial Engineering. This program is being established under the Skills for Future Economy (SFE) project, an ADB-support initiative aimed at developing Cambodia's workforce for the modern economy. The SFE project recognizes Industrial Engineering as a crucial skill area, and GIM, classified as a Group-A institute, is well-positioned to take the lead in delivering this program. With its existing experience in competency-based training (CBT), GIM will not only offer this new program but also guide and support Group-B institutes, such as Kandal and Kampong Speu Polytechnics, in implementing their own programs.

Building upon the success of the S4C project, which introduced CBT to GIM in 2019, the new Industrial Engineering program will leverage this effective teaching model to bridge the skills gap and prepare graduates for immediate contributions in the workforce. Furthermore, the SFE project will provide resources for faculty development, advanced training equipment, and facility upgrades, ensuring a comprehensive and high-quality learning experience for our students.

#### 2. PROGRAM OBJECTIVE

This program equips graduates with the following core competencies to excel in various industrial settings:

- **Hands-on Technical Skills:** Graduates will gain proficiency in operating and maintaining common machines and utility equipment, fostering a strong foundation in practical applications.
- **Automation Fundamentals:** The program introduces students to the principles of low-cost automation systems, preparing them to contribute to the efficiency and productivity of manufacturing and processing industries.
- **Quality Assurance Expertise:** Graduates will develop a comprehensive understanding of quality planning, control, and assurance practices, enabling them to maintain consistently high standards within industrial environments.
- **Process Improvement Techniques:** The program equips students with the knowledge of Lean methodologies (including 5S and Muda-dori), Six Sigma, and Kaizen, empowering them to optimize processes and eliminate waste.
- **Sustainable Practices:** Graduates will learn to conduct energy audits and implement effective energy management strategies, contributing to environmental sustainability.
- **Operational Efficiency Management:** The program covers the fundamentals of work facility layout, inventory control, and material handling systems, allowing graduates to optimize industrial operations for efficiency.

- **Safe Work Environment:** Students will gain a strong understanding of industrial ergonomics and workplace safety principles, enabling them to contribute to creating a safe and healthy work environment.
- **Maintenance Expertise:** The program equips graduates with the ability to perform and manage maintenance tasks for industrial utilities and machinery, ensuring smooth operation and minimizing downtime.
- **Emerging Technologies:** Graduates will gain a foundational understanding of Artificial Intelligence (AI) applications in industrial engineering, including Human-Machine Interface (HMI) systems, decision support systems, and information management technologies, preparing them for the future of industrial practices.

By mastering these competencies, graduates of this program will be well-positioned for successful careers in various industrial sectors, contributing to increased efficiency, quality, and innovation within the workforce.

### 3. CURRICULUM

Below table show the course structure of the associate's degree program in Industrial Engineering

Module	Number of hours				Number of Credits				
	Semester:	IA	IIA	IB	IIB	Lecture	Exercise	Practice	TOTAL
Apply Mathematical Calculations for Industrial Engineering		48				1	1	0	2
Supervise Application of Basic Computer Software Such as Ms Office and E-mail		48				1	0	1	2
Perform operations and processes on common machines and utilities machines		144				3	0	3	6
Plan and apply industrial ergonomics and workplace health and safety measures		96				2	0	2	4
Plan and implement green measures and techniques at workplace		48				1	0	1	2
Apply Communication and Team Building Skills in Workplace			32			2	0	0	2
Apply quality planning, control and assurance in industry			128			2	0	3	5
Apply and monitor data collection and analysis in conformance to 4IR			64			2	0	1	3
Understand AI for industrial engineering through HMI, decision support and information systems			128			2	0	3	5
Perform energy audit and apply energy management			64			2	0	1	3

Internship Report			96					2
Apply basic concepts of Lean/ 6 Sigma/ Kaizen/ 5S and Muda-dori			96		2	0	2	4
Apply basic concepts of low- cost automations systems in manufacturing and process industries			96		2	0	2	4
Perform and manage maintenance of plant utilities and machinery			112		3	0	2	5
Understand work facilities, layout, inventory and material handling system for efficient operations			112		3	0	2	5
Final Year Internship				384				9
<b>Total per semester</b>	384	416	512	384	28	1	23	63
<b>Total Hours</b>	<b>800</b>		<b>896</b>		<b>1696</b>			

#### 4. HUMAN RESOURCES, TRAINING FACILITY AND EQUIPMENT

In our department, we currently have a total of 36 faculty members, including 33 lecturers and 3 support staff members. Among the lecturers, 7 hold Ph.D. degrees, while the others hold Master's degrees. The faculty members involved in the new associate's degree program are listed in the table below:

No.	Name	Qualification	University and Country of Graduation	Year of Graduation
1	CHAN Sarin	Ph.D	Bandung Institute of Technology, (Indonesia), and Keio University (Japan)	2011
2	CHHITH Saosometh	Ph.D	Ghent University (Belgium)	2017
3	KRUY Sothea	Ph.D	Keio University (Japan)	2015
4	SEANG Chansopheak	Ph.D	INSA de Rennes (France)	2013
5	SAR Sambo	Master	Université Libre de Bruxelles (Belgium)	2004
6	PHUOY Lyheng	Master	Changmai University (Thailand)	2015

7	SENG Piseth	Master	University of Malaya (Malaysia)	2013
8	SAN Sophak	Master	Bandung Institute of Technology (Indonesia)	2017
9	PICH Yanghav	Master	Institute of Technology of Cambodia	2018
10	HEANG Latin	Master	Institute of Technology of Cambodia	2020
11	KEO Chivorn	Master	Institute of Technology of Cambodia	2020
12	LY Leangchheng	Master	Institute of Technology of Cambodia	2020
13	SREY Sokserey	Master	Institute of Technology of Cambodia	2023



### Annexe 3

## Detail of establishment of new program namely “Associate Degree in Geotechnical Engineering” under Faculty of Geo-resources and Geotechnical Engineering

### 1. BACKGROUND

Department of Geo-resources and Geotechnical Engineering was established in late 2011 to response for urgent needs for management and development of the resource’s sustainability of minerals and petroleum in Cambodia. According to Prokas No. 726 of Ministry of Education Youth and Sports, Department of Geo-resources and Geotechnical Engineering has upgraded to Faculty of Geo-resources and Geotechnical Engineering, consisting of two departments, Department of Geo-resources and Geotechnical Engineering, and Department of Petroleum Engineering. However, due to narrow of job market in the field of petroleum, the Faculty of Geo-resources and Geotechnical Engineering has been implementing only one engineering program – Program of Geo-resources and Geotechnical Engineering with multidisciplinary fields, such as mining, petroleum, and geotechnical engineering.

In response to the current urgent need of human resources for engineers and associate degrees in geotechnical engineering, which is experiencing significant growth, there is a rising demand for skilled professionals in the field. The construction and real estate sectors are expanding, contributing to the increased demand. Over the past decade (2009 -2019), Cambodia has seen a 7.1% GDP growth, with 2% increase in construction and real estate, as reported by World Bank, resulting in the creation of 220,000 jobs. In 2022, Cambodia’s GDP grew by about 5.5% and an estimated growth rate of 6.6% is expected in 2023. Geotechnical engineers and technicians play a crucial role not only in construction companies but also in mining industries, supporting activities such as soil investigation, tunnelling, retaining wall, surface, and underground mining.

Establishing an associate degree program in geotechnical engineering will help prepare individuals for these specific roles and ensure they have the relevant knowledge and skills required by the industry. Moreover, the establishment of the associate degree program aligns with the institution's vision and supports national development goals, such as the Rectangular Strategy Phase 4 of the Royal Government. By providing quality education and producing skilled graduates in geotechnical engineering, the program contributes to the growth of employment, equity, and efficiency, which are vital for the overall development of Cambodia. The faculty aims to enhance educational opportunities for students interested in geotechnical engineering by offering a structured curriculum that covers foundational principles and practical skills in the field. This program can serve as a stepping stone for those who choose to pursue further education or enter the workforce directly after completing the associate degree. Therefore, the faculty proposes the establishment of an 'Associate Degree in Geotechnical Engineering'."

### 2. PROGRAM OF GEOTECHNICAL ENGINEERING ASSOCIATE DEGREE

- Name in French: DUT Génie Géotechniques
- Name in Khmer: បរិញ្ញាបត្ររងទេព្យកោសល្យគ្រឹះភូគព្ភសាស្ត្រ

## **2.1. Program Education Objectives (PEOs)**

The program of Associate Degree in Geotechnical Engineering is 2 -years program under faculty of Geo-resources and Geotechnical Engineering at Institute of Technology of Cambodia. It aims to prepares students for lifelong careers as skilled and productive technicians who can adapt to new situations and emerging programs while maintaining a high level of awareness of ethical, social and environmental concerns. Upon graduation, within two years, students will be able to:

**PEO1:** Acquiring foundational knowledge and practical skills in Geotechnical Engineering-related areas such as Shallow and Deep Foundation Design, Earth Structure Analysis, and Soil/Rock Slope Stability for entry-level positions in the field.

**PEO2:** Developing essential soft skills including teamwork, problem-solving, and communication to effectively collaborate in engineering projects and contribute to team efforts.

**PEO3:** Cultivating a commitment to continuous learning and professional development to adapt to evolving technologies and industry practices.

**PEO4:** Emphasizing ethical conduct, responsibility, and awareness of societal implications of engineering decisions, promoting integrity and service-oriented values in engineering practice at the technician level.

## **2.2. Program Learning Outcomes (PLOs)**

Associate Degree program of Geotechnical Engineering under Faculty of Geo-resources and Geotechnical Engineering at ITC aims to instill in our graduates the following attributes:

### **A – KNOWLEDGE**

**PLO1:** Apply foundational engineering knowledge, mathematics, and basic science principles in practical applications within the field of Geotechnical Engineering.

**PLO2:** Perform basic experimental procedures, analyze data, and interpret results relevant to Geotechnical Engineering.

### **B – COGNITIVE SKILLS**

**PLO3:** Investigate and analyze simple engineering problems in Geotechnical Engineering using established methodologies and basic research skills.

**PLO4:** Apply basic critical thinking skills to identify and solve straightforward engineering problems.

### **C – INTERPERSONAL SKILLS AND RESPONSIBILITY**

**PLO5:** Demonstrate professionalism and ethical behavior in engineering practice at the technician level.

**PLO6:** Collaborate effectively in small-scale engineering projects within a team environment.

**PLO7:** Engage in professional development activities and demonstrate a commitment to lifelong learning.

#### **D – NUMERICAL SKILLS, INFORMATION TECHNOLOGY, AND COMMUNICATION**

**PLO8:** Communicate technical information effectively through written reports and oral presentations.

**PLO9:** Utilize basic numerical and information technology skills to support engineering tasks.

#### **E – PSYCHOMOTOR SKILLS**

**PLO10:** Apply fundamental techniques and resources for basic product development and engineering tasks.

### **2.3. Course hours and credits**

For each semester of 1<sup>st</sup> year and 2<sup>nd</sup> year, students will be required to take 4 to 5 courses to fulfill 15 to 18 credits which equivalent to 384 hours or almost the same number of hours of studying. Total credits for the program are required about 66 credits (including final year project which is 18 credits) equivalent to 1408 class hours in total.

The credit to be equivalent with teaching hour as follows:

- 16 hours of teaching course (C) = 1 credit
- 32 hours of tutorial (TD) = 1 credit
- 32 hours of laboratory practice (TP) = 1 credit

### **2.4. Curriculum of the program**

This curriculum is designed for associate degree which illustrate the whole two years **Geotechnical Engineering Associate Degree Program** in Faculty of Geo-resources and Geotechnical Engineering from 1<sup>st</sup> year to 2<sup>nd</sup> year.

The curriculum of Geotechnical Engineering in academic year 2024-2025

**Curriculum for 1<sup>st</sup> year (T1) semester 1:**

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	Computer Aides Drawing (CAD)					64	64	2
2	Engineering Geology			32	16		48	2.5
3	Hydrogeology			32	16		48	2.5
4	Soil Mechanics			48		64	112	5
5	Rock Mechanics			32		32	64	3
<b>Total for 1<sup>st</sup> semester T1</b>				<b>144</b>	<b>32</b>	<b>160</b>	<b>336</b>	<b>15</b>

**Curriculum for 1<sup>st</sup> year (T1) semester 2:**

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	Construction Materials			32		64	96	4
2	In-situ Geotechnical Investigation			32		32	64	3
3	Shallow Foundation			48	32		80	4
4	Geodesy and Surveying			64		64	128	6
<b>Total for 2nd semester T1</b>				<b>176</b>	<b>32</b>	<b>160</b>	<b>368</b>	<b>17</b>

### Curriculum for 2<sup>nd</sup> year (T2) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	Deep Foundation			48	32		80	4
2	Slope Stability Analysis & Earth Retaining Structure			48	32		80	4
3	Deep Excavation			48	32		80	4
4	Project Management, Work Safety and Ethics			48	32		80	4
<b>Total for 1<sup>st</sup> semester T2</b>				<b>192</b>	<b>128</b>	<b>0</b>	<b>320</b>	<b>16</b>

### Curriculum for 2<sup>nd</sup> year (T2) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
	Final Internship						384	18
<b>Total for 2<sup>nd</sup> semester T2</b>							<b>384</b>	<b>18</b>

## 2.5. Human Resources

Faculty of Geo-resources and Geotechnical Engineering has sufficient human resources with master and PhD holders in the field of Geo-resources and Petroleum Engineering, who were graduated from Japan, Thailand, Indonesia, Malaysia, Australia, Cambodia. Based on the number of staff and strategy plan of faculty staffs, GGG will be capable to run new associate degree program of Geotechnical Engineering.

### Human resources of Program of Geotechnical Engineering

No.	Name	Degree	University	Graduated
1	Eng Chandoeun	PhD	Kyushu University	2018
2	Pech Sopheap	PhD	Institute of Technology of Cambodia	2023

3	Pich Bunchoeun	PhD	Hokkaido University	2010
4	Horng Vuthy	PhD	Hokkaido University	2010
5	Por Sopheap	PhD	Chulalongkorn University	2015
6	Boeut Sophea	PhD	Hokkaido University	2020
7	Sreu Tola	PhD	Kyushu University	2022
8	Seang Sirisokha	PhD	Kyushu University	2019
9	Kret Kakda	PhD	Kyushu University	2019
10	Mao Pisith	PhD	Kyushu University	2020
11	Vamoeurn Nimol	Master	The University of Melboure	2000
12	Kaing Sainglong	Master	Asian Institute of Technology	2015
13	Kong Sotheara	Master	University of the Philippines Diliman	2023
14	Hong Pisith	Master	Tokai University	2020
15	Chea Monyneath	Master	Nagaoka University of Technology	2022
16	Seng Mengly	Master	Chulalongkorn University	2021
17	Sreng Laymey	Master	Institute of Technology of Cambodia	2022
18	Heng Ratha	Master	Institute of Technology of Cambodia	2022

## 2.6. Laboratory Facilities

The faculty has 7 laboratories for supporting the research and practical class works for both engineer and associate degrees programs are shown below:

### Laboratory facilities and function for program at GGG

No	Name of Laboratory	Equipment	Function
1	Sample Preparation	<ul style="list-style-type: none"> <li>- Large Scale Cutting Machine</li> <li>- Small Scale Cutting Machine</li> <li>- Precision Cutting Machine</li> </ul>	<ul style="list-style-type: none"> <li>- Cutting, polishing, and preparing rock and soil samples</li> <li>- Experiment on mineral processing</li> </ul>

		<ul style="list-style-type: none"> <li>- Rock Polishing Iron Plate</li> <li>- Rock Polishing Glass Plate</li> <li>- Electric Hot Plate</li> <li>- Mineral Separating Machine</li> <li>- Stainless Mortar</li> <li>- Iron Motar</li> <li>- Ultrasonic Cleaner</li> <li>- Diamond Polishing machine (Big)</li> <li>- Diamond Polishing machine (small)</li> <li>- Centrifuges with rotor (Pro-Analytical)</li> <li>- Electric Balance</li> <li>- Hand Auger Equipment</li> </ul>	<ul style="list-style-type: none"> <li>- Experiment on liquid and solid separating of minerals</li> </ul>
2	X-Ray	<ul style="list-style-type: none"> <li>- X-Ray Diffraction (XRD)</li> <li>- X-Ray Fluorescence (XRF)</li> </ul>	Minerals and chemical characterization
3	Petroleum	<ul style="list-style-type: none"> <li>- Instructional Gravimetric Capillary Pressure System</li> <li>- Bench Top Liquid Permeability Measurement System</li> <li>- Floor Stand Manual Drill Press</li> <li>- Instructional Gas Permeameter</li> <li>- Instructional Helium Porosimeter</li> <li>- Univeral Strength Testing</li> <li>- Pressure Valum Temperature apparatus</li> <li>- Viscometer</li> <li>- Densitymeter</li> <li>- Gasometer</li> <li>- Stirrer</li> <li>- High precious digital scale</li> </ul>	Petroleum exploration, oil and gas reservoir characterization, rock and soil properties analysis
4	Geotechnics	<ul style="list-style-type: none"> <li>- Electric Furnace</li> <li>- Electrical Oven</li> <li>- Micro-Deval Apparatus</li> <li>- Unconfined Compression Tester</li> <li>- Hydrometer Analyzer</li> <li>- Liquid Limit Apparatus (Cassagrand)</li> <li>- Stirrer (Oriental Motor)</li> <li>- Extruder</li> <li>- Electric Balance Big size</li> <li>- Agate Motar, small, medium, and large sizes</li> <li>- Direct shear</li> <li>- Unconfined compression test apparatus</li> <li>- Point Load Index test apparatus for rock</li> <li>- Oil rotary vacuum pump</li> <li>- Sieve and small ball mil</li> </ul>	To support geotechnical and geo-resources investigation
5	Microscope	<ul style="list-style-type: none"> <li>- Binocular Polarizing Metallurgical Microscope</li> </ul>	Minerals characterization

		<ul style="list-style-type: none"> <li>- Trinocular Polarizing Metallurgical Microscope</li> <li>- Heating/Freezing Stage Apparatus (Fluid Inclusion)</li> </ul>	
6	Nanostructure and Chemical analysis	<ul style="list-style-type: none"> <li>- MP-AES</li> <li>- SEM/EDS</li> <li>- UV-vis</li> </ul>	Chemical and morphology analysis
7	Exploration Geophysics	<ul style="list-style-type: none"> <li>- Magnetometer</li> <li>- Two Seismograph -48channels</li> <li>- Four workstations and one mobile workstation</li> </ul>	Geo-resources and geotechnical exploration



## Annexe 4

### Detail of Proposed Modification of Engineering Program Curriculum of Civil Engineering Department

#### 1. BACKGROUND

Civil Engineering Department (GCI) of Civil Engineering Faculty (FGC) is the eldest department among three departments of the faculty. The other two departments included Architectural Engineering Department (GAR) and Infrastructure and Transports Engineering Department (GTI). Our mission is to promote the quality of sciences and technology education in the field of civil engineering to the regional and international level. Based on our mission, our program curriculum is one crucial key which required continuous attention to check and revise when necessary.

#### 2. PROPOSED MODIFICATION OF CURRICULUM OF CIVIL ENGINEERING PROGRAM

For the academic year 2024-2025, the engineering program curriculum of the Civil Engineering Department is requested for a modification. The modification includes shifting the courses between semesters and reducing the credit number of a course in compensating to add in another course. The summary of the proposed modification is shown in Table 1.

Table 1: Summary of proposed modification of the curriculum of GCI for fiscal year 2024-2025

Gr	No.	Name of course	Current Situation				Proposed modification			
			C	TD	TP	Credit	C	TD	TP	Credit
I3GCI-S1	1	Hydrology	32	0	0	2	Shift to 3 <sup>rd</sup> year, semester 2			
	2	Geology	In 3 <sup>rd</sup> year, semester 2				16	0	0	1
	3	Heat in Building	In 3 <sup>rd</sup> year, semester 2				16	0	0	1
I3GCI-S2	1	Hydrology	In 3 <sup>rd</sup> year, semester 1				32	0	0	2
	2	Geology	16	0	0	1	Shift to 3 <sup>rd</sup> year, semester 1			
	3	Heat in Building	16	0	0	1	Shift to 3 <sup>rd</sup> year, semester 1			
I4GCI-S2	1	Soil mechanics II	32	32	0	3	16	16	0	1.5
	2	Finite Element Method	None				16	0	16	1.5

#### 3. CURRICULUM OF ENGINEERING PROGRAM OF CIVIL ENGINEERING DEPARTMENT

The proposed program curriculum for engineering degree of civil engineering in the academic year 2024-2025 is shown in Table 2.

Table 2: Program Curriculum of Civil Engineering

Curriculum for 3<sup>rd</sup> year (I3GCI) semester 1:

No.	Name of subject	Code	Instructor	Cours	TD	TP	Total	Credit
1	English I	GCI31LAN				32	32	1
2	French I	GCI31LFR				64	64	2
3	AutoCAD	GCI31AUC	MEY Dina			32	32	1
4	Geology	GCI32GEO	HENG Ratha	16			16	1
5	Heat in Building	GCI32THB	LEU Leanghong	16			16	1
6	Fluid Mechanics	GCI31MDF	POUV Keang Se	32			32	2
7	Continuum Mechanics	GCI31MSF	OUCV Vanthet	16	16		32	1.5
8	Strength of Materials I	GCI3RDM	RATH Sovann Sathya	16	32		48	2
9	Statistics	GCI31STA		16	32		48	2
10	Surveying	GCI31TOP	OENG Thaileng	32		32	64	3
<b>Total for 1<sup>st</sup> semester I3GCI</b>				<b>144</b>	<b>80</b>	<b>160</b>	<b>384</b>	<b>16.5</b>

Curriculum for 3<sup>rd</sup> year (I3GCI) semester 2:

No.	Name of subject	Code	Instructor	Cours	TD	TP	Total	Credit
1	English II	GCI32LAN				64	64	2
2	French II	GCI32LFR				32	32	1
3	Architecture	GCI32ARC	VENH Lay Ou	16	32		48	2
4	Electricity in Building	GCI32EDB	BUN Seang	16			16	1
5	Electrotechnics	GCI32ELT	BUN Seang	16			16	1
6	Construction Materials (Concrete)	GCI32MDCB	HENG Sounean	16		16	32	1.5
7	Construction Materials (steel)	GCI32MDCA	LY Hav	16			16	1
8	Informatics (MATLAB)	GCI32MAT	POUV Keang Sé	16		16	32	1.5

9	Strength of Materials II	GCI32RDM	RATH Sovann Sathya	16	32	0	48	2
10	Hydrology	GCI31HYL	ANN Vannak	32			32	2
11	Building Construction Technology	GCI32TDB	PROK Narith	16	32		48	2
<b>Total for 2<sup>nd</sup> semester I3GCI</b>				<b>160</b>	<b>96</b>	<b>128</b>	<b>384</b>	<b>17</b>

*Curriculum for 4<sup>th</sup> year (I4GCI) semester 1:*

No.	Name of subject	Code	Instructor	Cours	TD	TP	Total	Credit
1	English I	GCI41LAN				32	32	1
2	French I	GCI41LFR				32	32	1
3	Structural analysis I	GCI41ADS	VONG Seng	32			32	2
4	Reinforced Concrete I	GCI41BEA	LIM Sovanvichet	16	32		48	2
5	Engine in construction site	GCI41EDC	OUCH Vanthet	16			16	1
6	Steel design and construction I	GCI41COM	LY Hav	32			32	2
7	Plumbing System and Sanitary Equipment	GCI41INS	CHHANG Sophy	32			32	2
8	Soil Mechanics I	GCI41MDS	KY Sambath	32	16	16	64	3
9	Road Design and Construction I	GCI41ROU	POUV Keang Se	48			48	3
10	Safety in construction site	GCI41SEC	LIM Sovanvichet	16			16	1
11	Construction site technology	GCI41TDC	CHHANG Sophy	16			16	1
12	External Works	GCI41VRD	OENG Thaileng	16			16	1
13	Internship Report	GCI32RDS						2
<b>Total for 1<sup>st</sup> semester I4GCI</b>				<b>256</b>	<b>48</b>	<b>80</b>	<b>384</b>	<b>22</b>

Curriculum for 4<sup>th</sup> year (I4GCI) semester 2:

No.	Name of subject	Code	Instructor	Cours	TD	TP	Total	Credit
1	English II	GCI42LAN				32	32	1
2	French II	GCI42LFR				32	32	1
3	Structural analysis II	GCI42ADS	VONG Seng	16	32		48	2
4	Reinforced concrete II	GCI42BEA	LIM sovanvichet	16	32		48	2
5	Prestressed concrete I	GCI42BPR	CHEA Savuth	32			32	2
6	Structural Wood design and construction	GCI42COB	KAN Kuchvichea	16	32		48	2
7	Steel design and construction II	GCI42COM	LY Hav	16	32		48	2
8	Soil mechanics II	GCI42MDS	KY Sambath	16	16		32	1.5
9	Road design and construction II	GCI42ROU	KAN Kuchvichea		16	16	32	1
10	Finite Element Method	GCI42MEF	LIM Sovanvichet	16		16	32	1.5
<b>Total for 2<sup>nd</sup> semester I4GCI</b>				<b>128</b>	<b>160</b>	<b>96</b>	<b>384</b>	<b>16</b>

Curriculum for 5<sup>th</sup> year (I5GCI) semester 1:

No.	Name of subject	Code	Instructor	Cours	TD	TP	Total	Credit
1	English	GCI51LAN				32	32	1
2	French	GCI51LFR				32	32	1
3	Prestressed Concrete II	GCI51BPR	CHEA Savuth	16	32		48	2
4	Structural Design by Computer Aids	GCI51CDS	CHREA Rada	16	32		48	2
5	Construction Law	GCI51DRO	MEY Dina	32			32	2
6	Contract	GCI51MAR	HIN Raveth	16			16	1
7	Quantity estimation	GCI51MET	HIN Raveth	32			32	2
8	Planning	GCI51PLA	MAO Kunthea	16	16		32	1.5

9	Bridge Design and Construction	GCII51PON	KAING Sao Serey	48	32		80	4
10	Conception of Earthquakes	GCII51CTT	PROK Narith	32			32	2
<b>Total for 1<sup>st</sup> semester I5GCI</b>				<b>208</b>	<b>112</b>	<b>64</b>	<b>384</b>	<b>18.5</b>

Curriculum for 5<sup>th</sup> year (I5GCI) semester 2:

No.	Name of subject	Code	Instructor	Cour s	TD	TP	Total	Credit
1	Final Year Internship	GCII52SFE					384	9
<b>Total for 2<sup>nd</sup> semester I5GCI</b>							<b>384</b>	<b>9</b>

## Annexe 5

### Detail of proposed modification of Transport and Infrastructure Engineering program of Faculty of Civil Engineering

#### 1. BACKGROUND

Transport sector plays a very important role for the overall economic growth of a society. It integrates mobility of people and goods at both domestic and international levels (e.g., transport by roads, railway, maritime, river, and air transport networks). The continuous population growth and their daily activities pose significant challenges to the development of transport systems and infrastructures in many countries, including Cambodia. Particularly, the number of qualified people with specialization in the transport and infrastructure related fields remains quite limited to respond to Cambodia's development. This is due to the fact that there is very little educational training program in these fields. Certain existing courses related to buildings and public works are often included in civil engineering program.

#### 2. NAME OF THIS PROGRAM

- Name in French: Génie des Transports et des Infrastructures
- Name in English: Transport and Infrastructure Engineering
- Name in Khmer: ដេប៉ាតឺម៉ង់ទេពកោសល្យហេដ្ឋារចនាសម្ព័ន្ធ និងដឹកជញ្ជូន

#### 3. OBJECTIVE OF THIS PROGRAM

This program was launched in 2022, for the first time in Cambodia, to educate more specialists and qualified engineers in respond to needed human resources in the fields of transport and infrastructure engineering. It allows students to acquire specific technical skills such as the study on road traffic, the design of construction plans, planning, construction techniques, maintenance and repair of infrastructure, management of goods flows, etc. After their studies, students can work either in design offices, on construction sites, or in administration responsible for different tasks related to transport and logistics and with different responsibilities. They also have the opportunity to continue their studies at higher degrees, including master and doctoral degrees.

#### 4. PROPOSED UPDATED CURRICULUM OF THIS PROGRAM

In response to the current job markets and digital society transformation, the curriculum of this program “Transport and Infrastructure Engineering” should be updated accordingly. We propose to slightly modify 3 courses as shown in Table 1. Table 2 shows the full curriculum of Transport and Infrastructure Engineering program at Institute of Technology of Cambodia, after this update.

Table 1: Proposed Updated Course Items in the Transport and Infrastructure Engineering Program

No.	Year/ Semester	Previous Course	Revised Course	Descriptions
1	GTI-I3-S2	Management of Supply Chains and transport systems	Management of Supply Chains	-We revised the name of this course, by deleting the term “and Transport Systems” -The terms “Transport Systems” is already included in other course “Transport Systems of Freights and Travelers”
2	GTI-I4-S2	Management of stocks and supplies	Digital Technologies for Transport and Infrastructure	-Previous course is similar to other course “Management of Supply Chains” in GTI-I3-S2, so we replaced this course with new course “Digital Technologies for Transport and Infrastructure” -This new course is 2-credit (32 h coursework) -This new course is designed corresponding to the current job market and the national pentagon strategy (about digital society)
3	GTI-I5-S1	Underground structures	Underground structures	-We slightly adjusted the TD duration, from 32h to 16h. -The remaining 16h is added to the new course “Digital Technologies for Transport and Infrastructure” in GTI-I4-S2.

Table 2: Updated Curriculum of Transport and Infrastructure Engineering Program

No.	Course Name	C	TD	TP	Credit
<b>GTI-I3-S1</b>					
1	English			32	1
2	French			64	2
3	C.A.D. 1 (AutoCAD)	16		32	2
4	Strength of Materials 1	16	32		2
5	Statistics	32	32		3
6	Surveying	32		32	3
7	Choice of Transport Infrastructures and Sustainability	16			1
8	Life Cycle Analysis	16			1
9	Transport Economies	16			1
10	Fundamental Notions of Logistics	16			1
	<b>Sub-total</b>	<b>160</b>	<b>64</b>	<b>160</b>	<b>17</b>
<b>GTI-I3-S2</b>					
1	English			64	2
2	French			32	1
3	Geology	16			1
4	Hydrology	32			2
5	Construction Materials (concrete)	16		16	1.5
6	Strength of Materials 2	16	32		2
7	Transport Engineering	32			2
8	Traffic Management and Modelling	32			2
9	Transport Systems of Freights and Travelers	16	16		1.5

No.	Course Name	C	TD	TP	Credit
10	Cross-Border and Road Transport	16	16		1.5
11	<del>Management of supply chains and transport systems</del> Management of supply chains	16	16		1.5
12	Final year internship				2
	<b>Sub-total</b>	<b>192</b>	<b>80</b>	<b>112</b>	<b>20</b>
<b>GTI-I4-S1</b>					
1	English			32	1
2	French			32	1
3	Structural analysis for construction and public works 1	32			2
4	Reinforced concrete	32	32		3
5	Steel design and construction	16	32		2
6	Soil mechanics 1	32	16	16	3
7	Road design 1	48			3
8	Urban drainage system	32			2
9	Air transport	32			2
	<b>Sub-total</b>	<b>224</b>	<b>80</b>	<b>80</b>	<b>19</b>
<b>GTI-I4-S2</b>					
1	English			32	1
2	French			32	1
3	Structural analysis for construction and public works 2	16	32		2
4	Pre-stressed concrete	16	32		2
5	Soil mechanics 2	16	32		2
6	Road design 2	16	16	16	2
7	Site management	32			2
8	C.A.D. 2 (Civil 3D)	16			1
9	Maritime ports	16	32		2
10	<del>Management of Stocks and Supplies</del> Digital Technologies for Transport and Infrastructure	<del>16</del> 32	<del>16</del>		<del>1.5</del> 2
	<b>Sub-total</b>	<b>160</b>	<b>144</b>	<b>80</b>	<b>17</b>
<b>GTI-I5-S1</b>					
1	English			32	1
2	French			32	1
3	Calculation of structures (Plaxis 2D)	16	32		2
4	Laws	32			2
5	Marketing	16			1
6	Cost and quantity estimation	32			2
7	Planning	16	16		1.5
8	Bridge design	48	32		4
9	Railways	32			2
10	Underground structures	16	<del>32</del> 16		1.5
	<b>Sub-total</b>	<b>208</b>	<b>96</b>	<b>64</b>	<b>18</b>
<b>GTI-I5-S2</b>					
1	Final year internship				9



No.	Course Name	C	TD	TP	Credit
	<b>Sub-total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>

<b>Total</b>	<b>944</b>	<b>464</b>	<b>496</b>	<b>100</b>
	<b>C</b>	<b>TD</b>	<b>TP</b>	<b>Credit</b>

Note: C: Lecture (1 credit = 16 hours); TD: Exercise (1 credit = 32 hours); TP: Practice (1 credit = 32 hours)

## **Annexe 6**

### **Detail of proposed modification of Geo-resources and Geotechnical program of Faculty of Geo-resources and Geotechnical Engineering**

#### **1. BACKGROUND**

Program of Geo-resources and Geotechnical Engineering at Faculty of Geo-resources and Geotechnical Engineering has implemented since the establishment of the department in late 2011. The primary objective of the program is to provide undergraduate students with multidisciplinary skills and knowledge in the fields of economic geology, petroleum and geotechnical engineering. In addition to the technical knowledge, the program also emphasizes the development of professional skills and ethical awareness. Students are provided with knowledge and training in engineering ethics, work safety practices, environmental impact assessment, and decision-making processes. These skills are crucial for students to navigate real-world challenges and make informed decisions that consider the ethical, social, and environmental implications of their work.

Recognizing the high demand for professional geotechnical engineers, particularly in the areas of foundation and slope stability design in various industries, the faculty proposes to modify the courses in the 5th-year program. This modification aims to ensure that the program stays up-to-date with the latest developments in the field of geotechnical engineering. By incorporating the most relevant and current knowledge and skills into the curriculum, the faculty ensures that graduates are well-prepared to meet the industry's demands and excel in their careers. The proposed modifications in the courses enable students to gain a deeper understanding of advanced topics related to foundation and slope stability design. It allows students to explore emerging technologies, industry best practices, and the latest research findings in these areas. By staying up-to-date with the field's advancements, students can develop the necessary expertise and proficiency to address the complex challenges associated with geotechnical engineering in the industry.

#### **2. PROPOSE MODIFICATION OF THE CURRICULUM OF GEO-RESOURCES AND GEOTECHNICAL ENGINEERING PROGRAM**

For the upcoming academic year, the program of Geo-resources and Geotechnical Engineering requested to modify 4 courses in total, in which 1 course modified name, 1 course is removed, 1 course is modified the duration, and 1 course is a new course.

Table 1: Summary of proposed modification of 4 courses in Geo-resources and Geotechnical Program

Gr	No.	Name of course	Current Situation				New Proposal			
			C	TD	TP	Credit	C	TD	TP	Credit
I5GGG-S1	1	French	0	0	32	1	0	0	32	1
	2	English	0	0	32	1	0	0	32	1
	3	Foundation Engineering II	16	16	0	1.5	32	16	0	2.5
	4	Fundamental of Petroleum Engineering	48	0	0	3	48	0	0	3
	5	Mineral Processing	16	0	32	2	16	0	32	2
	6	Exploitation of Gravel, Sand, and Clay	32	0	0	2	Delete			
	7	Research Methodology	New				16	0	0	1
	8	Oil and Gas Resources Development	48	0	0	3	48	0	0	3
	9	Mining Project Management (Modified name from Mining Project) Management)	32	0	0	2	32	0	0	2
	10	Economics and Management of Mineral Resources	32	0	0	2	32	0	0	2
	11	Geo-environment	32	0	0	2	32	0	0	2
	12	Work Safety and Ethics	16	0	0	1	16	0	0	1
	13	Internship Report	0	0	0	2	0	0	0	2

### 3. CURRICULUM OF THE MODIFIED PROGRAM

This curriculum is designed for an engineering degree that illustrates the whole three years program at Faculty of Geo-resources and Geotechnical Engineering from 3<sup>rd</sup> -year to 5<sup>th</sup> – year.

The curriculum of the Geo-resources and Geotechnical Program in the academic year 2024 -2024 is shown below:

Table 2: Curriculum for 3<sup>rd</sup> year (I3) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	64	64	2
2	English			0	0	32	32	1
3	Statistics			16	32	0	48	2
4	Geodesy and Topology			32	0	32	64	3
5	Geochemistry			32	0	0	32	2
6	General Geology of Geology of Cambodia			32	0	0	32	2
7	Mechanic of Materials			32	0	0	32	2
8	Computer Aides Drawing (CAD)			0	0	32	32	1
9	Structural Geology			32	0	0	32	2
10	General Electronics			16	0	0	16	1
<b>Total for 1<sup>st</sup> semester I3</b>				<b>192</b>	<b>32</b>	<b>160</b>	<b>384</b>	<b>18</b>

Table 3: Curriculum for 3<sup>rd</sup> year (I3) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	32	32	1
2	English			0	0	64	64	2
3	Petrology and Mineralogy			16	0	48	64	2.5

4	Sedimentology			32	0	0	32	2
5	Mineral Deposits			48	0	0	48	3
6	Principles of Geographic Information Systems			16	0	32	48	2
7	Geostatistics			32	0	0	32	2
8	Soil Mechanics			32	0	32	64	3
9	Fluid Mechanics			32	0	0	32	2
<b>Total for 2<sup>nd</sup> semester I3</b>				<b>176</b>	<b>0</b>	<b>176</b>	<b>384</b>	<b>17.5</b>

Table 4: Curriculum for 4<sup>th</sup> year (I4) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	32	32	1
2	English			0	0	32	32	1
3	Principles of Remote Sensing			16	0	16	32	1.5
4	Mineral Exploration			48	0	0	48	3
5	Geophysics			32	0	32	64	3
6	Basic Geological Mapping			32	0	0	32	2
7	Hydrogeology			32	0	0	32	2
8	Rock Blasting Techniques			32	0	0	32	2
9	Petroleum Geology			48	0	0	48	3
10	Rock Mechanics			32	0	0	32	2
<b>Total for 1<sup>st</sup> semester I4</b>				<b>272</b>	<b>0</b>	<b>112</b>	<b>384</b>	<b>20.5</b>

Table 5: Curriculum for 4<sup>th</sup> year (I4) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	32	32	1
2	English			0	0	32	32	1
3	Principles of Slope Stability			16	16	0	32	1.5
4	Well logging and Reservoir Evaluation			48	0	0	48	3
5	Surface and Underground Mining			48	0	0	48	3
6	Drilling Techniques			32	0	0	32	2
7	Fluid Mechanics			32	0	0	32	2
8	Cement Production Technology			32	0	0	32	2
9	Foundation Engineering I			16	16	0	32	1.5
10	Petroleum Chemistry			32	0	0	32	2
11	Deep Excavation			32	0	0	32	2
<b>Total for 2<sup>nd</sup> semester I4</b>				<b>272</b>	<b>48</b>	<b>64</b>	<b>384</b>	<b>20.5</b>

Table 6: Curriculum for 5<sup>th</sup> year (I5) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	32	32	1
2	English			0	0	32	32	1
3	Foundation Engineering II			32	16	0	48	2.5
4	Fundamental of Petroleum Engineering			48	0	0	48	3
5	Mineral Processing			16	0	32	48	2
6	Research Methodology			16	0	0	16	1

7	Oil and Gas Resources Development			48	0	0	48	3
8	Project Management			32	0	0	32	2
9	Economics and Management of Mineral Resources			32	0	0	32	2
10	Geo-environment			32	0	0	32	2
11	Work Safety and Ethics			16	0	0	16	1
12	Internship Report			0	0	0	0	2
<b>Total for 1<sup>st</sup> semester I5</b>				<b>288</b>	<b>0</b>	<b>96</b>	<b>384</b>	<b>21</b>

Table 7: Curriculum for 5<sup>th</sup> year (I5) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	Final Year Internship							9
<b>Total for 2<sup>nd</sup> semester I5</b>								<b>9</b>

## Annexe 7

### Detail of modification of Mechanical Engineering Program

#### 1. BACKGROUND

The Mechanical Engineering program at the Institute of Technology of Cambodia (ITC) boasts a rich history, evolving alongside Cambodia's growing need for skilled professionals in mechanization and automation across various sectors. Originally offered within a combined program with Industrial Engineering, the program became independent in 2012. This separation allowed for a more specialized Mechanical Engineering curriculum, preparing graduates for the anticipated advancement of technologies that would drive Cambodia's industrial progress.

Presently, with Cambodia's rapid industrialization and commitment to economic diversification, we see the urgent need to further revise and modernize the curriculum. This revision aims to equip graduates with the skills and knowledge to address the challenges and opportunities presented by Industry 4.0, the rise of Artificial Intelligence, and the ever-evolving global landscape.

Cambodia's national focus on industrial growth has fueled a surging demand for skilled mechanical engineers. This trend directly aligns with the country's development goals outlined in the Industrial Development Policy 2015-2025 (IDP 2025), which targets transforming Cambodia into a "upper-middle-income" nation by 2030, heavily reliant on a robust industrial sector. (<https://cdc.gov.kh/wp-content/uploads/2022/04/IDP-English.pdf>)

One of the key strategies is mobilizing and attracting foreign investments as well as private domestic investments in prioritized sectors which include manufacturing and support industries. The key sectors like garments, automotive parts, and electronics, all of which heavily rely on mechanical engineers for:

- Designing and developing production processes and machinery
- Implementing, and maintaining mechanical systems
- Optimizing production lines for efficiency and quality control
- Integrating sustainable energy solutions
- Supervising and managing teams of technicians.

Furthermore, mechanical engineers play a critical role in Cambodia's construction sector, acting as the core force behind MEP (Mechanical, Electrical, and Plumbing) works in all new and existing construction projects. Their expertise is essential for designing, installing, and maintaining of:

- Heating, ventilation, and air conditioning (HVAC) systems
- Plumbing systems, Fire protection systems
- Elevators and escalators
- Building automation systems.

According to the Ministry of Economy and Finance (MEF), the garment, footwear, and travel goods industry alone, which contributes significantly to Cambodia's GDP, employed over 750,000 individuals in 2022 (<https://www.khmersme.gov.kh/en/news/cambodias-garment-footwear-travel-goods-exports-up-40-pct-in-h1-of-2022/>). This vast industry, along with the growing automotive and electronics sectors, necessitates a substantial pool of qualified mechanical engineers.



Furthermore, a report by the World Bank estimates that Cambodia's manufacturing sector will continue to grow at a rate of 7-8% annually for the next five years (<https://data.worldbank.org/indicator/NV.IND.MANF.ZS?locations=KH>). This projected growth further underscores the critical role mechanical engineers will play in driving this expansion and ensuring Cambodia's continued industrial development.

Table 1: Curriculum of the existing 3<sup>rd</sup> Year Mechanical Engineering program

SUBJECTS	Number of hours							Number of credits				
	Group:		3A		4A		5A	TOTAL	Lecture	Exercise	Practice	TOTAL
	Semester:		I	II	I	II	I	II				
French	64							64		2		2
English	32							32		1		1
Statistics	48							48	1	1		2
Mechanics	64							64	2	1		3
Electrotechnics	32							32	2			2
Materials Sciences I	64							64	2		1	3
Mechanical production, Metrology	48							48	1		1	2
Mechanical design	64							64	2		1	3
French		32						32		1		1
English		64						64		2		2
Computer programming (Matlab)		32						32		1		1
Strength of materials		64						64	2		1	3
Fluids mechanics		64						64	2		1	3
Computer Aid Design (CAD)		48						48	1		1	2
Thermics		48						48	1	1		2
<b>Total I3-GIM</b>									16	10	6	<b>32</b>

## 2. PROPOSE MODIFICATION

To ensure the most effective use of our available faculty resources, we will prioritize the deep revision and modernization of other programs within the GIM department before tackling the Mechanical Engineering program. This prioritization ensures we can dedicate the necessary focus and resources to each program for a successful revision. We plan to begin the in-depth revision of the Mechanical Engineering program curriculum from next year onwards.

The Mechanical Engineering and Industrial Engineering programs at GIM share a common curriculum in the third year, allowing for the efficient development of a strong foundation in core engineering principles

for both specializations. Therefore, as we modify the Industrial Engineering program, the third year of the Mechanical Engineering program will be modified accordingly.

Table 2: Curriculum of the proposed modified 3<sup>rd</sup> Year Mechanical Engineering Program

SUBJECTS	Number of hours						Number of credits				
	3A		4A		5A		TOTAL	Lecture	Exercise	Practice	TOTAL
	I	II	I	II	I	II					
French	64						64		2		2
English	32						32		1		1
Statistics	48						48	1	1		2
Mechanics	48						48	2	1		3
Computer Aid Design (CAD)	48						48	1		1	2
Materials Sciences I	48						48	2		0,5	2,5
Introduction to Control theory	32						32	1	0,5		1,5
Thermal Engineering	64						64	2	1		3
Mechanical design		48					48	2		1	3
French		32					32		1		1
English		64					64		2		2
Introduction to AI for Engineering Applications		48					48	1	0,5	0,5	2
Strength of materials		64					64	2		1	3
Electricity and Electronics		48					48	1	1		2
Introduction to Manufacturing Engineering		48					48	3			3
Metal machining, Metrology		48					48	1		1	2
<b>Total I3-GIM</b>								19	11	5	<b>35</b>

## Annexe 8

### Detail of modification of Industrial Engineering Program

#### 1. BACKGROUND

The Industrial Engineering program at the Institute of Technology of Cambodia (ITC) has a rich history, evolving alongside Cambodia's growing industrial sector. Originally offered within a combined Industrial and Mechanical Engineering program, the program became independent in 2012. This separation aimed to streamline the curriculum, allowing for the inclusion of more specialized industrial engineering subjects to better prepare graduates for the anticipated rise in demand for industrial engineers.

The early years of the independent program were marked by a pragmatic approach to curriculum design. A limited pool of qualified lecturers, coupled with a nascent interest in industrial engineering among students and a young job market in the field, necessitated careful planning. However, this did not stifle the program's growth. Recognizing the significant strides made by Cambodia's industrial sector, coupled with national policy initiatives and the rapid pace of technological advancement, a first curriculum revision was undertaken in 2018.

Presently, with Cambodia's rapid industrialization and commitment to economic diversification, we see the urgent need to further revise and modernize the curriculum. This revision aimed to improve upon the existing program and prepare graduates for the challenges and opportunities presented by Industry 4.0, the rise of Artificial Intelligence, and the ever-evolving global landscape.

Cambodia's rapid industrialization, coupled with its commitment to economic diversification, has created a significant demand for skilled industrial engineers. This aligns perfectly with the country's ambitious goals outlined in the Industrial Development Policy 2015-2025 (<https://cdc.gov.kh/wp-content/uploads/2022/04/IDP-English.pdf>), which aims to transform Cambodia into an "upper-middle-income" nation by 2030 through a robust industrial sector.

One of the key strategies is mobilizing and attracting foreign investments as well as private domestic investments in prioritized sectors which include manufacturing and support industries. Key sectors like garments, automotive parts, and electronics all heavily rely on industrial engineers to:

- Optimize production processes and workflows
- Design and implement efficient layouts for factories and production lines
- Analyze and improve quality control systems
- Manage and integrate automation and technology
- Ensure adherence to safety regulations and environmental standards

Furthermore, the construction sector, experiencing significant growth in Cambodia, also presents opportunities for industrial engineers to contribute their expertise in:

- Project planning and management
- Cost analysis and optimization
- Supply chain management
- Facility design and layout

According to the Ministry of Economy and Finance (MEF), the garment, footwear, and travel goods industry alone, a significant contributor to Cambodia's GDP, employed over 750,000 individuals in 2022

(<https://cleanclothes.org/resources/publications/factsheets/cambodia-factsheet-february-2015.pdf>). This vast industry, along with the growing automotive, electronics, and construction sectors, necessitates a substantial pool of qualified industrial engineers.

A report by the World Bank estimates Cambodia's manufacturing sector to grow at 7-8% annually for the next five years (<https://data.worldbank.org/indicator/NV.IND.MANF.ZS?locations=KH>). This projected growth, coupled with the ongoing development in various sectors, emphasizes the critical role industrial engineers will play in enhancing Cambodia's industrial efficiency, boosting productivity, and ensuring its sustainable economic development.

The Industrial Engineering program at ITC is committed to providing graduates with the necessary skills and knowledge to thrive in this dynamic environment. By continuously modernizing the curriculum, we aim to equip them to become the driving force behind Cambodia's industrial success story.

Table 1: Curriculum of the existing Industrial Engineering program

SUBJECTS	Number of hours							Number of credits			
	3A		4A		5A		TOTAL	Lecture	Exercise	Practice	TOTAL
	I	II	I	II	I	II					
French	64						64		2		2
English	32						32		1		1
Statistics	48						48	1	1		2
Mechanics	64						64	2	1		3
<i>Electrotechnics</i>	32						32	2			2
Materials Sciences I	64						64	2		1	3
Mechanical production, Metrology	48						48	1		1	2
<i>Mechanical design</i>	64						64	2		1	3
French		32					32		1		1
English		64					64		2		2
<i>Computer programming (Matlab)</i>		32					32		1		1
Strength of materials		64					64	2		1	3
<i>Fluids mechanics</i>		64					64	2		1	3
Computer Aid Design (CAD)		48					48	1		1	2
<i>Thermics</i>		48					48	1	1		2
<b>Total I3-GIM</b>								16	10	6	<b>32</b>
Training after year three										2	2
French			32				32		1		1
English			32				32		1		1
<i>Industrial Hydraulics</i>			32				32	2			2
<i>Electronics</i>			32				32	2			2

Power Electronics			32				32	2			2
Organs of machines			48				48	1	1		2
Servo-control systems			48				48	1	1		2
Computer Aids Manufacturing (CAM)			32				32	2			2
Welding technology			48				48	1		1	2
Operations Research			48				48	1	1		2
French				32			32		1		1
English				32			32		1		1
Metallic materials operations				48			48	1	1		2
Automation				48			48	1		1	2
Industrial ergonomic				48			48	1		1	2
Materials Sciences II				48			48	1	1		2
Product design				48			48	1		1	2
Lean Manufacturing I				32			32	2			2
Project Management				48			48	1		1	2
<b>Total I4-GIM</b>								20	9	7	<b>36</b>
French					32		32		1		1
English					32		32		1		1
Research Methodology					32		32	2			2
Regulation					32		32	2			2
Operations Management					48		48	1	1		2
Advanced manufacturing process					48		48	1		1	2
Lean Manufacturing II					48		48	1		1	2
Engineering Ethics, Health and Safety					48		48	1	1		2
Design of Experiments					32		32	2			2
Green Boiler Technology					32		32	2			2
Final year training						384				9	9
<b>Total I5-GIM</b>								12	4	11	<b>27</b>
<b>Total per semester</b>	416	352	384	384	384			48	23	24	<b>95</b>
<b>TOTAL GENERAL</b>	<b>768</b>		<b>768</b>	<b>384</b>	<b>384</b>	<b>2304</b>					

## 2. PROPOSE MODIFICATION

The proposed modifications have been carefully considered based on the following aspects:

- Eliminate less relevant subjects.
- Rearrange the year 3 syllabus to focus on core and relevant fundamental subjects.
- Modernize the curriculum to reflect current trends in technology development.
- Align with Cambodia's industrial development policy and economic digitalization.
- Provide students with a strong foundation in the core principles and theories of industrial engineering.
- Foster an appreciation for the interdisciplinary nature of industrial engineering.
- Emphasize the importance of continuous improvement in industrial processes.
- Introduce project-based learning to motivate and engage students, enhancing both practical and soft skills.
- Equip students with the tools to effectively lead and manage projects and teams.

Since the Industrial Engineering and Mechanical Engineering programs at GIM share the same third year, the subjects are designed to be common, building a strong foundation for both specializations.

### 2.1. Deleted courses

- Computer Programming (MATLAB) (GIMI32MLB)
- Organs of Machines (INDI41ODM)
- Welding Technology (INDI41SDG)
- Materials Science II (INDI42SM2)
- Design of Experiments (INDI51CDE)
- Green Boiler Technology (INDI51TVC)

### 2.2. Combined and renamed courses

Fluid Mechanics (GIMI32MDF) and Thermics (GIMI32THM)

➔ Thermal Engineering (GIMI32THM)

Electrotechnics (GIMI31ELT) and Electronics (INDI4ELN)

➔ Electricity and Electronics (GIMI31ELT)

Mechanical Design (GIMI31CON) and Industrial Hydraulics (INDI41HDI)

➔ Mechanical Design (GIMI31CON)

Servo-control systems (INDI41SAS) and Regulation (INDI51RGT)

➔ Introduction to Control Theory (GIMI31SAS)

Metallic material operations (INDI42MOM)

➔ INDI41PRP: Production Process

### 1.3. New courses

- Introduction to AI for Engineering Applications (GIMI32IIA)
- Introduction to Manufacturing Engineering (GIMI32IME)
- Engineering Economics (INDI42ECI)
- Total Productive Maintenance (INDI41TPM)
- Supply Chain Management I (INDI41GC1)
- Supply Chain Management II (INDI42GC2)
- Engineering Health and Safety (INDI42EHS)
- Multidisciplinary Project I (INDI42MP1)
- Multidisciplinary Project II (INDI51MP2)
- Professional and Personal Development (INDI51DPP)

Table 2: Curriculum of the proposed modified Industrial Engineering Program

SUBJECTS	Number of hours							Number of credits			
	3A		4A		5A		TOTAL	Lecture	Exercise	Practice	TOTAL
	I	II	I	II	I	II					
French	64						64		2		2
English	32						32		1		1
Statistics	48						48	1	1		2
Mechanics	48						48	2	1		3
Computer Aid Design (CAD)	48						48	1		1	2
Materials Sciences I	48						48	2		0,5	2,5
Introduction to Control theory	32						32	1	0,5		1,5
Thermal Engineering	64						64	2	1		3
Mechanical design		48					48	2		1	3
French		32					32		1		1
English		64					64		2		2
Introduction to AI for Engineering Applications		48					48	1	0,5	0,5	2
Strength of materials		64					64	2		1	3
Electricity and Electronics		48					48	1	1		2

Introduction to Manufacturing Engineering		48					48	3			3
Metal machining, Metrology		48					48	1		1	2
<b>Total I3-GIM</b>								19	11	5	<b>35</b>
Year 3 Internship										2	2
French			32				32		1		1
English			32				32		1		1
Machine Learning			48				48	1	1		2
Operations Research			48				48	1	1		2
Power Electronics			32				32	2			2
Computer Aids Manufacturing (CAM)			48				48	1		1	2
Engineering Economics			32				32	1	0,5		1,5
Production Process			32				32	1	0,5		1,5
Total Productive Maintenance			32				32	1	0,5		1,5
Supply Chain Management I			32				32	1	0,5		1,5
French				32			32		1		1
English				32			32		1		1
Automation				48			48	1		1	2
Ergonomic Design				48			48	1		1	2
Industrial Design				48			48	1		1	2
Quality Management (Lean I)				48			48	2	0,5		2,5
Engineering Health and Safety				32			32			1	1
Supply Chain Management II				32			32	1	0,5		1,5
Project Management				48			48	1		1	2
Multidisciplinary Project I				32			32			1	1
<b>Total I4-GIM</b>								16	9	9	<b>32</b>
French					32		32		1		1
English					32		32		1		1
Research Methodology					32		32	1		0,5	1,5



Operations Management					48		48	1	1		2
Advanced machining process					48		32	1	0,5		1,5
Industrial Planning and Control (Lean II)					48		48	1	1		2
Professional and Personal Development					48		32	1		0,5	1,5
Engineering Ethics					48		48	1	1		2
Multidisciplinary Project II					48		48			1,5	1,5
Final year internship						384	384			9	9
<b>Total I5-GIM</b>								6	4,5	11,5	<b>23</b>
<b>Total per semester</b>	384	400	368	400	384	384	2288	41	24,5	25,5	<b>90</b>
<b>TOTAL GENERAL</b>	<b>784</b>		<b>768</b>		<b>768</b>		<b>2320</b>				

## Annexe 9

### Detail of proposed modification of Water Resources Engineering and Rural Infrastructure (WRI)

#### 1. BACKGROUND

Engineering program in Water Resources Engineering and Rural Infrastructure (WRI) provides the knowledge and skill for the construction of water-related infrastructures such as the construction of dams, bridges, reservoirs, canals, roads, irrigation systems, retaining walls, and foundations. The student will learn about water resources planning, modelling, and design for water resources projects. This specialization will provide critical thinking on basin management studies, and provide water resources planning. Based on the tracer study from 2021 to 2023, there are 50% of graduates from the WRI program got the job related to infrastructure development such mainly road construction. It is clearly shown that the soft skills become more important for their working environment which they have mention leadership and entrepreneurship skill is lacking in their professional work. Due to the need of job market in this skill particularly road construction, we decided to upgrading the program. The upgrading is aimed to improve the quality of the program in order to meet the need of the local job market and promoting the 21st century skills to the new graduates. There are two aspects shall be improved as following:

- Improving the competency of road construction and irrigation engineering
  - Improve soft-skills through Skills for Employability session
  - Integrated Problem-Based Learning method and improve the computing program which is really important for the 21st century working skills.
- **Human Resources:**
    - In academic year 2023-2024, Faculty of Hydrology and Water Resources Engineering has 23 (F:7) full-time lecturers possess Master and PhD degree. PhD fulltime: 15 (F:5), PhD Part-time: 3 (F:0), Master fulltime: 8 (F:2), Master Part-time: 5 (F:1).
    - The WRI program has a professional program coordinator to review and develop the program based on job market needs
    - Host series of up-skill training for department's staffs to effectively improve the course content and teaching method
  - **Facility:**

Main facilities currently available and particularly support the WRI program:

- Hydrology and Hydraulics Lab
- Soil Lab
- Topography Lab
- HydroMet and Disaster Management Lab
- Coastal & Wetland Environmental Lab
- Khmer Earth Observation Lab
- Irrigation experimental station

Through the HEIP2, the faculty proposed to upgrade the lab equipment for student practices including equipment for hydrology demonstration in laboratory.

- **Program Marketing:** boost the visualization of the program by

- Organized students' monthly seminar with invited speaker from alumni of WRI
- Invite companies to join career fair and join the thesis defend day
- Develop attractive brochures and other promotion materials for both online and offline campaign
- Promote to high school students through the students networking and promotion mission in the province
- Expand the collaboration with stakeholders to promote internships, research collaboration, training seminar and other practical skills.

## 2. PROPOSE MODIFICATION OF CURRICULUM OF WATER RESOURCES ENGINEERING AND RURAL INFRASTRUCTURE (WRI)

For the upcoming academic year, the WRI program requested to remove 3 courses by replacing 2 new courses which are Skills for Employability, and Climate-resilient Road Design. The others 2 courses are modified the name. The total number of credits is proposed to change from 94.5 credits to 93 credits while the total number of hours remains same.

Table 1: Summary of propose modification:

Gr.	No.	Name of Subject	Current Situation					New Proposal				
			C (hr)	TD (hr)	TP (hr)	Total (hr)	Credit	C (hr)	TD (hr)	TP (hr)	Total (hr)	Credit
I3-S1	1	French		64		64	2		64		64	2
	2	English		32		32	1		32		32	1
	3	Statistics	16	32		48	2	16	32		48	2
	4	Fluid Mechanics	32	16	16	64	3	32	16	16	64	3
	5	Soil Science	16	16	16	48	2	16	16	16	48	2
	6	Strength of Materials	16	32		48	2	16	32		48	2
	7	Meteorology	16			16	1	16	16		32	1.5
	8	Geology and Hydrogeology	16	16		32	1.5	16	16		32	1.5
	9	Hydrometeorology	16	16		32	1.5	Remove				
	10	Skills for Employability	Add New						16		16	0.5
<b>Total of I3-S1</b>			<b>128</b>	<b>224</b>	<b>32</b>	<b>384</b>	<b>16</b>	<b>112</b>	<b>240</b>	<b>32</b>	<b>384</b>	<b>15.5</b>
I3-S2	1	French		32		32	1		32		32	1
	2	English		64		64	2		64		64	2
	3	Computer-aided Design (AutoCAD)			32	32	1			32	32	1
	4	Hydrology	32	16	16	64	3	32	16	16	64	3

	5	Soil Mechanics and Foundations	32	16	16	64	3	32	16	16	64	3
	6	Surveying	16	16	48	80	3	16	16	48	80	3
	7	MATLAB	16		16	32	1.5	Remove				
	8	Introduction to Environmental Engineering	16			16	1	Remove				
	9	Computing programing	Add New					16		32	48	2
	<b>Total of I3-S2</b>			<b>112</b>	<b>144</b>	<b>128</b>	<b>384</b>	<b>15.5</b>	<b>96</b>	<b>144</b>	<b>144</b>	<b>384</b>
<b>I4-S1</b>	1	French I		32		32	1		32		32	1
	2	English I		32		32	1		32		32	1
	3	Hydraulics	16	16	16	48	2	16	16	16	48	2
	4	Structural Analysis	32	32		64	3	32	32		64	3
	5	Construction Materials	16		32	48	2	16		32	48	2
	6	Earth Dam Design and Construction	16	16	16	48	2	16	16	16	48	2
	7	GIS and Remote Sensing	16		64	80	3	16		64	80	3
	8	Water-induced Disaster Risk Assessment	32			32	2	Remove				
	9	Disaster Risk Assessment	Add New					32			32	2
	<b>Total of I4-S1</b>			<b>128</b>	<b>128</b>	<b>128</b>	<b>384</b>	<b>16</b>	<b>128</b>	<b>128</b>	<b>128</b>	<b>384</b>
<b>I4-S2</b>	1	French II		32		32	1		32		32	1
	2	English II		32		32	1		32		32	1
	3	Reinforced Concrete Design	32	32		64	3	32	32		64	3
	4	Groundwater Exploration	32			32	2	32			32	2
	5	Irrigation and Drainage System	32	32		64	3	32	48		80	3.5
	6	Road Engineering and Construction	32	16	16	64	3	32	16	16	64	3
	7	On-site Safety Management	16			16	1	16			16	1
	8	Introduction to Integrated Water Resources Management	16			16	1	16			16	1

	9	Hydropower Development and Pumping Station	32	16	16	64	3	Remove				
	10	Climate-resilient Road Design	Add New					16	32		48	2
	<b>Total of I4-S2</b>		<b>192</b>	<b>160</b>	<b>32</b>	<b>384</b>	<b>18</b>	<b>176</b>	<b>192</b>	<b>16</b>	<b>384</b>	<b>17.5</b>
<b>I5-S1</b>	1	Module d'Insertion Professionnelle (MIP)		32		32	1		32		32	1
	2	English for Work and Career: Engineering Skills		32		32	1		32		32	1
	3	Internship					2					2
	4	Land Management	16	32		48	2	16	32		48	2
	5	Climate Change Impacts and Adaptation	32			32	2	32			32	2
	6	Hydraulic Structures	32	32	32	96	4	32	32	32	96	4
	7	Water Resources Economics	32			32	2	32			32	2
	8	Cost Estimating and Contracting	16			16	1	16			16	1
	9	Project Management	32			32	2	32			32	2
	10	Multi-Disciplinary Design Project	32	32		64	3	32	32		64	3
		<b>Total of I5-S1</b>		<b>192</b>	<b>160</b>	<b>32</b>	<b>384</b>	<b>20</b>	<b>192</b>	<b>160</b>	<b>32</b>	<b>384</b>
<b>I5-S2</b>	1	Final Year Internship				384	9				384	9
	<b>Total of I5-S2</b>					<b>384</b>	<b>9</b>				<b>384</b>	<b>9</b>
<b>Total of WRI</b>			<b>752</b>	<b>816</b>	<b>352</b>	<b>2304</b>	<b>94.5</b>	<b>704</b>	<b>864</b>	<b>352</b>	<b>2304</b>	<b>93</b>

### 3. CURRICULUM OF THE PROPOSED PROGRAM WRI

This curriculum is designed for an engineering degree that illustrates the whole three years program in Water Resources Engineering and Rural Infrastructure (WRI) from the 3<sup>rd</sup> year to 5<sup>th</sup> year. The curriculum of the WRI in the academic year 2024-2025 is shown below:

Table 2: New curriculum of WRI

Gr.	No.	Name of Subject	C (hr)	TD (hr)	TP (hr)	Total (hr)	Credit
<b>I3-S1</b>	1	French		64		64	2

	2	English		32		32	1
	3	Statistics	16	32		48	2
	4	Fluid Mechanics	32	16	16	64	3
	5	Soil Science	16	16	16	48	2
	6	Strength of Materials	16	32		48	2
	7	Meteorology	16	16		32	1.5
	8	Geology and Hydrogeology	16	16		32	1.5
	9	Skills for Employability		16		16	0.5
	<b>Total of I3-S1</b>		<b>112</b>	<b>240</b>	<b>32</b>	<b>384</b>	<b>15.5</b>
<b>I3-S2</b>	1	French		32		32	1
	2	English		64		64	2
	3	Computer-aided Design (AutoCAD)			32	32	1
	4	Hydrology	32	16	16	64	3
	5	Soil Mechanics and Foundations	32	16	16	64	3
	6	Surveying	16	16	48	80	3
	7	Computing programing	16		32	48	2
	<b>Total of I3-S2</b>		<b>96</b>	<b>144</b>	<b>144</b>	<b>384</b>	<b>15</b>
<b>I4-S1</b>	1	French I		32		32	1
	2	English I		32		32	1
	3	Hydraulics	16	16	16	48	2
	4	Structural Analysis	32	32		64	3
	5	Construction Materials	16		32	48	2
	6	Earth Dam Design and Construction	16	16	16	48	2
	7	GIS and Remote Sensing	16		64	80	3
	8	Disaster Risk Assessment	32			32	2
	<b>Total of I4-S1</b>		<b>128</b>	<b>128</b>	<b>128</b>	<b>384</b>	<b>16</b>
<b>I4-S2</b>	1	French II		32		32	1
	2	English II		32		32	1
	3	Reinforced Concrete Design	32	32		64	3

	4	Groundwater Exploration	32			32	2
	5	Irrigation and Drainage Systems	32	48		80	3.5
	6	Road Engineering and Construction	32	16	16	64	3
	7	On-site Safety Management	16			16	1
	8	Introduction to Integrated Water Resources Management	16			16	1
	9	Climate-resilient Road Design	16	32		48	2
	<b>Total of I4-S2</b>		<b>176</b>	<b>192</b>	<b>16</b>	<b>384</b>	<b>17.5</b>
<b>I5-S1</b>	1	Module d'Insertion Professionnelle (MIP)		32		32	1
	2	English for Work and Career: Engineering Skills		32		32	1
	3	Internship					2
	4	Land Management	16	32		48	2
	5	Climate Change Impacts and Adaptation	32			32	2
	6	Hydraulic Structures	32	32	32	96	4
	7	Water Resources Economics	32			32	2
	8	Cost Estimating and Contracting	16			16	1
	9	Project Management	32			32	2
	10	Multi-Disciplinary Design Project	32	32		64	3
	<b>Total of I5-S1</b>		<b>192</b>	<b>160</b>	<b>32</b>	<b>384</b>	<b>20</b>
<b>I5-S2</b>	1	Final Year Internship				384	9
	<b>Total of I5-S2</b>					<b>384</b>	<b>9</b>
<b>Total of WRI</b>			<b>704</b>	<b>864</b>	<b>352</b>	<b>2304</b>	<b>93</b>

## Annexe 10

### Detail of proposed modification of Water and Environmental Engineering (WEE)

#### 1. BACKGROUND

Water and Environmental Engineering Program (WEE) is established in 2018 under the faculty of hydrology and water resources engineering (GRU) responds to the needs of engineers and expert on WASH sector. WEE program was updated in 2022 to adopt green education strategies and Lab Base Education and Problem-Based Learning method for the maximum benefit of 4C's education and 21st-century skills. There were 94 students graduated in 2023, 80% of them go the job and own a business while another 20% continue master degree in Cambodia and in other countries. However, we found that the students face difficulty to follow the specialized course of Unit Operations and Processes for Environmental Engineering due to the lack of fundamental course of engineering which is a basic of unit operation course. Therefore, we propose to modify some courses to improve the student competency base. There are two aspects shall be improved as following:

- Improving the competency of wastewater engineering on unit operation
  - Improve soft-skills through Skills for Employability
  - Integrated Problem-Based Learning method and improve the computing program which is really important for the 21<sup>st</sup> century working environment.
- **Human Resources:**
    - In academic year 2023-2024, Faculty of Hydrology and Water Resources Engineering has 23 (F:7) full-time lecturers possess Master and PhD degree. PhD fulltime: 15 (F:5), PhD Part-time: 3 (F:0), Master fulltime: 8 (F:2), Master Part-time: 5 (F:1).
    - The WEE program has a professional program coordinator to review and develop the program based on job market needs
    - Highly competent of lecturers with long working experience which keep improving the course content and teaching method
  - **Facility:**

Main facilities currently available and particularly support the WRI program:

    - Hydrology and Hydraulics Lab
    - Water Quality Lab
    - Plumbing lab
    - HydroMet and Disaster Management Lab
    - Water Environment Lab
    - Coastal & Wetland Environmental Lab
    - Khmer Earth Observation Lab

Through the HEIP2, the faculty proposed to upgrade facilities for the implementation of PBL such as Equipment for Water and Wastewater, and Equipment for Plumbing Experiment and Testing.

- **Program Marketing:** boost the visualization of the program by
  - Organized students' monthly seminar with invited speaker from alumni of WEE



- Invite companies to join career fair and join the thesis defend day
- Develop attractive brochures and other promotion materials for both online and offline campaign
- Promote to high school students through the students networking and promotion mission in the province
- Expand the collaboration with stakeholders to promote internships, research collaboration, training seminar and other practical skills.

## 2. PROPOSE MODIFICATION OF CURRICULUM OF WATER AND ENVIRONMENTAL ENGINEERING (WEE)

For the upcoming academic year, the WEE program requested to remove 2 courses by replacing 2 new courses which are Skills for Employability, and Fundamental for Environmental Engineering. The others 2 courses are modified the name. The total number of credits is proposed to change from 97.5 credits to 97 credits while the total number of hours remains same.

Table 1: Summary of propose modification:

Gr.	No.	Name of Subject	Current Situation					New Proposal				
			C (hr)	TD (hr)	TP (hr)	Total (hr)	Credit	C (hr)	TD (hr)	TP (hr)	Total (hr)	Credit
I3-S1	1	French		64		64	2		64		64	2
	2	English		32		32	1		32		32	1
	3	Statistics	16	32		48	2	16	32		48	2
	4	Fluid Mechanics	32	16	16	64	3	32	16	16	64	3
	5	Soil Science	16	16	16	48	2	16	16	16	48	2
	6	Strength of Materials	16	32		48	2	16	32		48	2
	7	Meteorology	16			16	1	16	16		32	1.5
	8	Geology and Hydrogeology	16	16		32	1.5	16	16		32	1.5
	9	Hydrometeorology	16	16		32	1.5	Remove				
	10	Skills for Employability	Add New						16		16	0.5
<b>Total of I3-S1</b>			<b>128</b>	<b>224</b>	<b>32</b>	<b>384</b>	<b>16</b>	<b>112</b>	<b>240</b>	<b>32</b>	<b>384</b>	<b>15.5</b>
I3-S2	1	French		32		32	1		32		32	1
	2	English		64		64	2		64		64	2
	3	Computer-aided Design (AutoCAD)			32	32	1			32	32	1
	4	Hydrology	32	16	16	64	3	32	16	16	64	3
	5	Soil Mechanics and Foundations	32	16	16	64	3	32	16	16	64	3

	6	Surveying	16	16	48	80	3	16	16	48	80	3
	7	MATLAB	16		16	32	1.5	Remove				
	8	Introduction to Environmental Engineering	16			16	1	Remove				
	9	Computing Programing	Add New					16		32	48	2
	<b>Total of I3-S2</b>		<b>112</b>	<b>144</b>	<b>128</b>	<b>384</b>	<b>15.5</b>	<b>96</b>	<b>144</b>	<b>144</b>	<b>384</b>	<b>15</b>
I4-S1	1	French I		32		32	1		32		32	1
	2	English I		32		32	1		32		32	1
	3	Chemistry for Environmental Engineering	16	32		48	2	16	32		48	2
	4	Biology for Environmental Engineering	48			48	3	48			48	3
	5	Environmental Engineering Laboratory			32	32	1			32	32	1
	6	GIS and Remote Sensing	16		64	80	3	16		64	80	3
	7	Environmental Hydraulics	16	16	16	48	2	16	16		32	1.5
	8	Unit Operations and Processes for Environmental Engineering	32	32		64	3	Remove				
	9	Fundamental for Environmental Engineering	Add New					32	16		48	2.5
	10	Environmental Pollution Control	Add New					32			32	2
	<b>Total of I4-S1</b>		<b>128</b>	<b>144</b>	<b>112</b>	<b>384</b>	<b>16</b>	<b>160</b>	<b>128</b>	<b>96</b>	<b>384</b>	<b>17</b>
I4-S2	1	French II		32		32	1		32		32	1
	2	English II		32		32	1		32		32	1
	3	Water Quality Analysis and Management	32			32	2	32			32	2
	4	Water Treatment Processes and Design	32	32		64	3	32	16		48	2.5
	5	Water Supply Engineering	32	32		64	3	32	32		64	3
	6	Hydro-informatics	32			32	2	32			32	2

	7	Introduction to Integrated Water Resources Management	16			16	1	16			16	1
	8	Plumbing Design	48	16	16	80	4	Remove				
	9	Environmental Pollution Control	32			32	2	Remove				
	10	Unit Operations and Processes for Environmental Engineering	Add New					16	32		48	2
	11	Building Sanitation Engineering	Add New					48	16	16	80	4
	<b>Total of I4-S2</b>		<b>224</b>	<b>144</b>	<b>16</b>	<b>384</b>	<b>19</b>	<b>208</b>	<b>160</b>	<b>16</b>	<b>384</b>	<b>18.5</b>
<b>I5-S1</b>	1	Module d'Insertion Professionnelle (MIP)		32		32	1		32		32	1
	2	English for Work and Career: Engineering Skills		32		32	1		32		32	1
	3	Internship					2					2
	4	Design of Wastewater Treatment and Collection System	48	32		80	4	48	32		80	4
	5	Solid Waste Management	32			32	2	32			32	2
	6	Urban Drainage and Sewage System	32	32		64	3	32	32		64	3
	7	Environmental Engineering Project	32			32	2	32			32	2
	8	Environmental Impact Assessment	32			32	2	32			32	2
	9	Sustainable and Green Energy Systems	32			32	2	32			32	2
	10	Work Safety	16			16	1	16			16	1
	11	Research Methodology	32			32	2	32			32	2
		<b>Total of I5-S1</b>		<b>256</b>	<b>128</b>	<b>0</b>	<b>384</b>	<b>22</b>	<b>256</b>	<b>128</b>	<b>0</b>	<b>384</b>
<b>I5-S2</b>	1	Final Year Internship				384	9				384	9
	<b>Total of I5-S2</b>					<b>384</b>	<b>9</b>				<b>384</b>	<b>9</b>
<b>Total of WRI</b>			<b>848</b>	<b>784</b>	<b>288</b>	<b>2304</b>	<b>97.5</b>	<b>832</b>	<b>800</b>	<b>288</b>	<b>2304</b>	<b>97</b>

### 3. CURRICULUM OF THE PROPOSED PROGRAM WEE

This curriculum is designed for an engineering degree that illustrates the whole three years program in Water and Environmental Engineering (WEE) from the 3<sup>rd</sup> year to 5<sup>th</sup> year. The curriculum of the WRI in the academic year 2024-2025 is shown below:

Table 2: New curriculum of WEE

Gr.	No.	Name of Subject	C (hr)	TD (hr)	TP (hr)	Total (hr)	Credit
I3-S1	1	French		64		64	2
	2	English		32		32	1
	3	Statistics	16	32		48	2
	4	Fluid Mechanics	32	16	16	64	3
	5	Soil Science	16	16	16	48	2
	6	Strength of Materials	16	32		48	2
	7	Meteorology	16	16		32	1.5
	8	Geology and Hydrogeology	16	16		32	1.5
	9	Skills for Employability		16		16	0.5
	<b>Total of I3-S1</b>			<b>112</b>	<b>240</b>	<b>32</b>	<b>384</b>
I3-S2	1	French		32		32	1
	2	English		64		64	2
	3	Computer-aided Design (AutoCAD)			32	32	1
	4	Hydrology	32	16	16	64	3
	5	Soil Mechanics and Foundations	32	16	16	64	3
	6	Surveying	16	16	48	80	3
	7	Computing Programming	16		32	48	2
	<b>Total of I3-S2</b>			<b>96</b>	<b>144</b>	<b>144</b>	<b>384</b>
I4-S1	1	French I		32		32	1
	2	English I		32		32	1
	3	Chemistry for Environmental Engineering	16	32		48	2
	4	Biology for Environmental Engineering	48			48	3

	5	Environmental Engineering Laboratory			32	32	1
	6	GIS and Remote Sensing	16		64	80	3
	7	Environmental Hydraulics	16	16		32	1.5
	8	Fundamental for Environmental Engineering	32	16		48	2.5
	9	Environmental Pollution Control	32			32	2
	<b>Total of I4-S1</b>		<b>160</b>	<b>128</b>	<b>96</b>	<b>384</b>	<b>17</b>
<b>I4-S2</b>	1	French II		32		32	1
	2	English II		32		32	1
	3	Water Quality Analysis and Management	32			32	2
	4	Water Treatment Processes and Design	32	16		48	2.5
	5	Water Supply Engineering	32	32		64	3
	6	Hydro-informatics	32			32	2
	7	Introduction to Integrated Water Resources Management	16			16	1
	8	Unit Operations and Processes for Environmental Engineering	16	32		48	2
	9	Building Sanitation Engineering	48	16	16	80	4
		<b>Total of I4-S2</b>		<b>208</b>	<b>160</b>	<b>16</b>	<b>384</b>
<b>I5-S1</b>	1	Module d'Insertion Professionnelle (MIP)		32		32	1
	2	English for Work and Career: Engineering Skills		32		32	1
	3	Internship					2
	4	Design of Wastewater Treatment and Collection System	48	32		80	4
	5	Solid Waste Management	32			32	2
	6	Urban Drainage and Sewage System	32	32		64	3
	7	Environmental Engineering Project	32			32	2
	8	Environmental Impact Assessment	32			32	2

	9	Sustainable and Green Energy Systems	32			32	2
	10	Work Safety	16			16	1
	11	Research Methodology	32			32	2
	<b>Total of I5-S1</b>		<b>256</b>	<b>128</b>	<b>0</b>	<b>384</b>	<b>22</b>
<b>I5-S2</b>	1	Final Year Internship				384	9
	<b>Total of I5-S2</b>					<b>384</b>	<b>9</b>
<b>Total of WRI</b>			<b>832</b>	<b>800</b>	<b>288</b>	<b>2304</b>	<b>97</b>

## Annexe 11

### Detail of proposed separated Chemical Engineering and Food Science Technology from the third year and modify some major courses under Faculty of Chemical and Food Engineering

#### 1. BACKGROUND

The Food Science Technology program is one of the programs under the faculty of Chemical and Food Engineering, established in 1986. This Food Engineering program is a combination of food science, technology, and engineering with the core focus on problem-solving, process optimization, Food industrial design, Food Processing Technology, Food product development, valorization of by-products to reduce food waste, applied science and technology in food manufacturing, and **integration of digital solutions in the processes** (process optimization) to improve traceability, quality, safety, and efficiency in the production, and distribution system of Food. This program is highly relevant to the local needs and national development goals in Cambodia.

Chemical Engineering is a 5-year engineering program established in 2017 under the Faculty of Chemical and Food Engineering. This program is a combination of industrial process, bio-process, environment, chemistry, and engineering. Chemical engineers could be responsible for chemical production, synthesis, industrial development and design, and purification of materials that are associated with fuels biodiesel, and lubricants (petroleum), pharmaceuticals, cosmetics, fertilizers, synthetic fibers, microelectronic components, plastics, and food products. Chemical engineers are involved in minimizing and reducing the use of energy to make these products in safe and sustainable ways and lower the impact on the environment. This Chemical Engineering program shapes the students to different specializations of chemical engineering such as agro-chemical process and analysis engineering, pharmaceutical and cosmetic engineering, application of advanced organic chemistry, etc.) that could support to applied chemistry for industrial engineering, pharmaceutical, and cosmetic engineering, etc.

Two existing programs, the Chemical Engineering and Food Science Technology Program separated from the fourth year, so the students can study for their specialization for only 1 year and a half. Faculty plans to modify and improve the program to reach the national and regional standard (e.g AUN-QA) by 2029, so it is necessary to separate the program of Chemical Engineering and Food Science Technology from the third year. It means that the students will select the program (chemical Engineering or Food Science Technology) from their foundation year. After separating the program, the faculty will rearrange the program by integrating 21st-century skills, and project-based learning including the entrepreneurship course to create a business mindset and bring the products to markets, and the program also shapes the students to specialization by each semester.

#### 2. PROPOSE MODIFICATION OF THE CURRICULUM OF CHEMICAL ENGINEERING

For the upcoming academic year, the program of chemical engineering and Food Science Technology requested to separate from Year 3 as following

Table 1: Summary of proposed modification of 7 courses in the Chemical Engineering program

Gr	No.	Name of course	Current Situation				New Proposal			
			C	TD	TP	Credit	C	TD	TP	Credit
I3C-S1	1	Fundamental Chemistry and Calibration	32	16	48	4	32	16	48	4
	2	Physical Chemistry	16	20	12	2	32	8	24	3
	3	Heat and Mass Transfer	16	32	32	3	32	8	24	3
	4	Unit Operation I (Move to I3ChS2)	16			1	0	0	0	0
	5	Numerical Computations in for Chemical Engineering	0	0	0	0	16	0	32	2
I3Che-S2	1	Analytical Chemistry	16	16	16	2	32	8	24	
	2	Fluid Mechanics	16	32	32	3	32	8	24	
	3	Numerical Method (Move to I3ChS1)	16	20	12	2	0	0	0	0
	4	General Microbiology	32	0	32	3	32	0	32	3
	5	Unit Operation (merge UO I and II)	16	8	24	2	32	8	24	3
I4Che-S1	1	Chemical Reaction, Kinetic and thermodynamics	32	0	32	3	32	0	32	3
	2	Analytical and Instrument Chemistry	16	32	32	3	16	32	32	3
	3	Computing Software for Chemical Reaction	32	0	32	3	32	0	32	3
	4	Fundamental Catalyze Reaction	32	0	0	2	32	0	0	2
	5	Transport Phenomena	32	16	16	3	32	16	16	3



	6	Industrial Chemical process (Merge Industrial chemical process I and II)	32	0	0	2	32	0	0	2
	7	Internship								
I4Che-S2	1	Entrepreneurship (Move from I5Ch-S1)	32	0	0	2	32	0	0	2
	2	Material Science	48	0	32	4	48	0	32	4
	3	Applied Organic Chemistry	48	0	32	4	48	0	32	4
	4	Biochemical Process	32	0	0	2	32	0	0	2
	5	Chemistry for Cosmetics and Pharmaceutical	48	0	32	4	48	0	32	4
I5Che-S1	1	Agro-chemical processing and analysis	48	0	32	4	48	0	32	4
	2	Law and regulation for Chemical Engineer (Move from I5ChS1)	32	0	32	3	32	0	32	3
	3	Water Chemistry and waste management	48	0	32	4	48	0	32	4
	4	Chemical Plant Safety and Environmental Assessment (including green chemistry)	32	0	0	2	32	0	0	2
	5	Chemical Engineering project management	32	0	0	2	32	0	0	2
	6	Chemical Industrial Concept Design	32	0	0	2	32	0	0	2
	7	Chemical Engineering Seminar (Deleted)	16	0	0	1	0	0	0	0

Table 2: Summary of proposed modification of 35 courses in the Food Science Technology program

Gr	No.	Name of course	Current Situation				New Proposal			
			C	TD	TP	Credit	C	TD	TP	Credit
	1	Fundamental Chemistry and	32	16	48	4	32	16	48	4

I3FSF-S1	2	Physical Chemistry for Food Engineering	16	20	12	2	24	14	24	3
	3	Mass and Heat transfer (Move to I3FSF S2 and merge with the fluid mechanic)	16	32	32	3	0	0	0	0
	4	Unit Operation I (Move to I3FSF S2 and merge with Unit Operation II)	16	0	0	1	0	0	0	0
	5	Food Analytical Chemistry (Move from I3FSF S2)	0	0	0	0	24	14	24	3
	6	Numerical Computations in Food Engineering (Move from I3FSF S2)	0	0	0	0	16	0	32	2
I3FSF-S2	1	Analytical Chemistry (Move to I3FSF S1)	32	0	32	3	0	0	0	0
	2	Fluid Mechanics, Heat and Mass Transfer in Food System (Merge course)	32	16	16	3	32	32	32	4
	3	Numerical Method (Move to I3FSF S1)	16	0	32	2	0	0	0	0
	4	General Microbiology (deleted course)	32	0	0	2	0	0	0	0
	5	Unit Operation in Food Engineering (Merge Unit Operation I and II)	48	20	12	4	32	32	32	4
	6	Food Microbiology (Merge course General+Food)	0	0	0	0	40	16	32	4
I4FSF-S1	1	Food Microbiology (Move to I3 FSFS2)	32	0	32	3	0	0	0	0
	2	Biochemical Engineering (Change name from Biochemistry)	32	0	32	3	32	0	32	0
	3	Nutrition and Health (Move to I5FSFS1)	32	0	0	2	0	0	0	0

	4	Food Preservation (merge I and II)	64	0	0	4	72	16	32	6
	5	Food Chemistry	32	0	32	3	32	0	32	3
	6	Biotechnology and Genetic Engineering (Merge biotech and genetic)	32	0	0	2	32	0	32	3
	7	Internship								
I4FSF-S2	1	Biotechnology (Move to I4FSFS1)	48	0	32	4	0	0	0	0
	2	Food Processing I (deleted)	48	0	32	4	0	0	0	0
	3	Food Packaging Technology (Change name from Packaging and Packing)	32	0	0	2	32	0	32	3
	4	Food Preservation II (Move to I4FSFS1)	32	0	0	2	0	0	0	0
	5	Food Safety (Move to I5FSFS1)	48	0	0	3	0	0	0	0
	6	Water Chemistry (Move to I5FSFS1)	16	8	24	2	0	0	0	0
	7	Cereal processing Technology (including nut, fait and oil) (New course)	0	0	0	0	32	8	24	3
	8	Fruit and vegetable processing technology (New course)	0	0	0	0	16	8	24	2
	9	Dairy and Ovo product processing Technology (New course)	0	0	0	0	8	0	16	1
	10	Beverage and Alcoholic beverage Technology (mainly soft drink) (New course)	0	0	0	0	8	0	16	1
	11	Product Development (Move from I5FSFS1)	0	0	0	0	32	0	32	3
	12	Sensory Evaluation (Move from I5FSFS1)	0	0	0	0	16	16	16	2

	13	Entrepreneurship in Agro Food Sector (Move from I5FSFS1)	0	0	0	0	32	0	0	2
	1	Agro-Food Industry Management	32	0	0	2	32	0	0	2
	2	Sensory Evaluation (Move to I4FSFS2)	32	0	0	2	32	0	0	2
	3	Project Management (deleted)	32	0	0	2	32	0	0	2
	4	Food Processing II (deleted)	80	0	32	6	0	0	0	0
	5	Entrepreneurship (Move to I4FSFS2)	32	0	0	2	0	0	0	0
	6	Food Quality Assurance	32	0	0	2	32	0	0	2
	7	Automation and Control in Food Industry	32	0	0	2	32	0	0	2
	8	Product Development (Move to I4FSFS2)	64	0	0	4	0	0	0	0
	9	Meat, Poultry, Fish, and seafood processing Technology (New course)	0	0	0	0	32	0	32	3
	10	Food Industrial Design (New course)	0	0	0	0	16	0	0	1
	11	Food fortification, nutrition and Health (Move from I4FSFS2)	0	0	0	0	32	0	0	2
	12	Water quality control and Food Industry waste management (Move from I4SFS2)	0	0	0	0	32	0	32	3
	13	Food Safety and Risk Management (Move from I4SFS2)	0	0	0	0	48	0	0	3
	14	Food Law and Regulation (New course)	0	0	0	1	16	0	0	1

### 3. CURRICULUM OF THE MODIFIED PROGRAM

This curriculum is designed for an engineering degree that illustrates the whole three years program Faculty of Chemical and Food Engineering from the 3<sup>rd</sup> year to 5<sup>th</sup> year, and separated Chemical Engineering program and Food Science Technology Program since year 3.

**The curriculum of the Food Science and Technology in the academic year 2024-2025 is shown below:**

Table 3: Curriculum for 3<sup>rd</sup> year (I3) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	64	64	2
2	English			0	0	32	32	1
3	Statistics			16	32	0	48	2
4	Fundamental Chemistry and Calibration			32	16	48	96	4
5	Food Analytical Chemistry			24	14	24	62	3
6	Numerical Computations in Food Engineering			16	0	32	48	2
7	Physical Chemistry for Food Engineering			24	14	24	62	3
<b>Total for 1<sup>st</sup> semester I3</b>				<b>112</b>	<b>76</b>	<b>224</b>	<b>412</b>	<b>17</b>

Table 4: Curriculum for 3<sup>rd</sup> year (I3) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French					32	32	1
2	English					64	64	2
3	Fluid Mechanics, Heat and Mass Transfer in Food System			32	32	32	96	4
4	Unit Operation in Food Engineering			32	32	32	96	4
5	Food Microbiology (General+Food)			40	16	32	88	4
<b>Total for 2<sup>nd</sup> semester I3</b>				<b>104</b>	<b>80</b>	<b>192</b>	<b>376</b>	<b>15</b>

Table 5: Curriculum for 4<sup>th</sup> year (I4) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French					32	32	1
2	English					32	32	1
3	Food Chemistry			32	0	32	64	2
4	Biochemical Engineering			32	0	32	64	2
5	Biotechnology and Genetic Engineering			32	0	32	64	2
6	Food Preservation Technology			72	16	32	120	6
7	Internship							2
<b>Total for 1<sup>st</sup> semester I4</b>				<b>136</b>	<b>16</b>	<b>192</b>	<b>376</b>	<b>16</b>

Table 6: Curriculum for 4<sup>th</sup> year (I4) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French					32	32	1
2	English					32	32	1
3	Food Packaging Technology			32		32	64	3
4	Cereal processing Technology (including nut, fat and oil )			32	8	24	64	3
5	Fruit and vegetable processing technology (fruit juice)			16	8	24	48	2
6	Dairy and Ovo product processing Technology			8		16	24	1
7	Beverage and Alcoholic beverage Technology (mainly soft drink)			8		16	24	1
	Product Development			32		32	64	3
	Sensory Evaluation			16	16	16	48	2
	Entrepreneurship in Agro Food Sector			32			32	2
<b>Total for 2<sup>nd</sup> semester I4</b>				<b>176</b>	<b>32</b>	<b>224</b>	<b>432</b>	<b>19</b>

Table 7: Curriculum for 5<sup>th</sup> year (I5) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French					32	32	1
2	English					32	32	1
3	Meat, Poultry, Fish, and seafood processing Technology			32		32	64	3
4	Food Industrial Design			16			16	1
5	Food fortification, nutrition and Health			32			32	2
6	Water quality control and Food Industry waste management			32	0	32	64	3
7	Food Safety and Risk Management			48		0	48	3
8	Food Quality Assurance			32			32	2
9	Automation and Control in Food Industry			32			32	2
10	Agro-Food Industrial Management			32			32	2
	Food Law and Regulation			16			16	1
<b>Total for 1<sup>st</sup> semester I5</b>				<b>272</b>	<b>8</b>	<b>120</b>	<b>400</b>	<b>21</b>

Table 8: Curriculum for 5<sup>th</sup> year (I5) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	Final Year Internship							9
<b>Total for 2<sup>nd</sup> semester I5</b>								<b>9</b>

**The curriculum of the Chemical Engineering in the academic year 2024-2025 is shown below:**

Table 9: Curriculum for 3<sup>rd</sup> year (I3) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	64	64	2
2	English			0	0	32	32	1
3	Statistics			16	32	0	48	2

4	Fundamental Chemistry and Calibration			32	16	48	96	4
5	Physical Chemistry			32	8	24	64	3
6	Numerical Computations in for Chemical Engineering			16	0	32	48	2
7	Heat and Mass Transfer			32	8	24	64	3
<b>Total for 1<sup>st</sup> semester I3</b>				<b>128</b>	<b>64</b>	<b>224</b>	<b>416</b>	<b>17</b>

Table 10: Curriculum for 3<sup>rd</sup> year (I3) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	64	64	2
2	English			0	0	32	32	1
3	Analytical Chemistry			24	16	32	72	3
4	Fluid Mechanics			32	8	24	64	3
5	Unit Operation			24	16	32	72	3
6	General Microbiology			32	0	32	64	3
<b>Total for 2<sup>nd</sup> semester I3</b>				<b>112</b>	<b>40</b>	<b>216</b>	<b>368</b>	<b>15</b>

Table 11: Curriculum for 4<sup>th</sup> year (I4) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	32	32	1
2	English			0	0	32	32	1
3	Chemical Reaction, Kinetic and thermodynamics			32	0	32	64	3
4	Analytical and Instrument Chemistry			16	32	32	80	3
5	Computing Software for Chemical Reaction			32	0	32	64	3
6	Fundamental Catalyze Reaction			32	0	0	32	2
7	Transport Phenomena			32	16	16	64	3
8	Industrial Chemical process			32	0	0	32	1
9	Internship							2
<b>Total for 1<sup>st</sup> semester I4</b>				<b>176</b>	<b>16</b>	<b>176</b>	<b>400</b>	<b>19</b>



Table 12: Curriculum for 4<sup>th</sup> year (I4) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	32	32	1
2	English			0	0	32	32	1
3	Entrepreneurship			32	0	0	32	2
4	Material Science			48	0	32	80	4
5	Applied Organic Chemistry			48	0	32	80	5
6	Law and regulation for Chemical Engineer			32	0	0	32	2
7	Water Chemistry and waste management			48	0	32	80	4
<b>Total for 2<sup>nd</sup> semester I4</b>				<b>208</b>	<b>0</b>	<b>160</b>	<b>368</b>	<b>19</b>

Table 13: Curriculum for 5<sup>th</sup> year (I5) semester 1:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	French			0	0	32	32	1
2	English			0	0	32	32	1
3	Agro-chemical processing and analysis			48	0	32	80	4
4	Biochemical Process			32	0	32	64	3
5	Chemistry for Cosmetics and Pharmaceutical			48	0	32	80	4
6	Chemical Plant Safety and Environmental Assessment (including green chemistry)			32	0	0	32	2
7	Chemical Engineering project management			32	0	0	32	1
8	Chemical Industrial Concept Design			32	0	0	32	2
<b>Total for 1<sup>st</sup> semester I5</b>				<b>224</b>	<b>0</b>	<b>160</b>	<b>384</b>	<b>18</b>

Table 14: Curriculum for 5<sup>th</sup> year (I5) semester 2:

No.	Name of subject	Code	Instructor	Cour	TD	TP	Total	Credit
1	Final Year Internship							9
<b>Total for 2<sup>nd</sup> semester I5</b>								<b>9</b>

## **Annexe 12**

### **Detail of establishment of international program “Artificial Intelligence Engineering and Cybersecurity (AIECS)” – 5 Years Engineering Program under department GIC**

#### **1. BACKGROUND**

The Engineering Program in Artificial Intelligence Engineering and Cybersecurity has established according not only the demand of nation, it is also the international demands during this digital age. Human resources in terms of Artificial Intelligence and Cybersecurity will lead as the front row to develop all the sectors of the country that related to technology. There are a lot of encouragement and demands from country to let us lead this education domain such as

- Cambodia’s Science, Technology & Innovation Roadmap 2023 has focused on five scientific and technological domains and one of them is to provide services and digital economy including Artificial Intelligence and space and spatial technology.
- Cambodia’s Digital Economy and Society Policy Framework 2021-2035, for the part of Cambodia Financial Technology Development aims to use 12 strategies to support this sector and the fourth one is to use Artificial Intelligence and Machine Learning to accomplish and develop this goal.
- Not only the financial sector, our digital government also set the Blueprint of the starting components on the digital path to digital transformation for Cambodia’s Digital and Economy and one of the components is privacy and security domain. In addition, our country also needs to provide the applicable digital laws and regulation and cybersecurity standard for our citizen too.
- For the science, technology and innovation ecosystem of Cambodia, we also need to provide the information and communication technology development policy for ICT business in all platforms.

With the current state of business of our country now is being transformed into digital platform and our government too that needed to be digital government so numerous of human resource in ICT skills especially the one who are in term of Artificial Intelligence and cybersecurity needed to produce tremendously.

Based on the potential, the Department of Information and Communication would like to establish the Engineering Program in Artificial intelligence Engineering and Cybersecurity. The program aims at promoting the standard of study of AI Engineering and Cybersecurity in Cambodia on the international stage and increasing job and research opportunities for local and international students. The university partner supporting the program is Curtin University in Australia and Malaysia. Therefore, the International Program is recognized by Australia and Malaysia.

#### **2. ENGINEERING PROGRAM IN ARTIFICIAL INTELLIGENCE ENGINEERING AND CYBERSECURITY**

##### **2.1. Program Structure**

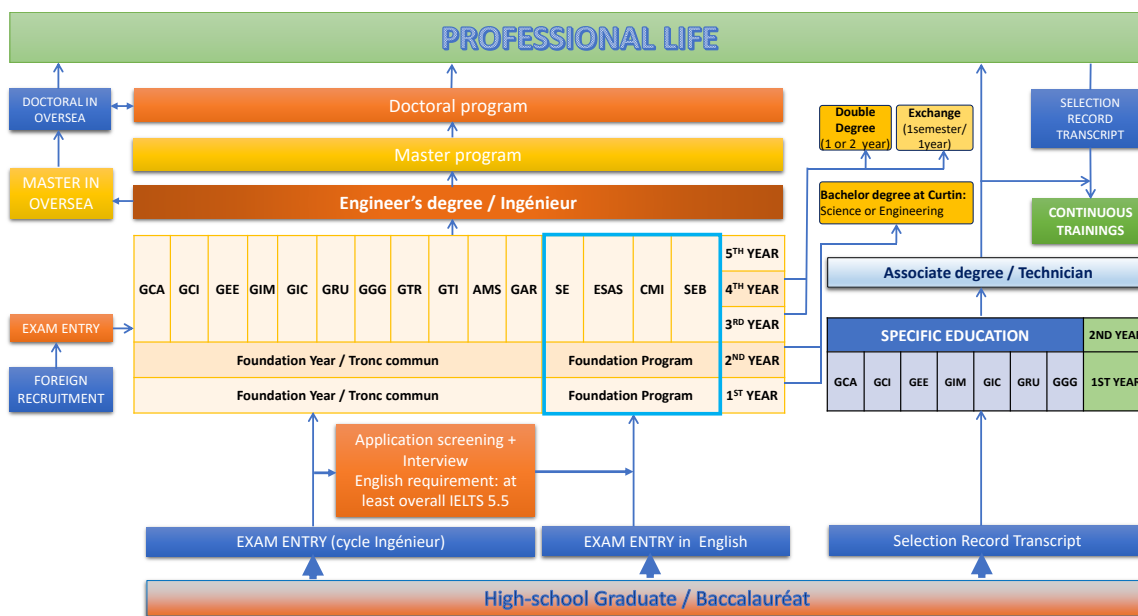
The Engineering Program in Artificial Intelligence Engineering and Cybersecurity is designed to be flexible with a total of five years (2 years of foundation + 3 years of degree program).

## ➤ Foundation Program

The 1<sup>st</sup> year of Foundation Program is the Pre-degree Foundation Program by applying the curriculum of Curtin University in 1 year at ITC. This one-year international foundation studies includes two semester courses in Foundation Engineering and Science.

The Foundation of Engineering and Science prepares students for undergraduate study in Engineering and Science and Information Technology. In addition to several units that are common to all foundation courses, students study units in Engineering Mathematics, Physics and Chemistry and Programming in C++. The courses are aimed at developing academic diligence, critical analysis, and a raft of generic skills in students. They provide a solid foundation for the students to adapt to university education more confidently, both in terms of level and style of education. Not only follow the Curtin University Curriculum, we also add other activities and courses such as Project and Seminar in order to let our students to start to be involved current technology related to AI and Cybersecurity as a small project to investigate and implement.

Students who obtain satisfactory results are eligible for either admission to a range of undergraduate courses offered in the Faculty of Engineering/Science at any Curtin campus (Malaysia, Perth-Australia, Singapore, etc) or admission to other international programs at ITC (see **Figure 1**).



**Figure 1** Learning chart of Foundation Program and all international programs at ITC

The course structure of 1 years Pre-degree Foundation in both Engineering and Science stream is shown in tables below. Student who successfully completed the Pre-degree Foundation Program in 1 years at ITC are eligible to pursue undergraduate study offered in any Curtin campus (see in Table 1) and other international programs at ITC (see Figure 1).

Table 1 Course structure of pre-degree foundation program

Engineering Stream		Science Stream	
Unit Offered		Unit Offered	
Semester 1	Semester 2	Semester 1	Semester 2
Effective Communication Skills	Engineering Mathematic II	Effective Communication Skills	Engineering Mathematics II
Engineering Mathematic I	Chemistry for Engineering	Engineering Mathematic I	Writing and Research Skills
Programming C++	Physics for Engineering II	Programming C++	Business Information Technology
Physic for Engineering I	Writing and Research Skills	Physic for Engineering I	Introduction to Business Studies
History		History	

Pathway to degree at Curtin	Bac. of Computing (Software Engineering/Cyber Security)	Pathway to degree at Curtin	Bac. of Technology (Computer system & networking)
	Bac. of Civil and Construction Engineering		Bac. of Applied science (Construction management)
	Bac. of Electrical and Electronic Engineering		Bac. of Science (Applied geology)
	Bac. of Mechanical Engineering	Pathway to degree at ITC	Engineer's Degree of Software Engineering
	Bac. of Chemical Engineering		Engineer's Degree of Electronics and Smart Automation Systems
	Bac. of Mechatronic Engineering		Engineer's Degree of Civil Engineering and Infrastructure Management
	Bac. of Petroleum Engineering		Engineer's Degree of Sustainable Engineering and Business
	Bac. of Environment Engineering		

**Note:** For ITC, we have added the other course named: Project and Seminar I and II of each semester for students to play along with AI technology and cybersecurity.

### Admission process for pre-degree foundation program:

To gain admission to the Curtin Foundation Program, students must have:

For National-High School Graduate:

- Take the entrance exam at ITC
- Meet the English requirement of at least IELTS 5.5
- Application Screening and Interview through the Committee

For International-High School Graduate:

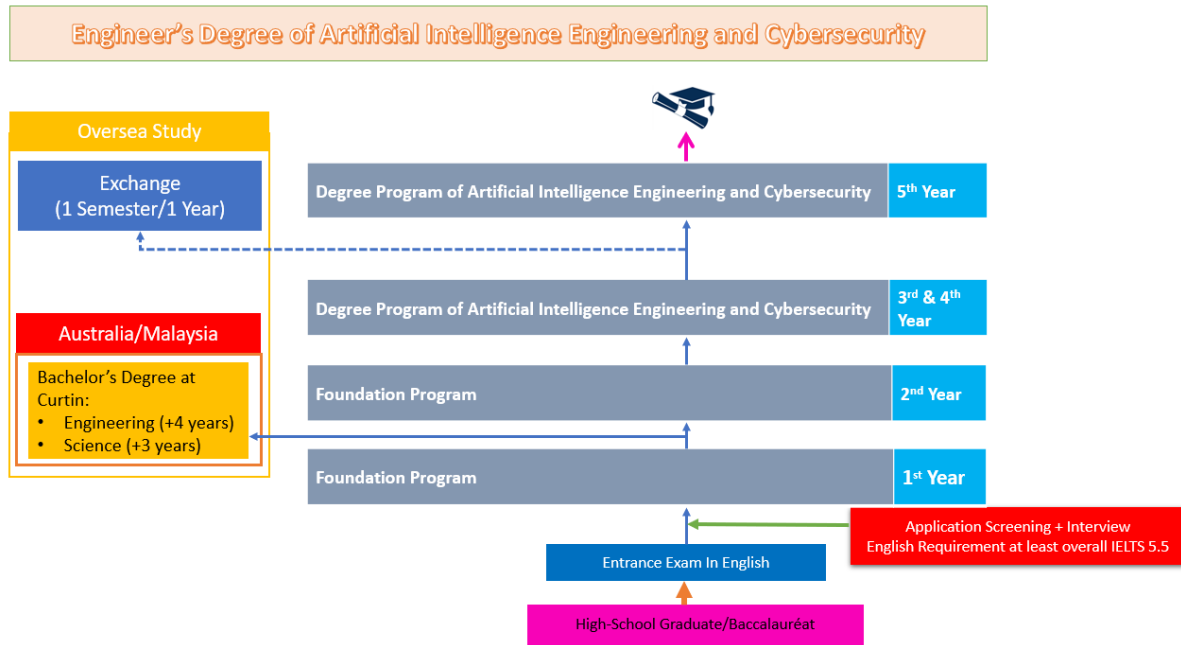
- Take the entrance exam in English at ITC
- Application Screening and Interview through the committee

The 1<sup>st</sup> year of Foundation Program is followed by the 2<sup>nd</sup> year of Foundation Program for students who continue their engineer's degree to all international programs at ITC (see **Figure 2**). The detailed course structure of 2<sup>nd</sup> year of Foundation Program is provided in **Table 2**.

### ➤ Degree Structure of Engineering Program in Artificial Intelligence Engineering and Cybersecurity

The high-school graduates must take the entrance exam and meet the English requirement (at least IELTS 5.5) before entering in Year 1 and Year 2 (Foundation program). Students need to spend five (5) years to complete their Engineering Program in Artificial Intelligence Engineering and Cybersecurity. After completing Year 1 and Year 2, students could have a choice to pursue their study in Curtin University in Australia or Malaysia. Those students do not want to continue their study abroad so they could also

continue their engineering program Artificial Intelligence Engineering and Cybersecurity at ITC. Students need to spend three (3) years to complete their Bachelor's Degree in Information Technology at Curtin Campus or at ITC. In Year 4 and Year 5 at ITC, students could have the opportunities to do an exchange program within one (1) semester per year in other university partners of ITC such as Curtin Malaysia, University of Grenoble Alpes, University of Toulouse, Le Mans University France, ENSIIE and universitas Pendidikan Ganesha Indonesia. It is not limited to only this universities, it will be flexible based on international MOU of our institute (See **Figure 2**).



**Figure 2** Learning Chart of Engineer's Degree of Artificial Intelligence Engineering and Cybersecurity (AIECS)

## 2.2. Program Education Objectives (PEOs)

The Engineering Program in Artificial Intelligence Engineering and Cybersecurity under the department of Information and Communication at Institute of Technology of Cambodia prepares students for lifetime careers as productive and innovative engineers adaptive to new situation and emerging programs with utmost awareness of ethical, social and environmental concerns so that, within 5 years after graduation, they will:

- ❖ **PEO1:** Graduates will be able to create, execute, and assess solutions for challenging problems by demonstrating competency in cutting-edge approaches, processes, and technologies related to cybersecurity, machine learning, and artificial intelligence.
- ❖ **PEO2:** Graduates will be capable of successfully communicating and working across disciplines to promote responsible use for the well-being of society. They will also comprehend the ethical issues and societal ramifications related to cybersecurity and AI technology.

- ❖ **PEO3:** Graduates will demonstrate dedication to ongoing learning and career advancement, consistently enhancing their expertise and staying abreast of advancements in AI engineering and cybersecurity to maintain relevance in their professional endeavors.

### 2.3. Program Learning Outcomes (PLOs)

Engineering Program in Artificial Intelligence Engineering and Cybersecurity under Department of Information and Communication at ITC aims to instill in our graduates the following attributes:

#### **A – KNOWLEDGE**

- PLO1: Demonstrate a deep understanding of core concepts and theories in artificial intelligence and cybersecurity.
- PLO2: Identify current trends, emerging technologies, and threats in artificial intelligence and cybersecurity.

#### **B – COGNITIVE SKILLS**

- PLO3: Analyze complex problems related to AI and cybersecurity using critical thinking and problem-solving techniques.
- PLO4: Utilize advanced data analysis and machine learning to strengthen cybersecurity strategies to extract valuable insights from data and make informed, data-driven decisions.
- PLO5: Illustrate the adaptability of the rapid evolution of AI and cybersecurity by assessing and adjusting AI algorithms and cybersecurity measures to address new threats, vulnerabilities, and technological advancements.
- PLO6: Understand the core AI and cybersecurity eco-system, including maintaining, monitoring, scaling, enhancing, and troubleshooting the challenges in practical projects to respond to model adaptation and ensure the continued optimal performance and relevance of AI solution.

#### **C – INTERPERSONAL SKILLS AND RESPONSIBILITY**

- PLO7: Resolve problems and conflicts taking into account the professional code of ethics and morals of multi cultures.
- PLO8: Perform collaborative tasks efficiently as team members and leaders to deliver high-quality outcomes.
- PLO9: Communicate effectively with diverse people in professional and non-professional audiences and be able to properly provide satisfactory explanations over complexities surrounding the technical problems.
- PLO10: Expose a strong ethical commitment and decision-making in AI and cybersecurity activities to address a deep understanding of ethical dilemmas within these fields, along with the responsibility use of both AI and cybersecurity to make informed ethical decisions and lead others in adhering to ethical guidelines.

## **D – NUMERICAL SKILLS, INFORMATION TECHNOLOGY AND COMMUNICATION**

PLO11: Utilize the latest and existing information and communication technology for numerous ways of communication and comprehend their beneficial functionalities and constraints.

## **E – PSYCHOMOTOR SKILLS**

PLO12: Develop the ability to respond effectively during AI and cybersecurity emergencies through realistic simulations to practice decision-making to ensure readiness for actual incidents.

PLO13: Acquire the ability to diagnose and troubleshoot network infrastructure issues efficiently, ensuring the continuous functionality and reliability of hardware resources that support AI and cybersecurity operations.

### **2.4. Course hours and credits**

For two semesters in each year from 1<sup>st</sup> year to 5<sup>th</sup> year, students will take about 10 courses, to fulfill about 30 credits equivalent to more or less 700 hours. Total credits for the program are required about 147 credits (including final year project equivalent to **3032** class hours in total).

The credit to be equivalent with teaching hour as follow:

- 16 hours of teaching course (C) = 1 credit
- 32 hours of tutorial (TD) = 1 credit
- 32 hours of laboratory practice (TP) = 1 credit

### **2.5. Curriculum of the program**

This curriculum is designed for engineering degree which illustrates the whole five years (2 year of Pre-degree foundation + 3 year of degree program) **Engineering Program in Artificial Intelligence Engineering and Cybersecurity** in Department of Information and Communication from 1<sup>st</sup> year to 5<sup>th</sup> year. Below is the curriculum of the engineering program in Artificial Intelligence Engineering and Cybersecurity followed by the need analysis that we have discussed in the previous section. Within the first and second year many international programs need to follow the common pre-degree foundation year, starting from year 3 students who choose the engineering program in Artificial Intelligence Engineering and Cybersecurity will follow our specialty curriculum. Curriculum of Engineering Program of Artificial Intelligence Engineering and Cybersecurity in academic year 2024-2025:

Table 2: Curriculum for 1<sup>st</sup> -5<sup>th</sup> year:

Year	Semester	No.	Course Code	Course Unit	Credit	L	P	T	Hours	
Y1	S1	1	AIECS001	Effective Communication Skills	2	16	32	0	48	
		2	AIECS002	Engineering Mathematic I	3.5	24	48	16	88	
		3	AIECS003	Programming C++	3	24	48	0	72	
		4	AIECS004	Physic for Engineering I	3	24	32	16	72	
		5	AIECS005	Business Information Technology	2	16	32	0	48	
		6	AIECS006	Project and Seminar I	1.5	8	0	32	40	
			<b>TOTAL Y1S1</b>			<b>15</b>	<b>112</b>	<b>192</b>	<b>64</b>	<b>368</b>
	S2	7	AIECS007	Engineering Mathematic II	3.5	24	48	16	88	
		8	AIECS008	Chemistry for Engineering	3	24	16	32	72	
		9	AIECS009	Physic for Engineering II	3	24	32	16	72	
		10	AIECS010	Writing and Research Skills	2	16	32	0	48	
		11	AIECS011	History	2	32	0	0	32	
		12	AIECS012	Project and Seminar II	1.5	8	0	32	40	
			<b>TOTAL Y1S2</b>			<b>15</b>	<b>128</b>	<b>128</b>	<b>96</b>	<b>352</b>
		<b>TOTAL YEAR 1</b>			<b>30</b>	<b>240</b>	<b>320</b>	<b>160</b>	<b>720</b>	
Y2	S1	13	AIECS013	Fundamental Concepts of Data Security	3	32	32	0	64	
		14	AIECS014	Integrating Indigenous Science and STEM	3.5	32	48	0	80	



		15	AIECS015	Introduction to Software Engineering	3	32	32	0	64
		16	AIECS016	Programming Design and Implementation	3.5	32	48	0	80
		17	AIECS017	Introduction to Computer Communication and Networks	2.5	32	16	0	48
		18	AIECS018	Project and Seminar I	1.5	8	0	32	40
		<b>TOTAL Y2S1</b>			<b>17</b>	<b>168</b>	<b>176</b>	<b>32</b>	<b>376</b>
	S2	19	AIECS019	Cyber Security Concepts	2.5	32	16	0	48
		20	AIECS020	Data Structures and Algorithms	4	32	64	0	96
		21	AIECS021	Linear Algebra and Statistics for Engineers	3	24	32	16	72
		22	AIECS022	Unix and C Programming	3	32	32	0	64
		23	AIECS023	Project and Seminar II	1.5	8	0	32	40
		<b>TOTAL Y2S2</b>			<b>14</b>	<b>128</b>	<b>144</b>	<b>48</b>	<b>320</b>
		<b>TOTAL YEAR 2</b>			<b>31</b>	<b>296</b>	<b>320</b>	<b>80</b>	<b>696</b>
Y3	S1	24	AIECS024	Object Oriented Programming	3	32	32	0	64
		25	AIECS025	Operating Systems	3	32	32	0	64
		26	AIECS026	Network	3	32	32	0	64
		27	AIECS027	Introduction to Database	3	32	32	0	64
		28	AIECS028	Cyber Crime and Security Enhanced Programming	3	32	32	0	64

		29	AIECS029	Project and Seminar I	1.5	8	0	32	40
		<b>TOTAL Y3S1</b>			<b>16.5</b>	<b>168</b>	<b>160</b>	<b>32</b>	<b>360</b>
	S2	30	AIECS030	System and Network Administration	3	32	32	0	64
		31	AIECS031	Introduction to Artificial Intelligence	3	32	32	0	64
		32	AIECS032	Automata Theory	3	32	32	0	64
		33	AIECS033	Introduction to Cybersecurity	3	32	32	0	64
		34	AIECS034	Introduction to Cryptography	3	32	32	0	64
		35	AIECS035	Project and Seminar II	1.5	8	0	32	40
		<b>TOTAL Y3S2</b>			<b>16.5</b>	<b>136</b>	<b>128</b>	<b>32</b>	<b>296</b>
		<b>TOTAL YEAR 3</b>			<b>33</b>	<b>304</b>	<b>288</b>	<b>64</b>	<b>656</b>
Y4	S1	36	AIECS036	Ethical Hacking and Penetration Testing	3	32	32	0	64
		37	AIECS037	Machine Learning	3	32	32	0	64
		38	AIECS038	Signal Processing	3	32	32	0	64
		39	AIECS039	System and Network Security	3	32	32	0	64
		40	AIECS040	Capstone Project I	3	0	0	96	96
		<b>TOTAL Y4S1</b>			<b>15</b>	<b>128</b>	<b>128</b>	<b>96</b>	<b>352</b>
	S2	41	AIECS041	Software and Web Security	3	32	32	0	64
		42	AIECS042	Computer Vision	3	32	32	0	64
		43	AIECS043	Introduction to Robotics	3	32	32	0	64

		44	AIECS044	Natural Language Processing	3	32	32	0	64	
		45	AIECS045	Capstone Project II	3	0	0	96	96	
		TOTAL Y4S2			15	128	128	96	352	
		TOTAL YEAR 4			30	256	256	192	704	
Y5	S1	46	AIECS046	Deep Learning	3	32	32	0	64	
		47	AIECS047	Risk Management	3	32	32	0	64	
		48	AIECS048	Digital Forensics	3	32	32	0	64	
		49	AIECS049	Secure DevOps	3	32	32	0	64	
			TOTAL Y5S1			12	128	128	0	256
	S2			Internship 1 (year 4)	2					
				Internship 2 (year 5)	9					
			TOTAL Y5S2			11	0	0	0	0
		TOTAL YEAR 5			23	128	128	0	256	
<b>NET</b>					<b>147</b>	<b>1224</b>	<b>1312</b>	<b>496</b>	<b>3032</b>	

## 2.6. Human Resources

The Institute of Technology of Cambodia has many human resources who got Master degrees and PhD degrees from abroad which are talented in their specific skills that could ensure the quality of teaching. Moreover, we have many staff and students who are still pursuing higher degrees overseas which could be the future potential staff.

Below is the name list of lecturers in the international program in Artificial Intelligence Engineering and Cybersecurity as department human resources and cross-department human resources.

Table 3. Number of staffs in international program in Artificial Intelligence Engineering and Cybersecurity 2024-2025

Degree	2024-2025
PhD	8
Master	15
<b>Total</b>	<b>23</b>

Table 4. List of staff in international program in Artificial Intelligence Engineering and Cybersecurity (AIECS) 2024-2025

No.	Name	Degree	Graduated University	Year
1	VALY Dona	PhD	Université catholique de Louvain (Belgium)	2020
2	KONG PhutPhalla	PhD	Université de Mons (Belgium)	2021
3	PICH Reatrey	Master	King Mongkut's Institute of Technology Laddkrabang (Thailand)	2018
4	SOK Kimheng	Master	INSA de Rennes (France)	2008
5	KHUN Dararith	Master	Institute of Technology of Cambodia	2023
6	LIV Bunthorn	Master	Institute of Technology of Cambodia	2023
7	TAL Tongsreng	Master	Institute of Technology of Cambodia	2018
8	YOU Vanndy	Master	Mahatma Gandhi University (India)	2016
9	SEAK Leng	Master	Institute of Technology of Cambodia	2016
10	KUY Movsun	Master	Institute of Technology of Cambodia	2017
11	BOU Channa	Master	Sirindhorn International Institute of Technology (Thailand)	2018
12	HOK Tin	Master	Chungbuk National University (Korea)	2021
13	HENG Rathpisey	Master	Gadjah Mada University (Indonesia)	2020

14	NOP Phearum	Master	Institute of Technology of Cambodia	2021
15	UN Lykong	Master	Université LYON 1 (France)	2023
16	SRANG Saroth	PhD	Tokyo Institute of Technology (Japan)	2014
17	PEC Rothna	PhD	Chung-Ang University (South Korea)	2017
18	HIN Raveth	PhD	Université de Rennes 1 (France)	2017
19	HOUNG Peany	PhD	Tokyo Institute of Technology	N/A
20	LIN Mongkolserey	PhD	Mahidol University (Thailand)	2014
21	PHAUK Sokkhey	PhD	University of the Ryukyus (Japan)	2021
22	LONG Sovann	Master	Royal University of Phnom Penh	N/A
23	SIEN Bross	N/A	N/A	N/A

## 2.7. Laboratory Facilities

### Infrastructure and facility

The Institute of Technology of Cambodia provides a comfortable study room and laboratory which enables teaching and learning. Moreover, ITC has one small conference hall that could handle 300 people, one big conference hall that could handle 2012 people, and two big tutorial rooms. At the same time, we have a STEM library that contains more than 12000 books, 14 computers, 30 laptops, a self-study room, two symposiums containing 10 small discussion rooms, a showroom and a startup incubation room.

### Laboratory

The Institute of Technology of Cambodia provides practical knowledge which is why there are many practical laboratories to support implementation and practical works for teaching and learning.

Table 5. Laboratory in international program in Artificial Intelligence Engineering and Cybersecurity

No.	Type of Laboratory	Devices in the laboratory	Qty	Status
1	Networking	Server machine	13	Functioning
2	Computer room	30 computers	3	New setup
3	Smart room	Smart screen	2	Functioning
4	Laboratory room	Office spaces and equipment	2	Functioning

### Equipment Specification

90 Brand new Desktops

#### **Brand New Desktop Computer Acer Veriton VM4680G**

- Processor: Core i7-12700 16M Cache (2.50 Up to 4.90GHz)
- RAM: 8GB DDR4 3200Mhz
- Storage: 256GB PCIe M.2 SSD (Boot) + 1TB SATA 7200 RPM
- GPU: GTX 1660 6GB GDDR5
- Wireless: 802.11 ax/ac/a/b/g/n, Wi-Fi 6, and Bluetooth 5
- Monitor: Monitor Acer 19.5" V206HQL
- Optical Drive: Built-in DVD-RW Drive
- Interface Port: 4xUSB 3.2 Type-A, 1xUSB 3.2 Type-C, 4xUSB 2.0 Type-A, Audio Jack 1xPS/2 Port 1x Line-Out, Line-in, SD 4.0 Card, and Gigabit LAN.
- OS: DOS
- Include: UPS ProLink 650VA, English Keyboard, Optical Mouse (3 Buttons and scroll), Configuration, and Installation.
- Warranty: 2 years on part and service.

## Annexe 13

### Detail of modification of Industrial Engineering and Supply Chain Management Program

#### 1. BACKGROUND

Our international programs, Robotics and Automation Engineering, and Industrial Engineering and Supply Chain Management have started in 2021. The programs are under partnership with ECAM LaSalle in Lyon, France. 12, 12, and 15 Cambodian students have enrolled in the first, the second and the third batches respectively. All Cambodian students received scholarships ranging from 30% to 80% of tuition fee, and received scholarships covering flight tickets and accommodation for exchange to study 1 semester in Lyon. There are exchanges of 36 French students to study in our programs as well.

Qualified and self-funded students have an opportunity to study another year in Lyon to get ECAM Engineer's degree which is equivalent to master's degree. Our programs in all campuses have signed double degree agreements at master's degree level with Chiangmai university, Kasetsart university in 2023. It is a great opportunity for those who want to pursue master's degree. And also, every year, there are going to be total number of 15 to 20 student exchange between ITC and the two universities.

The program was designed to response the needs of the Kingdom of Cambodia's industrial sector, which is specifically aligned with the latest policies by the royal government of Cambodia. Therefore, it is opted to regularly improve the curriculum accordingly.

#### **Cambodia Digital Government Policy (2022-2035):**

The Cambodia Digital Government Policy outlines strategic goals and actions to enhance digital infrastructure and services. While it primarily focuses on government operations, its principles can extend to the manufacturing sector.

Strategic Goal 1 emphasizes building digital infrastructure, including connectivity and security. A robust digital backbone benefits all sectors, including manufacturing<sup>1</sup>

Strategic Goal 2 aims to create digital governance and public services. Implementing digital systems in manufacturing can streamline processes, improve supply chains, and enhance efficiency<sup>1</sup>.

#### **Industry 4.0 Opportunities:**

A report by the UN Development Programme highlights opportunities for Cambodia's manufacturing industries to adopt Industry 4.0 technologies. Policies that encourage this adoption can drive digital transformation in manufacturing<sup>2</sup>.

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<sup>1</sup> [Cambodia Digital Government Policy 2022\\_2035\\_English.pdf](#)

<sup>2</sup> [Industry 4.0: How Cambodia Can Build for The Future | United Nations Development Programme \(undp.org\)](#)

### Digital Economy and Society Policy Framework (2021-2035):

The Digital Economy and Society Policy Framework provides a roadmap for Cambodia's digital development. By fostering a conducive environment for technology adoption, it indirectly supports the manufacturing sector's digitalization<sup>3</sup>.

Postal Sector Development Policy:

While not exclusively focused on manufacturing, the Postal Sector Development Policy contributes to digital infrastructure. Efficient logistics and communication channels benefit manufacturing supply chains<sup>4</sup>.

In summary, Cambodia's digital policies lay the groundwork for a thriving digital ecosystem, which includes the manufacturing sector. By leveraging these policies, Cambodia can propel its manufacturing industry into the digital age, enhancing competitiveness and economic growth.

Table 1: Curriculum of the existing Industrial Engineering and Supply Chain Management program

Year	Semester	Course Code	Subject	Credit	L	T	P	Hours
ECAM3	S1	COMI31054	Mathematics for engineers 5	2	1	1	0	48
		COMI31055	Network & security	1	1	0	0	16
		COMI31056	Strength of materials	1.5	1	0.5	0	32
		COMI31057	Materials 2	1.5	1	0	0.5	32
		COMI31058	Introduction to heat transfer	1.5	1	0.5	0	32
		COMI31059	Electrical machines	1.5	1	0.5	0	32
		COMI31060	Power electronics	1.5	1	0.5	0	32
		COMI31061	Industrial organization	2	1	1	0	48
		COMI31062	Industrial method	1	1	0	0	16
		COMI31063	Ecodesign project 1	2.5	2	0	0.5	48

<sup>3</sup> [CAMBODIA DIGITAL ECONOMY AND SOCIETY POLICY FRAMEWORK 2021 - 2035 – ក្រសួងរ៉ែបូរេនេសាវ និង ទាញយក \(mptc.gov.kh\)](#)

<sup>4</sup> [Press release on the progress of digital policies and regulations in the digital sector in Cambodia | Open Development Cambodia \(ODC\)](#)



		COMI31064	Professional and personal development 5	2	0	2	0	64	
			English 5	1.5	1	0	0.5	32	
			French 5	1.5	1	0	0.5	32	
		<b>Total S1</b>		<b>21</b>	<b>13</b>	<b>6</b>	<b>2</b>	<b>464</b>	
	<b>S2</b>	COMI32067	Mathematics for engineers 6	1.5	1	0.5	0	32	
		COMI32068	Object-oriented programming	1	1	0	0	16	
		COMI32069	Vibration	1	1	0	0	16	
		COMI32070	Control Theory 1	1.5	1	0.25	0.25	32	
		COMI32071	Electrical machine drives	1	1	0	0	16	
		COMI32072	Quality	1	1	0	0	16	
		COMI32073	Ecodesign Project 2	2	1	0.5	0.5	40	
		COMI32074	Professional and personal development 6	2	0	2	0	64	
		ISMI32075	Introduction to industrial and supply chain management	2	1	1	0	48	
		ISMI32076	Industrial Engineering & Project Management	2	1	1	0	48	
				English 6	1.5	1	0	0.5	32
				French 6	1.5	1	0	0.5	32
		<b>Total S2</b>		<b>19.50</b>	<b>12</b>	<b>5.25</b>	<b>2.25</b>	<b>406</b>	
<b>Total Year 3</b>				<b>40.50</b>	<b>25</b>	<b>11.25</b>	<b>4.25</b>	<b>870</b>	
<b>ECAM4</b>	<b>S1</b>	COMI41080	Sustainable management S7	3	3	0	0	48	
		COMI41081	Professional and Personal Development S7	4	4	0	0	64	

		COMI41082	Applied engineering internship (S6)	3	3 (Defense internship report)			
		COMI41083	Innovation project S7	4.5	2.5	2	0	104
		ISMI41084	Manufacturing Digital Transformation	1.5	1	0.5	0	32
		ISMI41085	Global, External and Circular Supply Chain	1.5	1	0.5	0	32
			English 7	1.5	1	0	0.5	32
			French 7	1.5	1	0	0.5	32
		<b>Total S1</b>		<b>22.5</b>	<b>14.5</b>	<b>3</b>	<b>5</b>	<b>408</b>
	<b>S2</b>	COMI42090	Sustainable management S8	1	1	0	0	16
		COMI42091	Research project: management and tools	1	0	0	1	32
		COMI42092	Human & managerial sciences S8	2	0	1	1	64
		COMI42093	Innovation project S8	3	2	1	0	64
		ISMI42094	Industry of the Future	2	0.5	0.5	1	64
		ISMI42095	Sustainable and Integrated Supply Chain	2	0.5	0.5	1	64
			English 8	1.5	1	0	0.5	32
			French 8	1.5	1	0	0.5	32
<b>Total S2</b>		<b>17</b>	<b>6</b>	<b>3</b>	<b>8</b>	<b>368</b>		
<b>Total Year 4</b>		<b>39.75</b>	<b>20.5</b>	<b>6</b>	<b>13</b>	<b>776</b>		

## 2. PROPOSE MODIFICATION

### Relevance and Streamlining:

- The curriculum overhaul aims to enhance the program's relevance in today's dynamic landscape. By eliminating less pertinent subjects, we ensure that students focus on core competencies directly applicable to digital manufacturing systems.

- Streamlining the syllabus allows students to delve deeper into specialized areas, fostering expertise and practical skills. The goal is to produce graduates who seamlessly integrate into the digital manufacturing workforce.

#### **Industry Demand and Student Engagement:**

- The surge in students entering the manufacturing sector underscores the need for tailored education. As more individuals seek careers in this field, the program must adapt to meet their aspirations.
- By aligning with industry demand, we empower students to contribute effectively to the manufacturing ecosystem. Their engagement and success are pivotal for both personal growth and the sector's advancement.

#### **Strategic Partnerships:**

- The collaboration with Kasetsart University and ECAM LaSalle in the digital manufacturing system engineering program is a strategic move. It fosters knowledge exchange, research collaboration, and exposure to diverse perspectives.
- Partnerships like these enrich the learning experience, providing students with global insights and networking opportunities.

#### **Modernization and Technological Trends:**

- The curriculum's modernization reflects the rapid pace of technological advancements. Digital manufacturing systems rely on cutting-edge tools, automation, and data analytics.
- By incorporating these trends, we equip students with relevant skills, ensuring they remain competitive in an ever-evolving industry.

#### **National Policy and Economic Impact:**

- Cambodia's industrial development policy emphasizes digitalization. Our program aligns with this vision, contributing to the nation's economic growth.
- Graduates will drive innovation, enhance productivity, and elevate Cambodia's position in the global manufacturing landscape.

#### **Foundational Knowledge:**

- The revamped curriculum emphasizes core principles and theories. Students gain a solid understanding of digital manufacturing, including process optimization, smart factories, and supply chain integration.
- This foundational knowledge prepares them for diverse roles, from production management to technology implementation.

- In summary, the modification isn't merely about rearranging courses; it's a strategic response to industry dynamics, technological shifts, and national imperatives. Our graduates will be well-equipped to shape the future of digital manufacturing.

Table 2: Curriculum of the proposed modified Industrial Engineering and Supply Chain Management Program

Year	Semester	Course Code	Subject	Credit	L	T	P	Hours
ECAM2	S1	Follow all the courses that ITC design in collaboration with Curtin University						
		<b>Total S1</b>						
	S2	DTCI22040	Mathematics for engineers 4	3.5	2.5	1	0	72
		DTCI22041	Simulation & numerical calculation 2	1.75	1.25	0.5	0	36
		DTCI22042	Mechanical design 4 – gearing modelling & force analysis	0.75	0	0.75	0	24
		DTCI22043	Materials 1	1	0.5	0.5	0	24
		DTCI22044	Theory System of Digital Manufacturing Science	1.5	0.75	0.25	0.5	36
		DTCI22045	Manufacturing Informatics	1	0.5	0.5	0	24
		DTCI22046	Digital design & embedded software 2	1	0.5	0	0.5	24
		DTCI22047	Electrical network	1	0.5	0.25	0.25	36
		DTCI22048	Electronics 2 – Functions & applications	0.75	0.5	0	0.25	20
		DTCI22049	Workshops / summer schools – concentration discovery	1.25	0	0	1.25	40
DTCI22050	Sustainable development 4	1	0	0.5	0.5	24		

		DTCI22051	Multidisciplinary project 2	0.75	0.25	0.25	0.25	24
		DTCI22052	Professional and personal development 4	2	0	2	0	64
			English 4	1.5	1	0	0.5	32
			French 4	1.5	1	0	0.5	32
		<b>Total S2</b>		<b>19.75</b>	<b>9.25</b>	<b>6</b>	<b>4.5</b>	<b>488</b>
<b>Total Year 2</b>				<b>37.75</b>	<b>17.25</b>	<b>13</b>	<b>7.5</b>	<b>936</b>
<b>ECAM3</b>	<b>S1</b>	COMI31054	Mathematics for engineers 5	2	1	1	0	48
		COMI31055	Network & security	1	1	0	0	16
		COMI31056	Strength of materials	1.5	1	0.5	0	32
		COMI31057	Materials 2	1.5	1	0	0.5	32
		COMI31058	Introduction to heat transfer	1.5	1	0.5	0	32
		COMI31059	Electrical machines	1.5	1	0.5	0	32
		COMI31060	Power electronics	1.5	1	0.5	0	32
		COMI31061	Industrial organization	2	1	1	0	48
		COMI31062	Industrial method	1	1	0	0	16
		COMI31063	Ecodesign project 1	2.5	2	0	0.5	48
		COMI31064	Professional and personal development 5	2	0	2	0	64
			English 5	1.5	1	0	0.5	32
			French 5	1.5	1	0	0.5	32
	<b>Total S1</b>		<b>21</b>	<b>13</b>	<b>6</b>	<b>2</b>	<b>464</b>	
	<b>S2</b>	COMI32067	Mathematics for engineers 6	1.5	1	0.5	0	32
		COMI32068	Object-oriented programming	1	1	0	0	16

		COMI32069	Vibration	1	1	0	0	16
		COMI32070	Control Theory 1	1.5	1	0.25	0.25	32
		COMI32071	Electrical machine drives	1	1	0	0	16
		COMI32072	Quality	1	1	0	0	16
		COMI32073	Ecodesign Project 2	2	1	0.5	0.5	40
		COMI32074	Professional and personal development 6	2	0	2	0	64
		ISMI32075	Introduction to Supply Chain Management	2	1	1	0	48
		ISMI32076	Industrial Engineering & Project Management	2	1	1	0	48
			English 6	1.5	1	0	0.5	32
			French 6	1.5	1	0	0.5	32
		<b>Total S2</b>		<b>19.50</b>	<b>12</b>	<b>5.25</b>	<b>2.25</b>	<b>406</b>
<b>Total Year 3</b>				<b>40.50</b>	<b>25</b>	<b>11.25</b>	<b>4.25</b>	<b>870</b>
ECAM4	S1	COMI41080	Sustainable management S7	3	3	0	0	48
		COMI41081	Professional and Personal Development S7	4	4	0	0	64
		COMI41082	Applied engineering internship (S6)	3	3 (Defense internship report)			
		COMI41083	Innovation project S7	4.5	2.5	2	0	104
		ISMI41084	Manufacturing Digital Transformation	1.5	1	0.5	0	32
		ISMI41085	Global Supply Chain and Information System	1.5	1	0.5	0	32
			English 7	1.5	1	0	0.5	32
			French 7	1.5	1	0	0.5	32
		<b>Total S1</b>		<b>22.5</b>	<b>14.5</b>	<b>3</b>	<b>5</b>	<b>408</b>

	<b>S2</b>	COMI42090	Sustainable management S8	1	1	0	0	16
		COMI42091	Research project: management and tools	1	0	0	1	32
		COMI42092	Human & managerial sciences S8	2	0	1	1	64
		COMI42093	Innovation project S8	3	2	1	0	64
		ISMI42094	Industry of the Future	2	0.5	0.5	1	64
		ISMI42095	<b>Robust Supply Chain</b>	2	0.5	0.5	1	64
			English 8	1.5	1	0	0.5	32
			French 8	1.5	1	0	0.5	32
			<b>Total S2</b>	<b>17</b>	<b>6</b>	<b>3</b>	<b>8</b>	<b>368</b>
		<b>Total Year 4</b>	<b>39.75</b>	<b>20.5</b>	<b>6</b>	<b>13</b>	<b>776</b>	
<b>Y5 (M1)</b>	<b>S1</b>	COMI51098	Minor Project	2	0	0	2	64
		COMI51099	Major Project	2	0	0	2	64
		ISMI51100	Course 1 to prepare for M1	2	1	1	0	48
		ISMI51101	Course 2 to prepare for M1	2	1	0.5	0.5	48
		ISMI51102	Course 3 to prepare for M1	2	1	0.5	0.5	48
	<b>S2</b>	Internship	9	0	0	9	--	
		<b>Total Year 5</b>						
		<b>Total (Y1 to Y5)</b>	<b>154 &gt; 120</b>	<b>81.5</b>	<b>43</b>	<b>29.5</b>	<b>3456</b>	

## Annexe 14

### Detail of proposal for Master Program of Architectural Engineering

#### 1. BACKGROUND

According to survey questionnaire among 170 graduated students and final year students, about 70% of them expressed their support and are interested in studying the master's degree of architecture by strongly arguing that the master program can really improve their knowledge of conceptual theory, sustainability and building information modelling (BIM) and train their skill in career practices,

Among 15 national and international companies, the survey showed that they strongly support for ITC to open a master 's degree in architecture and there are 8 companies which have mostly one or two architects holding master and 2 companies which have one architect holding Ph. D. degree. The other companies employed only architects holding bachelor's degrees. This explain that the availability of master architects is very limited, and today's demand is so high that ITC should take this opportunity to launch this master program.

Besides the survey of demand of architects holding master's degree, 7 companies did support by stating their interest and support to ITC for opening master's degree in architectural engineering. All support letters are attached.

In opening this master program, ITC have worked closely with professors specialized in Architectural Engineering from the University of Liège and University Libre of Brussel. In COMBOD'IA, Professor Piere LECLERCQ and Prof. Samia BEN RAJEB accept 3 PhD students to learn and do research for the field in order to form human resources, established a virtual bureau of architecture and improve the curriculum Bachelor of Architecture Engineering and propose a new Master of Architectural Engineering this year.

#### MASTER PROGRAM OF ARCHITECTURAL ENGINEERING

The Master Program of Architectural Engineering aims to build competent human resource for the construction sector. The mission, vision, value, curriculum structure, and staff are as follows:

##### **Mission**

The master program missions are as follows:

- Educate and train students to become highly skilled professionals in the field of architectural engineering.
- Equip students with the knowledge, skills, and expertise needed to address complex challenges in architecture and engineering in both regional and international level.
- Prepare to make significant contributions to the advancement of the architectural engineering field and to meet the evolving needs of society in term of science and technologies.
- Foster creativity, innovation, and sustainability in architectural design and construction practices
- Support the research unit of built design and built environment of ITC



## Visions

The visions of this master program are as follows:

- Build a strong cooperation with industries and public sector in construction fields as well as other stakeholders.
- Continue cooperating with universities in the region and internationally to provide students an excellent education and more opportunities in exchange Master program with other universities and pursuing PhD degrees.
- Build highly competent human resources.

## 2. PROGRAM OF MASTER OF ARCHITECTURAL ENGINEERING

### 2.1 Program Education Objectives (PEOs)

The Master Program of Architectural Engineering at Institute of Technology of Cambodia prepares students for lifetime careers as productive and innovative engineers adaptive to new situation and emerging programs with utmost awareness of ethical, social and environmental concerns so that, within five years after graduation, they will be able:

- PEO1:** Apply knowledge of science, mathematics, civil, engineering principles, and other relevant fields of studies to solve complex engineering problems.
- PEO2:** Solve complex problems based on investigation or research using the integration of knowledge and the consequent responsibilities relevant to professional practice.
- PEO3:** Ability in engineering, management, and finance principles in managing projects
- PEO4:** Function effectively as an individual or in a team to achieve common goals in diverse teams and in multi-disciplinary settings
- PEO5:** Understand the impact of engineering decisions and apply professional ethics for sustainable development.

### 2.2 Outcome Standards and Program Learning Outcomes

Master of Architectural Engineering at Graduate School of ITC aims at grooming future engineers with capability based on the Outcome Standards and Program Learning Outcomes. The Outcome Standards (OC) include the knowledge, cognitive skills, interpersonal and responsibility, numerical skills, information technology and communication, and psychomotor skills. Table 1 summarizes the Outcome Standards. The Program Learning Outcomes (PLO) consist of ten (10) elements presented in Table 2.

Table 1: Outcome Standards for Master Program

Outcome Standard	Outcome Title	Program Learning Outcomes (PLO)
OC1	Knowledge	PLO1, PLO2, PLO3, PLO4

OC2	Cognitive Skills	PLO5, PLO6, PLO7
OC3	Interpersonal and Responsibility	PLO8
OC4	Numerical Skills, Information Technology and Communication	PLO9
OC5	Psychomotor Skills	PLO10, PLO11

Table 2: Program Learning Outcomes for Master Program

<b>Program Learning Outcomes (PLO)</b>	<b>Title</b>	<b>Description</b>
PLO1	Scientific and Research	Ability to apply knowledge of scientific research related to architecture, engineering, and technology concerns.
PLO2	Architectural Engineering Knowledge	Ability to apply knowledge of science, technology, architecture, engineering principles, and other relevant fields of study to solve complex engineering problems.
PLO3	Design Strategies and Tools	Developing design strategies involves implementing methods and utilizing tools that support architectural design, ensuring a comprehensive and effective approach.
PLO4	Urban Design and Sustainable Development	Ability to design on an urban scale with application of sustainable strategies for less environmental impact.
PLO5	Innovative, Critical and Analytical Thinking	Ability to analyze, evaluate, and synthesize that enable to approach problems, ideas, and situations with creativity, discernment, and in-depth.
PLO6	Problem Solving	Ability to identify, analyze, evaluate, and solve problems related to architectural design, engineering and environmental impact.
PLO7	Soft Skill	Ability to communicate and collaborate in a teamwork environment with leadership skills.

PLO8	Management skill	Ability to organize, plan, and manage construction projects.
PLO9	Numerical Practice	Ability to learn and adapt with new technology and numerical innovation.
PLO10	Reflex skills and professional practice	Ability to have quick reflex skills and professional practicing through their workshop, and project.
PL11	Balancing theoretical knowledge and experience	Balancing theoretical knowledge and experiences in the project and complete the task effectively.

### 2.3 Course hours and credits

The curriculum of the Master Program of Architectural Engineering is prepared for students graduating within two (2) years. The total credits for completing this program are at least 65. There are 27 courses that students must enroll in within 2 years (for students that come from the other university). For students who graduated from ITC, there are 8 courses that they must enroll in starting from year 2 of Master Program. Each course includes the total hour for study (T. HR) per semester for coursework (C), tutorial (T), and practice (P).

The credit to be equivalent with teaching hour as follow:

- 16 hours of teaching course (C) = 1 credit
- 32 hours of tutorial (TD) = 1 credit
- 32 hours of laboratory practice (TP) = 1 credit

### 2.4 Curriculum Structure

Both students graduated from ITC and from other universities are eligible for this Master of Architectural Engineering. They will be screened and do the master. The students graduated from ITC shall be screened based on their GPA before accepting into M2, M1 are integrated in Year 4 and Year 5 however the students graduated from other universities shall be screened based on their score records in order to define if they need to do full M1 or only a supplementary list of few courses for first year and M2 for second year.

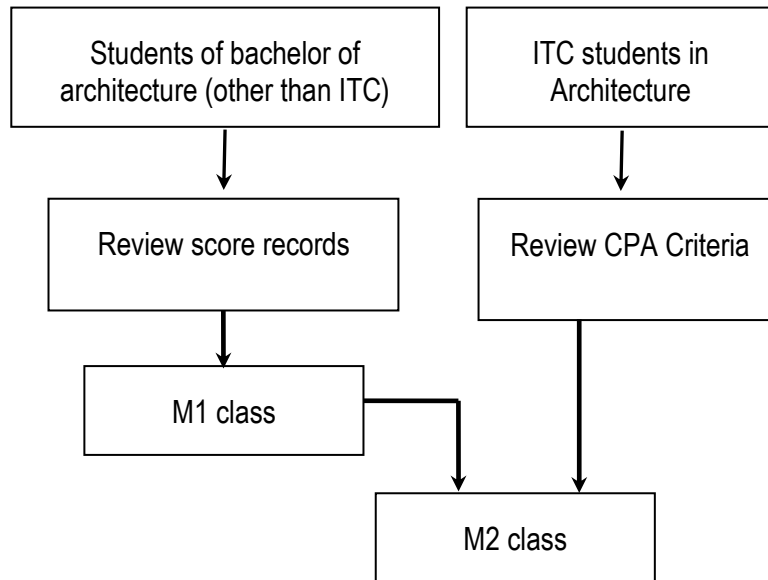


Figure 1: Curriculum Structure of Master Program of Architectural Engineering

## 2.5. Curriculum of Master Program of Architectural Engineering

This is the detail of curriculum for Master of Architectural Engineering discussed and proposed for 2 years.

Table 3: Total course and credit for Master Program of Architectural Engineering

N°	Course descriptions	Corse code	Course	TD	TP	Credits
<b>M1GAR-S1</b>			<b>384</b>			
1	Materials of constructions		16	0	32	2
4	Cost Estimation	GARI51MET	16	0	0	1
5	Thesis Writing and Research Methodology	GARI51MRT	16	0	0	1
6	Project Management	GARI51GES	16	32	0	2
8	Stability of Tall Building	GARI51SBG	16	0	0	1
9	Urban Planning II	GARI51URB	16	0	32	2
10	Architectural Design Workshop III (Monofunctional Building)	GARI41ATA	16	0	64	3
<b>SUB-TOTAL</b>			<b>112</b>	<b>32</b>	<b>128</b>	<b>12</b>
<b>M1GAR-S2</b>			<b>272</b>			
1	Architectural Design Workshop IV (Integrated Project)	GARI42ATA	16	0	64	3

	2	Interior Design	GARI42DIN	16	0	32	2
	3	Urban Regulations and Laws	GARI42RUD	32	0	0	2
	5	Urban Planning I	GARI42URB	16	32	0	2
	6	External Works (Building Services)	GARI42VRD	16	0	0	1
	8	Mechanics of Structure I	GSCM12MOS	32	0	32	3
<b>SUB-TOTAL</b>				<b>128</b>	<b>32</b>	<b>128</b>	<b>13</b>
<b>M2GAR-S1</b>				<b>288</b>			
	1	Workshop VI (sustainable, integrated project in Cambodia context, international jury)	GSCM21ATA	32	0	96	5
	2	Building Information Management (BIM)	GSCM21BIM	16	0	0	1
	3	Strategic Management/Construction Project Management	GSCM21SCP	16	0	0	1
	4	Sustainable Development and Smart City	GSCM21SDS	16	0	32	2
	5	Life Cycle Approach to Sustainable Building	GSCM21LCA	16	0	32	2
	6	Urban Planning and Management	GSCM21UPM	16	0	32	2
	7	Built Environment in a Resource Conservation Perspective	GSCM21BRC	16	0	32	2
	8	Master Thesis Writing and Introduction to Research Methodology	GSCM21TRM	32	0	0	2
				160	0	224	
<b>SUB-TOTAL</b>							<b>17</b>
<b>M2GAR-S2</b>							
	10	Master Thesis	GSCM2			540	12
<b>SUB-TOTAL</b>							<b>12</b>
<b>Total</b>				<b>400</b>	<b>64</b>	<b>1020</b>	<b>54</b>
				<b>1484</b>			

## 2.5. Human Resources

The current human resources can be employed actively for launching the program with some help in situ or online from Belgian experts in the field of architectural engineering. The local list of teachers is as follow:

Table 4. Human resources of Master Program of Architectural Engineering

No	Name	Degree	Graduated in year	Field of Expertise
1	Han Virak	Ph. D.	2006	Civil Engineering
2	Hash Chanly	Master	2008	Architectural Engineering: Urban and Regional Planning
3	Keth Kannary	Master, Ph. D candidate	2020	Architectural Engineering
4	Leu Leanghong	Master	2023	Architecture in Program Building Technology
5	Taing Kimnenh	Master, Ph. D candidate	2020	Architectural Engineering
6	Long Makara	Master, Ph. D candidate	2021	Architectural Engineering, professional focus in architectural and urban engineering
7	Venh Lay Ou	Master	2023	Architecture, research direction: sustainable urban design
8	Thai Srun	Bachelor	2002	Urban Management
9	May Raksmeay	Doctor of Engineering	2010	Urban and Environmental Engineering, Project Management

## Annexe 15

### Detail of proposal for revising the name of a research unit (from MSS to MBE)

The Materials Science and Structure Research Unit focuses on research and innovation trends in engineering and construction materials, especially low-carbon impact materials and lightweight structures. This includes geotechnical engineering, underground structures, structural engineering, minerals, polymers, ceramics, and alloys to address specific needs in Cambodia. The research unit also pays attention to the field of Architectural Engineering, particularly in studies related to affordable housing.

While the activities conducted in the Architectural Engineering field are already part of MSS, the unit's name is not reflected in this field. Therefore, a modification is proposed. After discussions among our team and partners, the new name "**Materials and Built Environment**" (MBE) has been suggested. The purpose of this modification is to integrate relevant research fields such as architectural engineering, transportation, logistics, and others into this research unit. Using the right terminology is crucial to raise awareness among the public and students, encouraging them to apply in this field, and promoting collaboration with professional stakeholders.

Currently, there are 3 senior researchers, 3 full-time researchers, and 2 potential lecturer researchers working in this field. Additionally, there are 5 ongoing research projects. The research themes in architectural engineering include but are not limited to:

- Integrated and instrumented design
- Bioclimatic construction
- Sustainable design
- Building Information Modeling/Management (BIM)
- Collaborative design
- Urbanization principles

The activities and management structure that have been conducted previously remain the same. The intention of this revision is to emphasize that relevant research fields can be accommodated within this unit for public awareness and to promote research collaboration.

## Annexe 16

### Research projects implementing in 2023-2024

#### ➤ Number of research projects implementing in 2023-2024

The first 27 research projects are new projects, whereas other 64 projects are continuing from previous year.

No.	Name of PI	Sex	Title	Period	Budget
1	Dr. OR Chanmoly	M	Accelerating Digital Transformation for Higher Education Institutions in Southeast Asia (DX.SEA)	2023-2025	Erasmus+
2	Dr. YOEU Sereyvath	M	Production of Organic-Mineral Fertilizers from Local Raw Materials	2023-2024	MoEYS
3	Mrs. SIENG Sreyvich	F	Assessment of Air Quality and Impact in Potential Areas in Cambodia	2023-2026	JICA/JST
4	Dr. TAN Reasmey	F	Development of Oyster Sauce from Cambodian Oysters and Green Mussels for Commercialization	2023-2024	CAPFish-UNIDO-EU
5	Dr. MITH Hasika	M	Health Risk Assessment and Quality Improvement of Cambodian Smoked Fish	2023-2024	CAPFish-UNIDO-EU
6	Dr. IN Sokneang	F	Improvement on Quality, Safety, and Shelf-Life (including Packaging) of Fermented Pangasius Fish for Accessing to New Markets	2023-2024	CAPFish-UNIDO-EU
7	Dr. PENG Chanthol	F	Feasibility Study of Siem Reap's Prahok toward Geographical Indication: History, Technology, and Quality	2023-2024	CAPFish-UNIDO-EU
8	Dr. IN Sokneang	F	Study on the Effect of Steam Conditions (Temperature, Time, and Green Mussel Size) on the Organoleptic Quality and Safety Quality of Green Mussels	2023-2024	CAPFish-UNIDO-EU
9	Dr. SUONG Malyna	F	Laboratory of Excellence in Co-Engineering for Sustainable Agrosystems	2024-2028	IRD
10	Dr. SUONG Malyna	F	Promoting Integrated Pest Management and Sustainability of the Fragrant Rice Quality in Cambodia by Valorization of Native Microbiota	2024-2026	Ministry of Europe and Foreign Affairs (via The Embassy of France)



11	Dr. SUONG Malyna	F	Soil-Borne Legacy and Microbiota-Mediated Disease Resistance in Rice-Based Systems in Cambodia	2024	Agropolis Fondation
12	Dr. SUONG Malyna	F	Training in the Use of Molecular Tools for Diagnosis of Rice Diseases to Support the Transition towards Integrated Pest Management	2024-2026	IRD
13	Dr. VALY Dona	M	Integrated Decision Support System for Non-Communicable Ocular Diseases using Machine Intelligence	2023-2024	ASEAN IVO
14	Ms. OUM Sotheara	F	Development of Autonomous and Semi-Autonomous Mobile Robots to Participate in Robocon 2024	2023-2024	Takahashi Foundation
15	Dr. KAN Kuchvichea	M	Evaluation Technico-Socio-Economique des Infrastructures Routières au Cambodge	2023-2025	ARES
16	Mr. SOM Chansamng	M	Effect of the Addition of Natural Fibers on Shrinkage, Cracking Risk and Healing Capacity of Cementitious Materials	2023-2026	BGF-MoEYS
17	Dr. PROK Narith	M	Performance of Tyfo(R)FibrAnchor under Axial Load	2023-2024	Fyfe Asia
18	Dr. OEUNG Thaileng	M	Investigation of Steel-Concrete Composite Structural Elements under Various Loadings	2023-2024	TMU
19	Dr. YOS Phanny	M	FSPI-R: Metal-related Skill and Create Link with Archeo-Metal Activities in Cambodia	2023-2024	French Embassy
20	Mr. SOK Sereyvathana	M	Removal of Organic Micropollutants by Coupling Simultaneous Continuous Adsorption and Sedimentation for Drinking Water Production	2023-2026	BGF & MoEYS
21	Dr. THENG Vouchlay	F	Photoproduction of Radicals and their Effects on Carbon Dynamics in Tropical Lakes (JSPS-Photochem)	2023-2027	JST
22	Dr. SOK Ty	M	Development and Social Implementation of Greenhouse Gas Emission Reduction Technologies in Paddy Fields of West Tonle Sap Lake by Establishing a Large Paddy Area Water Management System	2024-2028	JST/JICA

23	Dr. SOK Ty	M	Integrated River Basin Management of the Mekong Basin Tributary for Adaptation to Climate Change	2024-2027	Mekong Korea Cooperation Fund (MKCF)
24	Dr. BUN Saret	M	Stopping Macro- and Microplastic Pollutants by Installing Solar-Powered Air Bubble Screening (SBS) Device at Discharge Wastewater Canal to the Sea of Sihanoukville, Cambodia	2024	UNDP
25	Dr. BUN Saret	M	Rural Community Training on Safe Water Quality and its On-Site Demonstration Testing	2024	SUMERNET
26	Dr. BUN Saret	M	Addressing Water Scarcity through Groundwater Use: Development of Solar-Powered Groundwater Treatment System for Remote Area of Cambodia	2024-2025	MTT-RRP
27	Dr. Ratha MUON	F	Réhabilitation et Gestion Durable de la Fertilité des Sols pour Uneagriculture Durable et Résiliente au Cambodge (ReaSol)	2023-2025	IRD
28	Dr. OR Chanmoly	M	Optimization of Algae Cultivation for Biofuel Production in Cambodia	2023-2024	LBE-JICA
29	Mr. CHHLONH Chhith	M	Optimal Fault Location, Isolation, and Restoration Procedure for LV Microgrids	2021-2024	BGF
30	Mr. SORN Darong	M	Optimal Energy-Management System in Smart-Building	2023-2024	LBE-JICA
31	Dr. VAI Vannak	M	Development of a Virtual Cambodian Power System-Towards an Innovation Micro-Grid in Cambodia	2020-2024	HEIP
32	Dr. OR Chanmoly	M	Applied Geophysics for Investigating Hydrocarbon Potential and Depositional Environment of Sediments at Onshore Prospect, Southern Cambodia	2021-2023	HEIP
33	Dr. KRET Kakda	M	Investigation the Production Potential of the Cambodian Offshore Reservoir Considering Effects of Phase Behavior and Rock-fluid Interaction	2021-2023	HEIP
34	Dr. ENG Chandoeun	M	Quality Assurance of Concrete Pile Integrity Soil Properties Investigation in Phnom Penh City using Seismic and Electrical Resistivity Tomography Approaches	2021-2023	HEIP

35	Dr. VONGCHANH Kinnaeth	F	Study on Impact of Heat Stress to Human Productivity and Economic in Cambodia	2020-2023	CCCA3
36	Dr. VONGCHANH Kinnaeth	F	Energy Manager and Auditor Training Program	2020-2023	UNDP
37	Dr. KHON Kimsromn	M	Optimal Energy-Management System in Smart-Building	2023-2024	JICA-LBE
38	Dr. SUONG Malyna	F	Biotechnology for Integrated Pest Management towards pesticide reduction in Cambodia	2019-2023	HEIP
39	Dr. IN Sokneang	F	Valorization of High-Value Dry Food Products (Agricultural Products including Herbal and Spices) and Other By-products in Cambodia	2019-2023	HEIP
40	Dr. MITH Hasika	M	Improvement and Development of Rice-Based Products toward the Growth of SMEs/Industries in Cambodia	2019-2023	HEIP
41	Dr. TAN Reasmey	F	Development of Cambodian Soy Sauce by Fermentation Method	2019-2023	HEIP
42	M. KONG Sela	M	Development of Cooking Oil Processes for Commercialization	2021-2023	HEIP
43	Dr. PENG Chanthol	F	Improvement and Development of Fish and Meat Products for Better Preservation using Innovative Technology	2021-2023	HEIP
44	Dr. HOUNG Peany	F	Valorization of Agricultural By-Products in Cambodia through Extractions and Formulations of Essential Oils and Bioactive Compounds	2021-2023	HEIP
45	Dr. HOUNG Peany	F	Agroecology and Safe Food System Transitions (ASSET)	2020-2025	EU/AFD and GRET
46	Dr. PENG Chanthol	F	Reducing Foodborne Pathogen Contamination of Vegetables in Cambodia: Innovative Research, Targeted Interventions, and Impactful, Cambodian-Led Engagement	2020-2024	USAID
47	Dr. YOEUEN Sereyvath	M	ASEAN Network for Green Entrepreneurship and Leadership/ ANGEL	2021-2024	Erasmus+
48	Ms. CHIN Lyda	F	Impact of Initial Composition and Processing Techniques on Aromatic Quality of Mango	2021-2024	BGF & MoEYS,

					Tonle sap project
49	Dr. MITH Hasika	M	Development of High Nutritional Value Farmed Fish and Safe Processed Products (Smoked and Fermented Fish) in Cambodia	2022-2027	ARES
50	Dr. SUONG Malyna	F	Health of Plants in their Socio-Ecological Ecosystem (Plant Health)	2022-2024	GDA (MAFF)
51	Dr. SUONG Malyna	F	Deciphering the Function of the Plant Parasitic Nematode Microbiome in Suppressive Soils (DEPPAS)	2022-2024	Agropolis Fondation
52	Dr. IN Sokneang	F	Improving Fresh-Water Fish Powder Production for Versatile Use in Cambodian Diets	2023-2024	CAPFish-UNIDO-EU
53	Dr. HOUNG Peany	F	Improvement of Dried Fish Quality through Drying Technology Development	2023-2024	CAPFish-UNIDO-EU
54	Ms. NET Marinich	F	Development of Instant Fish Soups for Commercialization	2023-2024	CAPFish-UNIDO-EU
55	Dr. EK Pichmony	F	Development of Nutrient-Dense Waffle Rolls for Children by Incorporating Cambodian Freshwater Fish Powder	2023-2024	CAPFish-UNIDO-EU
56	Dr. MORM Elen	F	Shelf-Life Improvement and Development of Fish Jerky Products	2023-2024	CAPFish-UNIDO-EU
57	Dr. VALY Dona	M	Ancient Manuscript Digitization and Indexation	2020-2023	HEIP
58	Dr. PEC Rothna	M	Toward Product Innovation via FabLab-ITC	2020-2024	HEIP
59	Mr. CHHORN Sopheaktra	M	Controller System for Smart Greenhouse	2022-2023	HEIP+YG
60	Mr. CHHORN Sopheaktra	M	SOLAGEO's Internet of Energy	2022-2023	HEIP + Trade without Border
61	Dr. THOURN Kosori	M	Initiative towards Electrical and Electronic Product Testing and Certification by EMC Laboratory	2019-2024	HEIP
62	Dr. KIM Bunthern	M	Contribution to the Optimal Design, Control and Diagnostic of an E-tuk-tuk	2021-2024	HEIP
63	Mr. KUY Movsun	M	Investigation of Configuration Issues Related to SDN/NFV Deployments	2020-2024	ARES

64	Mr. CHIN Chan Daraly	M	The Vehicle as an Intelligent Thing	2022-2025	N/A
65	Dr. SRANG Sarot	M	Development of APSARA-1 (2U CubeSat) Engineering Model	2022-2024	MoEYS
66	Mr. TEP Sovichea	M	Smart Mushroom Control System Development	2023-2024	iDE
67	Dr. CHHIT Saosometh	M	Experimental Identification of Hardening Behavior of G300 Steel Grade	2023-2024	JICA-LBE
68	Mrs. AUN Srean	F	Development of Starch-Based Film for Biodegradable Packaging Using Cambodian Cassava as Starch Source	2023-2024	Takahashi
69	Ms. AUN Srean	F	Air Pollution in Phnom Penh/East Asia-Nanoparticle Monitoring Network (EA-Nanonet)	2011-Present	Kanazawa University
70	Ms. KETH Kannary	F	Managing the Interdisciplinary Collaboration in Construction 4.0: ITC's Workshop Case	2020-2024	ARES
71	Ms. TAING Kimnenh	F	Green BIM - Analysis of BIM Approach for Designing a Bioclimatic Building	2020-2024	ARES
72	Mr. LONG Makara	M	Sustainable Building Designs Integrated Life-Cycle Assessment (LCA), for Best Strategies to Design the Green Residential Building in Phnom Penh, Cambodia	2021-2025	ARES – COMBOdIA Project
73	Dr. PROK Narith	M	Performance of Tyfo(R)FibrAnchor under Axial Load	2023-2024	Fyfe Asia
74	Dr. DOUNG Piseth	M	Energy-Based Design for Buildings and Steel Ring Damper for Seismic Application	2020-2024	KMUTT
75	Dr. DOUNG Piseth	M	Initiative on the Development of Wind Load for Design of Building Structures in Cambodia	2021-2023	HH HEIP
76	Dr. HIN Raveth	M	Chemical Strengthening of Large-scale Glass Pieces for Construction and Other Engineering Applications	2020-2023	HEIP
77	Dr. PROK Narith	M	Performance of FRP Anchor Embedded into Concrete Cylinder	2022-2023	Fyfe Asia
78	Dr. OR Chanmoly	M	SATREPS: Establishment of Risk Management Platform for Air Pollution in Cambodia	2022-2027	JICA-JST
79	Dr. THENG Voulay	F	Preventing Zoonotic Diseases Emergence	2022-2027	AFD-RD

80	Dr. SANG Davin	F	Development of Electrocoagulation-Floatation (ECF) Reactor for Removal Turbidity, Color, and Oil & Grease from Slaughterhouse Wastewater	2023-2024	JICA/LBE
81	Dr. HEU Rina	F	Development of Locally-Produced Ceramic Pot Filter for Household Groundwater Purification in Rural Cambodia	2023-2024	JICA/LBE
82	Dr. TY Boreborey	F	Development of Monitoring and Controlling of IoT Based Aquaponics System using Green Energy (Acronym: Smart Aquaponics Project)	2023-2024	JICA/LBE
83	Dr. PEN Sytharith	M	Ecosystem-Base Adaptations for Sustainable Groundwater Resources Management in the Transboundary Cambodia-Vietnam Mekong Delta Aquifer, Lower Mekong Region (GEBA)	2022-2023	Stockholm Environment Institute (SEI)
84	Dr. HANG Leakhena	F	Development of a Bio-Filter System Model to Control Air Pollution toward Industrial Application	2021-2023	HEIP
85	Dr. HEU Rina	F	Improving Sustainable Water Supply and Sanitation in Cambodia: Case of Tonle Sap Lake's Floating Villages	2021-2023	HEIP
86	Dr. KET Pinnara	F	Integrated Approach of Precise Irrigation and Sustainable Soil Management to Improve Crop Water Productivity in Cambodia through ITC Soil Laboratory Development: The Focus on Rice Farming	2021-2023	HEIP
87	Dr. BUN Saret	M	Development of Eco-Friendly and Low-Cost Wastewater Treatment System as an On-Site Product	2021-2023	HEIP
88	Dr. SONG Layheang	M	Development of Climate Data Information System for Cambodia	2021-2023	HEIP
89	Dr. OEURNG Chantha	M	Strengthening Flood and Drought Risk Management and Early Warning System in Lower Mekong Basin of Cambodia	2021-2023	HEIP
90	Dr. CHAN Rathborey	M	Development of Electrocoagulation Reactor Integrated Sedimentation for Turbidity and Color Removal from Industrial Wastewater	2021-2023	HEIP
91	Dr. KET Pinnara	F	Prototype of Low-Cost and Smart In-vessel Composter for Converting Spent Mushroom Substrates to Bio-Organic Fertilizer	2021-2023	HEIP

➤ **Number of Projects/Proposals submitted 2022-2023**

No.	Title of Project	Speciality	Partner	Funding agency (Erasmus KA1, Erasmus KA1, AUN- SEED/Net, AUF, AFD, ADB, WB etc.,)	Funding Amount (USD)
1	Development of The Sustainable on Energy Solution Consultation Unit (SES_ITC)	ETM	N/A	LED	500,000 USD
2	Low-Cost Smart Energy Saving Devices for Residential and Industrial Applications	ETM	N/A	MoEYS (RCI fund)	25,000 USD
3	Application of Packaging Techniques to Extend Shelf Life of Fish-Vegetable Powder Product	FTN	Haiyat Handicraft	Capfish, UNIDO-EU	13,700 USD
4	Assessment of Existing Packaging Applications and their Impacts on the Quality of Processed Fish Products Available in Cambodian Markets	FTN	N/A	Capfish, UNIDO-EU	7,673 USD
5	Ending Plastic Pollution in Cambodia	FTN	Impact Hub	USAID	18,000 USD
6	Development of Compostable Bags from Cambodia Cassava	FTN	N/A	MoEYS (RCI fund)	53,000 USD
7	Cross-Sectional Study on Infection Control in Neonatal Care Units in Cambodia: Environmental Assessment by Bacterial Culture Examination	FTN	N/A	USAID	5,000 USD
8	Formulation and Evaluation of Active Film using Cassava Starch and Cabbage Leave Extracted	FTN	N/A	LBE-JICA	20,000 USD
9	Production of Collagen from Fish Processing Wastes Targeting Zero Waste Strategy	FTN	THOEUN SREYNY Handicraft	Capfish, UNIDO-EU	15,000 USD
10	Development of an AI-Powered Nutritional Program for Public and Private Schools to Reduce Malnutrition in Cambodia	FTN	Mahidol University (Thailand)	MoEYS (RCI fund)	150,000 USD
11	Development of Natural Bioactive Soap using Cambodian Local Plants	FTN	N/A	MoEYS (RCI fund)	20,000 USD
12	Improving of Processing Technique to Enhance the Quality of Smoked Fish Concerning Carcinogenic Chemical Contaminants	FTN	Liege University	MoEYS (RCI fund)	36,070 USD
13	Development of Functional Beverages with Improved Nutritional and Sensorial		CSL enterprise, Aprati Foods	MoEYS (HEIP 2)	1,268,000 USD


	Properties toward Local Economic Growth through Diversifying Cambodia's Agriculture Products	FTN			
14	Establishment of Cyclic Agricultural Platform (C-Agri) by Adopting Life Mechatronics in Cambodia	MIT	University of Fukui, Oita University, Tokyo Polytechnic University, Tokyo Institute of Technology, Tohoku University, The University of Tokyo, Tokushima University	SATREPS	N/A
15	Innovative Production Line for Smart Electronic Devices for Regional Products and Applications	MIT, ETM	N/A	MoEYS (HEIP2)	1,300,000 USD
16	Design and Implementation of Health Data Uploading for Rural Area using AI	MIT	N/A	MoEYS (RCI fund)	45,940 USD
17	Lab Upgrading and Maintenance	MIT	N/A	MoEYS (RCI fund)	30,000 USD
18	Development of Metamaterial-Based Sensors for Soil Monitoring Application in Agriculture	MIT	N/A	MoEYS (RCI fund)	30,000 USD
19	Smart Building Energy Management System	MIT	N/A	MoEYS (RCI fund)	40,000 USD
20	Ending Plastic Innovation Challenge	MSS	UNDP	UNDP	1,8000 USD
21	Development of Durable and Sustainable Smart Concrete Materials Used for Infrastructure Maintenance and Repair	MSS	N/A	MoEYS (RCI fund)	63,800 USD
22	Inclusion of Phosphorescent Octahedral Clusters in Biopolymers to be Applied as Mycocide by Irradiating the Sample	MSS	U Rennes	BGF-MoEYS	32,076 USD
23	Development of Highly Efficient Moldboard Ploughs Adapting to Different Soil Types	MSS	N/A	MoEYS (RCI fund)	19,000 USD
24	Blended Rubber Foam for Production of Heat Insulation Board	MSS	N/A	MoYES (RCI fund)	43,000 USD
25	Development of Compostable Bags from Cambodian Cassava	MSS	MoE	MoEYS (RCI fund)	48,000 USD
26	Cold Patching Asphalt Mixture (CPAM) for Road Repairs in Hot Climate and Rain-Prone Areas	MSS	N/A	MoEYS (RCI fun)	40,000 USD



27	Development of Locally Produced Activated Carbon from Variety of Agricultural Wastes for Wastewater Treatment	WAE	N/A	MoEYS (RCI fund)	35,000 USD
28	Combined Wastewater Treatment and Nutrient Recovery Technologies for Resource Efficiency in Aquaculture Systems to Advance Circular Economy in Cambodia (TECHNAQUA)	WAE	N/A	MoEYS (HEIP 2)	575,000 USD

Annexe 17

Academic Calendar 2024-2025

 ព្រះរាជាណាចក្រកម្ពុជា ราชอาณาจักรកម្ពុជា ព្រះរាជាណាចក្រកម្ពុជា ព្រះរាជាណាចក្រកម្ពុជា		CALENDRIER UNIVERSITAIRE 2024-2025												ព្រះរាជាណាចក្រកម្ពុជា ព្រះរាជាណាចក្រកម្ពុជា	
AOÛT	SEPTEMBRE	OCTOBRE	NOVEMBRE	DECEMBRE	JANVIER	FEVRIER	MARS	AVRIL	MAI	JUIN	JUILLET	AOÛT	SEPTEMBRE	OCTOBRE	
Je 1	Di 1	Me 1	<b>Fête des morts</b>	Ve 1	Di 1	Ve 1	<b>Nouvel an international</b>	Sa 1	Sa 1	Ve 1	<b>Journe internationale de Travail</b>	Di 1	Ma 1	Ve 1	Semaine de rattrapage
Ve 2	Lu 2	<b>Semaine de rattrapage</b>	Me 2	Sa 2	Lu 2	Orientations pour les admis (inscription du T1)	Je 2	<b>13</b>	Di 2	Ve 2	<b>Pré-CEVU</b>	Ve 2	Me 2	10	Sa 2
Sa 3	Ma 3	Je 3	<b>Fête des morts</b>	Di 3	Ma 3	Je 3	<b>13</b>	Lu 3	Session d'examens de fin semestre	Me 3	<b>7</b>	Sa 3	Me 3	10	Di 3
Di 4	Me 4	Ve 4	<b>Fête des morts</b>	Lu 4	Ve 4	<b>CEVU</b>	Sa 4	Me 4	<b>8</b>	Ma 4	<b>7</b>	Di 4	Me 4	14	Ve 4
Lu 5	Je 5	<b>Concours en I3</b>	Me 5	Di 5	Je 5	<b>9</b>	Me 5	<b>10</b>	Ma 5	<b>3</b>	Di 5	Lu 5	Je 5	14	Sa 5
Me 6	Ve 6	Di 6	<b>Fin d'année de I1 et T1</b>	Lu 6	Ve 6	<b>5</b>	Me 6	<b>10</b>	Ma 6	<b>3</b>	Di 6	Me 6	14	16	Je 6
Me 7	Sa 7	<b>Fin d'année de I1 et T1</b>	Lu 7	Ve 7	Sa 7	<b>5</b>	Me 7	<b>10</b>	Ma 7	<b>3</b>	Di 7	Me 7	14	16	Je 7
Je 8	Di 8	Me 8	<b>Retré scolaire</b>	Lu 8	Ve 8	<b>5</b>	Me 8	<b>10</b>	Ma 8	<b>3</b>	Di 8	Me 8	14	16	Je 8
Ve 9	Lu 9	Me 9	<b>1</b>	Sa 9	Lu 9	<b>Fête de l'Indépendance National</b>	Je 9	<b>14</b>	Di 9	<b>Journe internationale des Femmes</b>	Ve 9	Me 9	14	19	Sa 9
Sa 10	Ma 10	Je 10	<b>1</b>	Di 10	Ma 10	Inscription du T1 pour les réserves	Je 10	<b>14</b>	Di 10	<b>Journe internationale des Femmes</b>	Ve 10	Me 10	14	19	Sa 10
Di 11	Me 11	Jury de septembre	Ve 11	Lu 11	Me 11	<b>10</b>	Sa 11	Correction et relevé de notes	Ma 11	<b>4</b>	Di 11	Me 11	14	19	Je 11
Lu 12	Je 12	Sa 12	<b>6</b>	Ma 12	Je 12	<b>10</b>	Me 12	<b>W</b>	Ma 12	<b>4</b>	Di 11	Me 11	14	19	Sa 11
Me 13	Ve 13	Di 13	<b>6</b>	Lu 13	Me 13	<b>10</b>	Je 13	<b>4</b>	Di 12	<b>W</b>	Lu 12	Je 12	15	19	Ma 12
Me 14	Sa 14	Lu 14	<b>Fête des eaux</b>	Me 14	Je 14	<b>15</b>	Me 14	<b>4</b>	Di 13	<b>W</b>	Me 13	Je 13	15	19	Ve 12
Ju 15	Di 15	Ma 15	<b>2</b>	Je 15	Me 15	<b>15</b>	Je 15	<b>4</b>	Di 14	<b>W</b>	Me 14	Je 14	15	19	Me 13
Ve 16	Lu 16	Me 16	<b>2</b>	Sa 16	Lu 16	<b>15</b>	Me 16	<b>4</b>	Di 15	<b>W</b>	Me 14	Je 14	15	19	Je 14
Sa 17	Ma 17	Je 17	<b>2</b>	Di 17	Ma 17	<b>15</b>	Je 17	<b>4</b>	Di 16	<b>W</b>	Me 14	Je 14	15	19	Me 14
Di 18	Me 18	Jury de passage pour I1 et T1	Ve 18	Lu 18	Me 18	<b>11</b>	Je 18	<b>5</b>	Di 17	<b>W</b>	Me 14	Je 14	15	19	Me 14
Lu 19	Je 19	Sa 19	<b>11</b>	Ma 19	Je 19	<b>11</b>	Me 19	<b>5</b>	Sa 18	<b>W</b>	Me 14	Je 14	15	19	Me 14
Me 20	Ve 20	Di 20	<b>11</b>	Lu 20	Me 20	<b>11</b>	Je 20	<b>5</b>	Sa 19	<b>W</b>	Me 14	Je 14	15	19	Me 14
Me 21	Sa 21	Lu 21	<b>11</b>	Me 21	Je 21	<b>11</b>	Me 21	<b>5</b>	Di 20	<b>W</b>	Me 14	Je 14	15	19	Me 14
Ju 22	Di 22	Ma 22	<b>11</b>	Je 22	Me 22	<b>16</b>	Je 22	<b>5</b>	Di 21	<b>W</b>	Me 14	Je 14	15	19	Me 14
Ve 23	Lu 23	Me 23	<b>3</b>	Sa 23	Lu 23	<b>16</b>	Je 23	<b>5</b>	Di 22	<b>W</b>	Me 14	Je 14	15	19	Me 14
Sa 24	Ma 24	Je 24	<b>3</b>	Di 24	Ma 24	<b>12</b>	Je 24	<b>5</b>	Di 23	<b>W</b>	Me 14	Je 14	15	19	Me 14
Di 25	Me 25	Ve 25	<b>3</b>	Lu 25	Me 25	<b>12</b>	Je 25	<b>5</b>	Di 24	<b>W</b>	Me 14	Je 14	15	19	Me 14
Lu 26	Je 26	Sa 26	<b>3</b>	Ma 26	Je 26	<b>12</b>	Me 26	<b>5</b>	Sa 25	<b>W</b>	Me 14	Je 14	15	19	Me 14
Me 27	Ve 27	Di 27	<b>3</b>	Lu 27	Me 27	<b>12</b>	Je 27	<b>5</b>	Di 26	<b>W</b>	Me 14	Je 14	15	19	Me 14
Me 28	Sa 28	Lu 28	<b>3</b>	Me 28	Je 28	<b>12</b>	Me 28	<b>5</b>	Di 27	<b>W</b>	Me 14	Je 14	15	19	Me 14
Je 29	Di 29	Ma 29	<b>3</b>	Je 29	Me 29	<b>12</b>	Je 29	<b>5</b>	Di 28	<b>W</b>	Me 14	Je 14	15	19	Me 14
Ve 30	Lu 30	Me 30	<b>3</b>	Sa 30	Lu 30	<b>12</b>	Je 30	<b>5</b>	Di 29	<b>W</b>	Me 14	Je 14	15	19	Me 14
Sa 31	Ma 31	Je 31	<b>3</b>	Di 31	Ma 31	<b>12</b>	Je 31	<b>5</b>	Di 30	<b>W</b>	Me 14	Je 14	15	19	Me 14