

មហាវិទ្យាល័យ
(Faculty)

— **កសិកម្ម និង**

កែច្នៃចំណីអាហារ

(Agriculture and Food
processing)

មេដឹកនាំ — **កែច្នៃចំណីអាហារ**
(Department food processing)

ឆ្នាំទី 3
(Year of Study)

ឆមាសទី 1
(Semester)

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមុខវិជ្ជា: _____

(Course Code)

ចំណងជើងមុខវិជ្ជា: _____ ជីវបច្ចេកវិទ្យា _____

Course Title: _____ Biotechnology _____

ក្រេឌីត: _____ 3 _____ (ស្មើ/Equal _____ 60 _____ ម៉ោង/Hours)

(Credit)

មុខវិជ្ជាបម្រុងឱ្យរៀនជាមុន: គីមីចំណីអាហារ មីក្រូជីវសាស្ត្រសណេទិច

និង ជីវគីមី

Prerequisite: _Food Chemistry, Microbiology, Genetic and
Biochemistry

សាស្ត្រាចារ្យសម្របសម្រួល: ក. សុខ វង្ស រស្មី

(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer³)

ភ្នាក់ងារស្តីពី: _____

(Guest Speaker¹)

ភ្នាក់ងារស្តីពី: _____

(Guest Speaker²)

Module Description Form

ចំណងជើងមុខវិជ្ជា	ជីវបច្ចេកវិទ្យា
Course Title	Fruit and Vegetable Processing
មូលហេតុ Rationale	<p>(បញ្ជាក់ពីមូលហេតុដែលនាំឱ្យមានការបញ្ចូលមុខវិជ្ជានេះក្នុងកម្មវិធីសិក្សា)</p> <p>(Provide the reason why this course is included into the curriculum)</p> <p>ជីវបច្ចេកវិទ្យា ជាមុខវិជ្ជាមួយមានតួនាទីចម្បង នៅក្នុងវិស័យបច្ចេកទេសទំនើបនានាជាច្រើន ដូចជា ឧស្សាហកម្មអាហារ ជីវបច្ចេកវិទ្យាថ្នាំពេទ្យ ជីវបច្ចេកវិទ្យាបរិស្ថាន ជីវបច្ចេកវិទ្យាកសិកម្ម និង ព្រៃឈើជាដើម។ (Biotechnology is the main course that play in role in all modern technology such as food industries, medical biotechnology, environmental biotechnology, agriculture and forest etc, .)</p>
គោលដៅរបស់មុខវិជ្ជា Overall Course Aim or Objective	<p>(នៅចុងបញ្ចប់នៃមុខវិជ្ជា តើចំណេះដឹងអ្វីដែលនិស្សិតនឹងទទួលបាន?)</p> <p>(At the end of the course, what knowledge will the students acquire?)</p> <p>និស្សិតនឹងដឹងហើយយល់ថា អ្វីជាជីវបច្ចេកវិទ្យា? ហេតុអ្វីបានជាមុខវិជ្ជានេះមានសារៈសំខាន់សម្រាប់និស្សិតយកទៅអនុវត្តក្នុងការងារទៅអនាគត? តើមុខវិជ្ជានេះអាចយកទៅប្រើក្នុងវិស័យណាខ្លះ? ។ (Student will know and understand what is biotechnology? Why is it necessary for students to practice in their future work? And which domains does this course apply?)</p>
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	<p>(នៅចុងបញ្ចប់នៃមុខវិជ្ជា តើនិស្សិតនឹងមានសមត្ថភាពពិពណ៌នាអំពីអ្វីខ្លះ?)</p> <p>(At the end of the course, what will the students able to describe?)</p> <p>គោលបំណងមុខវិជ្ជានេះ គឺ បង្ហាញនិស្សិតអោយដឹងថា អតិសុខុមច្រណែនមានប្រយោជន៍មកប្រើក្នុងការផលិតនូវផលិតផលផ្សេងៗ រឺ សិក្សាស្រាវជ្រាវអ្វីផ្សេងៗ ដោយប្រើប្រាស់បច្ចេកវិទ្យានិងវិធីសាស្ត្រទំនើប។ (The objectives of this course are to show the student to understand that there are a lot of useful microorganisms used for production or any researches by using new technology and procedure.)</p>
គោលបំណងផ្នែកអនុវត្ត Practical Objecties	<p>(នៅចុងបញ្ចប់នៃមុខវិជ្ជា តើនិស្សិតនឹងមានសមត្ថភាពធ្វើអ្វីខ្លះ?)</p> <p>(At the end of the course, what will the students able to do?)</p> <p>អនុវត្តជាក់ស្តែងនៅក្នុងមន្ទីរពិសោធន៍ ដើម្បីយល់អោយកាន់តែច្បាស់អំពីទ្រឹស្តីបទ។ (Practice in laboratory to make student better understanding about theoretical course.)</p>
ការបរិយាយមុខវិជ្ជា Course Description	<p>(បរិយាយពីមាតិកាសំខាន់ៗដែលត្រូវបង្រៀន)ច</p> <p>(Decribe main contents to be taught)</p> <p>មុខវិជ្ជានេះ មាន ៥ជំពូកសំខាន់ៗ ដែលជាប់ទាក់ទងទៅនឹងការអនុវត្តដោយផ្ទាល់ក្នុងការងារពិសោធន៍ និង បច្ចេកទេសថ្មីៗដែលត្រូវគេយកមកអនុវត្តនៅក្នុងផលិតនូវផលិតផលផ្សេងៗ ដែលនឹងបានរៀបរាប់នៅក្នុងមាតិកាខាងក្រោម។ (this course have 5 main chapters that relate to experiment in laboratory and new technology used in food production from that will be decribe in content below.)</p>
លទ្ធផលដែលនិស្សិតទទួលបាន Student Outcome	<p>(នៅពេលបញ្ចប់មុខវិជ្ជានេះ តើនិស្សិតនឹងរំពឹងអ្វីខ្លះ?)</p> <p>(On the completion of the course, what will the students expect?)</p> <p>មេរៀន និង ការងារអនុវត្តនៃមុខវិជ្ជានេះ គឺជាចំណេះដឹងដ៏ពិតប្រាកដមួយសម្រាប់ឱ្យនិស្សិតយកទៅអនុវត្ត នៅក្នុងការស្រាវជ្រាវ ផ្នែកជីវសាស្ត្រ ដូចជា ជីវមាស ជីវឧស្ម័ន ជាដើម។ ហើយអាចយកទៅអនុវត្តក្នុងការផលិតនូវផលិតផលក្នុងរោងចក្រ ឧស្សាហកម្ម ផ្នែកអាហារ និង ជីវផលិតផល ឬក្រសួងផ្សេងៗ ទៀត ដែល ពាក់ព័ន្ធ។ (Theories and Lab experiements of this course are good knowledge for student to practice some research on biology such as biomass, biogas, cte. And then is able to practic on production chain of industries of food or other bioproducts or relevant ministries)</p>

គារពងផែនការសម្រាប់ការរៀនមុខវិជ្ជា Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:	ការកែច្នៃបន្លែ និង ផ្លែឈើ Fruit and Vegetable Processing				
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល បង្រៀន Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី ១ Session 1	I. សេចក្តីផ្តើមរបស់ជីវបច្ចេកវិទ្យា: (Introduction biotechnology)	1h30	ផ្តល់មេរៀននិងឯកសារដែលទាក់ទងនឹងមុខវិជ្ជាទៅអោយនិស្សិតមុននឹងចាប់ផ្តើមបង្រៀន	សុខ រំហូរស្នី (SOK Vong Raksmei)	
ពេលទី ២ Session 2	II. Food microbiology	1h30	- រំលឹកមេរៀនដែលទាក់ទងមុខវិជ្ជា		
ពេលទី ៣ Session 3	II. Food microbiology (cont.)	1h30	- មេរៀនបង្ហាញតាម Power Point		
ពេលទី ៤ Session 4	III. Principles of Biochemistry and molecular biology	1h30	- លើកជាសំណួរដើម្បីបង្កើនចំណាំអារម្មណ៍និស្សិតក្នុងមេរៀន		
ពេលទី ៥ Session 5	III. Principles of Biochemistry and molecular biology (cont.)	1h30	- មេរៀនបង្ហាញតាម Power Point		
ពេលទី ៦ Session 6	IV. Fermentation and Bioreactors: IV.1- Fermentation in food biotechnology IV.2. Type of fermentation	1h30	- ផ្តល់នូវឧទាហរណ៍ជាគំរូសម្រាប់និស្សិតធ្វើការអនុវត្តន៍នៅក្នុងការពិសោធន៍		
ពេលទី ៧ Session 7	IV.3. Bioreactor configuration	1h30	- ដាក់សំណួរពិភាក្សាតាមក្រុម		
ពេលទី ៨ Session 8	IV.3. Bioreactor configuration (cont.)	1h30	- ពន្យល់បញ្ហាដែលកើតឡើង និង ឃើញជាឧទាហរណ៍ខ្លះមកបញ្ជាក់		
ពេលទី ៩ Session 9	IV.4. Stages in a fermentation process	1h30	- បង្កើនឱកាសអោយនិស្សិត សួរសំណួរផ្សេងៗ ដែលមិនយល់ និង មិនច្បាស់		
ពេលទី ១០ Session 10	IV.4. Stages in a fermentation process (cont.) (kinetic study on batch fermentation)	1h30	(-Introduce myself and students		
ពេលទី ១១ Session 11	Mid-team exam	1h30	- Give the lessons and some documents to student before starting course.		
ពេលទី ១២ Session 12	IV.4. Stages in a fermentation process (cont.) (kinetic study on fed-batch fermentation)	1h30	-review the previous lessons relevant to this course -Ask some question to make student attractive about each part of course		
ពេលទី ១៣ Session 13	IV.4. Stages in a fermentation process (cont.) (kinetic study on Continuous	1h30	-Give lesson by doing Power Point		

	fermentation)		-Give some examples to student for doing during experiment -Ask questions to student group for discussing		
ពេលទី ១៤ Session 14	IV.4. Stages in a fermentation process (cont.) (kinetic study on aeration)	1h30	-Explain about all phenomena of each component by give some examples - Make opportunity to student for asking the questions what they don't understand or are not clear well)		
ពេលទី ១៥ Session 15	Do exercises of fermentation process	1h30			
ពេលទី ១៦ Session 16	Do exercises of fermentation process (cont.)	1h30			
ពេលទី ១៧ Session 17	Articles presentation of biotechnology	1h30			
ពេលទី ១៨ Session 18	IV.5- Enzyme Kinetic study	1h30			
ពេលទី ១៩ Session 19	V. Application Biotechnology	1h30			
ពេលទី ២០ Session 20	Final Exam	1h30			
ពេលទី ២១ Session 21	ការអនុវត្តក្នុងបរិស្ថានពិសោធន៍ (Practice in Laboratory) Explain about how to do experimental biotechnology in laboratory	1h30	-ការណែនាំអំពីសុវត្ថិភាពពិឡើងការ ការគ្រោះថ្នាក់ចៃដន្យផ្សេងៗក្នុងការពិសោធន៍នៅបរិស្ថានពិសោធន៍ -និស្សិតត្រូវអានការណែនាំ និងវិធីសាស្ត្រវិភាគអោយបានច្បាស់មុននឹងពិសោធន៍ -បែងចែកជាក្រុមតូចៗ -ពន្យល់របៀបពិសោធន៍ និងបាតុភូត ទៅនិស្សិតរាល់មុនពេលពិសោធន៍ -រាល់ការពិសោធន៍នីមួយៗនិស្សិតត្រូវសរសេរបាយការណ៍លើប្រគល់អោយគ្រូជីកនាំតាមការកំណត់ (- Explain about the security for avoiding all risks during experiments in Lab. - Student have to carefully read lab testing protocol before starting of analysis -Divide in small student group		
ពេលទី ២២ Session 22	PL1: batch fermentation (aerobic); Kinetic study of Yeast (<i>Saccharomyces cerevisiae</i>) on consumption of sugar, production of product.	1h30			
ពេលទី ២៣ Session 23	PL1: (Continue)	1h30			
ពេលទី ២៤ Session 24	PL1: (Continue)	1h30			
ពេលទី ២៥ Session 25	PL1: Determination of the parameter of PL1 (biomass, substrate and product). Explain how to translate the result in excel.	1h30			
ពេលទី ២៦ Session 26	(Continue)	1h30			
ពេលទី ២៧ Session 27	PL2 : Yogurt production produced by bacterial fermentation of milk.	1h30			
ពេលទី ២៨ Session 28	PL2 (Cont.)	1h30			
ពេលទី ២៩ Session 29	PL2 (Cont.)	1h30			

ពេលទី ៣០ Session 30	PL2 : Analysis of parameters.	1h30	-Explain the process of analysis before each test - For each test, student have to writ report of test and submit to lecture on time.)		
ពេលទី ៣១ Session 31	PL2 : Analysis of parameters. (cont.)	1h30			
ពេលទី ៣២ Session 32	PL3 : Lactic acid fermentation	1h30			
ពេលទី ៣៣ Session 33	PL3 (cont.)	1h30			
ពេលទី ៣៤ Session 34	PL3 (cont.)	1h30			
ពេលទី ៣៥ Session 35	PL3 : Analysis of parameters.	1h30			
ពេលទី ៣៦ Session 36	PL4 : batch fermentation (anaerobic): Kinetic study of Yeast (<i>Saccharomyces cerevisiae</i>)	1h30			
ពេលទី ៣៧ Session 37	PL4 (cont.)	1h30			
ពេលទី ៣៨ Session 38	PL4 (cont.)	1h30			
ពេលទី ៣៩ Session 39	PL4 (cont.)	1h30			
ពេលទី ៤០ Session 40	Report and presentation the results	1h30			
សរុប		60h			
ការវាយតម្លៃលើសមត្ថភាពសិស្ស Assessment scheme	(តើអ្នកវាយតម្លៃសមត្ថភាពនិស្សិតយ៉ាងដូចម្តេច?) (How do you assess the ability of the students?)				
	- វត្តមាន : 10 % (Presence)				
	- ការធ្វើបទបង្ហាញ : 10 % (Doing the Presentation)				
	- របាយការណ៍ពិសោធន៍ និង ប្រឡងពាក់កណ្តាលឆមាស : 30 % (Report of lab experiments and Midteam exam)				
	- ប្រឡងឆមាសទី២ : 50 % (Semestry I exam)				
	- សរុប : 100 % (Total)				
បញ្ជីឯកសារយោង List of References					
(រាយឈ្មោះសៀវភៅសំខាន់ៗសម្រាប់ឱ្យនិស្សិតអាន) (List important books for the students to read)					
ឈ្មោះអ្នកនិពន្ធ (ឆ្នាំបោះពុម្ព). ចំណងជើងសៀវភៅ។ កន្លែងបោះពុម្ព/ឈ្មោះរោងពុម្ព។ ប្រទេសដែលបោះពុម្ព។					

Author's Name (Year of Publication). Title of Books. Name of Publishing Company. Country.

- 1- Kalidas Shetty, Gopinadhan Paliyath, Anthony Pometto And Robert E. Levin (2006). Food Biotechnology.. Taylor & Francis Group, LLC. Page 26 – 37
- 2- J. Schwender (ed.), *Plant Metabolic Networks*, DOI 10.1007/978-0-387-78745-9 4, Springer Science+Business Media, LLC 2009.
- 3- René Scriban (1993). Biotechnologie. Technique and Documentation, Paris

មហាវិទ្យាល័យ

(Faculty)

កសិកម្មនិងកែច្នៃ

អាហារ

មេធាវីកែច្នៃអាហារ

(Department)

ឆ្នាំទី៣

(Year of Study)

រមាសទី ១

(Semester)

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមុខវិជ្ជា:

FPR 3402

(Course Code)

ចំណងជើងមុខវិជ្ជា:

ការរក្សាទុក

Course Title:

ក្រេឌីត ២(១,១) ស្មើ/Equal 60 ម៉ោង/Hours)

(Credit)

មុខវិជ្ជាតម្រូវឱ្យរៀនជាមុន: សរីរវិទ្យាសរីរាង្គបច្ចេកវិទ្យាទុកដាក់

Prerequisite:

សាស្ត្រាចារ្យសម្របសម្រួល:

(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម:

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម:

(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម:

(Invited Lecturer³)

វត្តមានពិសេស: បណ្ឌិត ទូច វិសាលសុខ

(Guest Speaker¹)

វត្តមានពិសេស:

(Guest Speaker²)

តារាងពិពណ៌នាអំពីមុខវិជ្ជា

Module Description Form

ចំណងជើងមុខវិជ្ជា Course Title	បច្ចេកវិទ្យាការរក្សាទុក
មូលហេតុ Rationale	ក្រោមអំពើមជ្ឈដ្ឋានធម្មជាតិផលិតផលចំណីអាហារក្រោយការប្រមូលផលពី ផលិតផលកសិកម្មក្រោយពីទទួលទិន្នផលផលិតផលកសិកម្មទាំងនេះឆាប់ខូចគុណភាពអាហារ។
គោលបំណងសរុបមុខវិជ្ជា Overall Course Aim or Objective	បន្ថយការខូចខាតក្នុងរយៈពេលដូចគ្នាពីពេលមុនបង្កើនរយៈពេលការរក្សាទុកដោយបន្ថយការខូចខាតគុណភាពអាហារ។
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	កាត់បន្ថយភ្នាក់ងារដែលបណ្តាលអោយផលិតផលខូចរៀបចំលក្ខណៈនិងស្ថានភាពដែលបង្កអោយមានការរីកចម្រើនដល់ភ្នាក់ងារបង្កអោយផលិតផលខូច។
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	ស្វែងយល់ និងគិតគូរមើលការបង្កការខូចខាតលើផលិតផលពិតដែលកំពុងជួបប្រទះរកវិធីដោះស្រាយ។
ការបរិយាយមុខវិជ្ជា Course Description	លក្ខខណ្ឌសំណើមសីតុណ្ហភាពបរិយាកាសការរៀបចំទុកជាក់ផលិតផលបរិមាណការរក្សាទុក និងតម្លៃសមស្របមួយ។
លទ្ធផលដែលសិស្សត្រូវទទួលបាន Student Outcome	វិធីទុកជាក់ផលិតផលតម្លៃសេដ្ឋកិច្ចរបស់ផលិតផលការរក្សាទុក

តារាងផែនការសម្រាប់ការរៀនមុខវិជ្ជា

Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:					
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល បង្រៀន Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី ១ Session 1	ការអនុវត្តន៍ការវិភាគតម្លៃ អាចចំណេញក្នុងការរក្សាទុក Application of cost-benefit analysis to storage	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន

ពេលទី ២ Session 2	ប្រតិបត្តិការការដកសំណើម ដោយប្រើចលនាខ្យល់ការដក ដោយចលនាខ្យល់ត្រជាក់ projectsAeration, Refrigerated Aeration	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៣ Session 3	បញ្ហាផ្សេងៗដែលមានឥទ្ធិ ពលក្នុងការជ្រើសរើស ឥបករណ៍ Factors influencing the choice of bulk store	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៤ Session 4	ឥបករណ៍ផ្សេងៗការរក្សា ទុកពីបូរាណ ចលនារបស់ខ្យល់ Ancillary equipment Air Movement	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៥ Session 5	កំដៅខ្យល់ ខ្យល់ក្តៅដកសំណើម ការប្រើប្រាស់វត្ថុធាតុដើម ជាចំហេះសំរាប់បានខ្យល់ ក្តៅ Air Heating Air Heating Use of Biomass	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៦ Session 6	ប្រតិបត្តិការការសំងួត Drying operations	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៧ Session 7	តំលៃនិងឥទ្ធិពលជំរុញ លើកទឹកចិត្តក្នុងការរក្សា ទុកការជ្រើសរើសឧបករ ណ៍និងការធ្វើអោយប្រសើរ ឡើងក្នុងការត្រួតពិនិត្យ Costs and incentives to store Alternative and supplementary control measures	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន

ពេលទី ៨ Session 8	ធ្វើអោយប្រសើរឡើងក្នុង រក្សាទុកនៅតាមទីជនបទ តួនាទីរបស់ការរក្សាទុកគិត ក្នុងកំរិតសេដ្ឋកិច្ច Improvement to storage on the farm The role of storage in the economy	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៩ Session 9	ត្រួតពិនិត្យសត្វល្អិតបំផ្លាញ ផ្សេងៗ Control of rodent pests	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ១០ Session 10	ឥទ្ធិពលសរីរវិទ្យា Biodeterioration	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ១១ Session 11	សំងួតគ្រាប់ធញ្ញជាតិ គិតកំរិតឧបករណ៍បក់ខ្យល់។ កាធន់ស្ទះឧបករណ៍បក់ខ្យល់។ Grain drying The selection and sizing of a fan to move air. The major resistance to the flow of air.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១២ Session 12	សំងួតគ្រាប់ធញ្ញជាតិ គិតកំរិតឧបករណ៍បក់ខ្យល់។ កាធន់ស្ទះឧបករណ៍បក់ខ្យល់។ Grain drying The selection and sizing of a fan to move air. The major resistance to the flow of air.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១៣ Session 13	កំដៅដោយខ្យល់ លក្ខណៈកំដៅដោយខ្យល់ពី លក្ខណៈ។ Air heating. Heater can be divided two types.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១៤ Session 14	កំដៅដោយខ្យល់ លក្ខណៈកំដៅដោយខ្យល់ពី លក្ខណៈ។ Air heating. Heater can be divided two types.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍

ពេលទី ១៥ Session 15	ប្រើប្រាស់ផលិតផលសំរេចកែច្នៃ ប្រេងឧស្ម័នធាតុការអនុវត្តន៍ច្រើន។ Use of Biomass oil and gaz are the conventional fuel employed in heated air dryers.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១៦ Session 16	ប្រើប្រាស់ផលិតផលសំរេចកែច្នៃ ប្រេងឧស្ម័នធាតុការអនុវត្តន៍ច្រើន។ Use of Biomass oil and gaz are the conventional fuel employed in heated air dryers.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១៧ Session 17	កាកសំណល់ផលិតផលកសិកម្ម។ ការប្រើប្រាស់ផលិតផលក្នុងកំរិត សេដ្ឋកិច្ចជាដំរើសរបស់ពិភពលោក។ ក។ Grate furnace The used of grates is probably the most commonly used method world-wide.	១ម៉ោង ៣០		ភ្នាក់ងារជំនាញ ខាងក្រៅ	រាងចក្រវីស្ថាបន៍ ឯកជនខាងក្រៅ
ពេលទី ១៨ Session 18	កាកសំណល់ផលិតផលកសិកម្ម។ ការប្រើប្រាស់ផលិតផលក្នុងកំរិត សេដ្ឋកិច្ចជាដំរើសរបស់ពិភពលោក។ ក។ Grate furnace The used of grates is probably the most commonly used method world-wide.	១ម៉ោង ៣០		ភ្នាក់ងារជំនាញ ខាងក្រៅ	រាងចក្រវីស្ថាបន៍ ឯកជនខាងក្រៅ
ពេលទី ១៩ Session 19	បច្ចេកវិទ្យាផ្សេងៗនិងបញ្ហាចោ កើតមាន។ Various technical and the problems.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២០ Session 20	បច្ចេកវិទ្យាផ្សេងៗនិងបញ្ហាចោ កើតមាន។ Various technical and the problems.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២១ Session 21	ការសំងួត Dry ration	១ម៉ោង ៣០		ភ្នាក់ងារជំនាញ ខាងក្រៅ	រាងចក្រវីស្ថាបន៍ ឯកជនខាងក្រៅ
ពេលទី ២២ Session 22	ការសំងួត Dry ration	១ម៉ោង ៣០		ភ្នាក់ងារជំនាញ ខាងក្រៅ	រាងចក្រវីស្ថាបន៍ ឯកជនខាងក្រៅ
ពេលទី ២៣ Session 23	ការត្រៀមជាមុនចលនារបក់ ដោយខ្យល់។ Pre-drying Aeration	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៤ Session 24	ការត្រៀមជាមុនចលនារបក់ ដោយខ្យល់។	១ម៉ោង		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍

	Pre-drying Aeration	៣០			
ពេលទី ២៥ Session 25	លក្ខណៈរូបរបស់គ្រាប់ធញ្ញជាតិ។ Physical properties of grain	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៦ Session 26	លក្ខណៈរូបរបស់គ្រាប់ធញ្ញជាតិ។ Physical properties of grain	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៧ Session 27	បរិមាណទំងន់គិតក្នុងខ្នាតមាឌ Bulk density	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៨ Session 28	បរិមាណទំងន់គិតក្នុងខ្នាតមាឌ Bulk density	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៩ Session 29	សន្និដ្ឋាននិងកិច្ចពិភាក្សានិងការបញ្ហាចោទ Resume and discussion and question	១ម៉ោង ៣០		កិច្ចពិភាក្សារបស់និស្សិត	មន្ទីរពិសោធន៍
ពេលទី ៣០ Session 30	សន្និដ្ឋាននិងកិច្ចពិភាក្សានិងការបញ្ហាចោទ Resume and discussion and question	១ម៉ោង ៣០		កិច្ចពិភាក្សារបស់និស្សិត	មន្ទីរពិសោធន៍
សរុប		៤៥ ម៉ោង			
ការវាយតម្លៃលើសមត្ថភាពសិស្ស Assessment scheme	ប្រលងពាក់កណ្តាលផ្តាច់ព្រ័ត្រប្រលងបញ្ចប់សំនួរពិភាក្សាជាគ្រូមរបាយការណ៍ការងារអនុវត្តន៍។				
បញ្ជីឯកសារយោង List of References					
(រាយឈ្មោះសៀវភៅសំខាន់ៗសម្រាប់ឱ្យនិស្សិតអាន) (List important books for the students to read)					
ឈ្មោះអ្នកនិពន្ធ (ឆ្នាំបោះពុម្ព). ចំណងជើងសៀវភៅ។ កន្លែងបោះពុម្ព/ឈ្មោះរោងពុម្ព។ ប្រទេសដែលបោះពុម្ព។ Author’s Name (Year of Publication). Title of Books. Name of Publishing Company. Country.					

បរិក្ខារវិទ្យាសាស្ត្រ
(Faculty)

កសិកម្ម និងកែច្នៃអាហារ

មេត្តាជួយ កែច្នៃអាហារ
(Department)

ឆ្នាំទី ៣
(Year of Study)

រដូវកាលទី ១
(Semester)

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមុខវិជ្ជា: FPR 3306

(Course Code)

ចំណាត់ថ្នាក់មុខវិជ្ជា:

Course Title: Biotechnology

ក្រេឌីត: ៣ (២,១) (ស្មើ/Equal ៦០ ម៉ោង/Hours)
(Credit)

មុខវិជ្ជាតម្រូវឱ្យរៀនជាមុន:

Prerequisite: Food Chemistry, Physic Chemistry,
Microbiology

សាស្ត្រាចារ្យសម្របសម្រួល: លោក យិត ស្ម័គ្រ

(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម^១:

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម^២: _____

(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម^៣: _____

(Invited Lecturer³)

ភ្នាក់ងារពិសេស^១:

(Guest Speaker¹)

ភ្នាក់ងារពិសេស^២: _____

(Guest Speaker²)

តារាងពិពណ៌នាអំពីមុខវិជ្ជា

Module Description Form

ចំណងជើងមុខវិជ្ជា Course Title	Bio-technology
មូលហេតុ Rationale	Biotechnology is not limited to medical/health applications (<i>unlike</i> Biomedical Engineering, which includes much biotechnology). Although not normally thought of as biotechnology, agriculture clearly fits the broad definition of " <i>using a biotechnological system to make products</i> " such that the cultivation of plants may be viewed as the earliest biotechnological enterprise. Agriculture has been theorized to have become the dominant way of producing food since the Neolithic Revolution . The processes and methods of agriculture have been refined by other mechanical and biological sciences since its inception.
គោលបំណងសរុបមុខវិជ្ជា Overall Course Aim or Objective	
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	<ul style="list-style-type: none"> - To make students understand about the Recombinant strain, Enzyme, Microbiology - To make them know the interest of bio-technology application for living
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	-Can be understanding how to do experiment biotechnology -
ការបរិយាយមុខវិជ្ជា Course Description	Introduction to Biotechnology is a laboratory-based course integrating the fundamental concepts of the life and physical sciences with the technical skills needed for postsecondary education and to work in a modern laboratory.
លទ្ធផលដែលសិស្សត្រូវបានរំពឹងថា Student Outcome	<p>Upon successful completion of the courses in this discipline, the student will have acquired the following knowledge and skills:</p> <ul style="list-style-type: none"> • Develop a results-oriented resume highlighting transferable skills relevant to bio-manufacturing positions. • Demonstrate effective interviewing skills to obtain employment in the biotech industry. • Understand and apply techniques to conduct a self-directed job search. • Apply scientific method and good experimental design in scientific experiments. • Understand and demonstrate lab safety procedures. • Maintain a lab notebook; describe correct SOPs, GLPs, and other documentation required in a biotech lab.

តារាងផែនការសម្រាប់ការរៀនមុខវិជ្ជា

Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:	Bio-Technology				
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល បង្រៀន Duration	វិធីសាស្ត្របង្រៀន Teaching method	គ្រូបង្ហាញ Lecturers	កន្លែងបង្រៀន Place

ពេលទី ១ Session 1	Interest of Bio-tech	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ២ Session 2	Overview of bioconversion process	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ៣ Session 3	Sugar are fermented to ethanol	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ៤ Session 4	Lignocellulose material	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ៥ Session 5	Pretreatment	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ៦ Session 6	Enzyme	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ៧ Session 7	Enzyme	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ៨ Session 8	Enzyme	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ៩ Session 9	Enzyme	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១០ Session 10	Fermentation kinetic	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១១ Session 11	Fermentation kinetic	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១២ Session 12	Fermentation kinetic	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១៣ Session 13	Presentation of student work	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១៤ Session 14	Presentation of student work	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១៥ Session 15	Presentation of student work	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១៦ Session 16	Separation and simultaneous enzymatic hydrolysis and fermentation	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១៧ Session 17	Separation and simultaneous enzymatic hydrolysis and fermentation	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១៨ Session 18	Separation and simultaneous enzymatic hydrolysis and fermentation	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន
ពេលទី ១៩ Session 19	Treatment to enhance enzyme hydrolysis of cellulose	1,5 h	Whole Class Teaching	យិតសួគ៌	ថ្នាក់រៀន

ពេលទី ២០ Session 20	Treatment to enhance enzyme hydrolysis of cellulose	1,5 h	Whole Class Teaching	យិតស្ម័គ្រី	ថ្នាក់រៀន
ពេលទី ២១ Session ២១	Literature review	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ២២ Session ២២	Literature review	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ២៣ Session ២៣	Literature review	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ២៤ Session ២៤	Research Plan	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ២៥ Session ២៥	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ២៦ Session ២៦	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ២៧ Session ២៧	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ២៨ Session ២៨	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ២៩ Session ២៩	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ៣០ Session ៣០	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ៣១ Session ៣១	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ៣២ Session ៣២	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ៣៣ Session ៣៣	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ៣៤ Session ៣៤	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ៣៥ Session ៣៥	Do the experiment	1,5h	In Lab	យិតស្ម័គ្រី	In Lab
ពេលទី ៣៦	Writing report	1,5h	In Lab	យិតស្ម័គ្រី	In Lab

Session ៣៦					
ពេលទី ៣៧ Session ៣៧	Writing report	1,5h	In Lab	ឃិតស្ម័គ្រី	In Lab
ពេលទី ៣៨ Session ៣៨	Writing report	1,5h	In Lab	ឃិតស្ម័គ្រី	In Lab
ពេលទី ៣៩ Session ៣៩	Defense	1,5h	In Lab	ឃិតស្ម័គ្រី	In Lab
ពេលទី ៤០ Session ៤០	Defense	1,5h	In Lab	ឃិតស្ម័គ្រី	In Lab

សរុប		60 hours			
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ការវាយតម្លៃលើ សមត្ថភាពនិស្សិត <i>Assessment scheme</i>	<ul style="list-style-type: none"> • វត្តមាន (Attendance) • សរសេររបាយការណ៍ (Reports) • ការធ្វើបទបង្ហាញ (Presentation) • សួរផ្ទាល់មាត់ (Oral Test) • ប្រលងពាក់កណ្តាលឆមាស (Mid-term Test) • ប្រលងបញ្ចប់ឆមាស (Final Exam) 	១០% (10%) ១០% (10%) ០៥% (05%) ០៥% (05%) ២០% (20%) ៥០% (50%)
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បញ្ជីឯកសារយោង List of References

- 1 Gray, K.A. et al. (2006) Bioethanol. Curr. Opin. Chem. Biol 10, 1–6
- 2 Herrera, S. (2006) Bonkers about biofuels. Nat. Biotechnol. 24, 755–760
- 3 Farrell et al. (2006) Ethanol can contribute to energy and environmental goals. Science 311, 506–508
- 4 Ogier, J.C. et al. (1999) Ethanol production from lignocellulosic biomass. Oil Gas Sci Technol 54, 67–94
- 5 Yu, Z. and Zhang, H.X. (2004) Ethanol fermentation of acid-hydrolyzed cellulosic pyrolysate with *Saccharomyces cerevisiae*. Bioresour. Technol. 93, 199–204
- 6 Sheehan, J. (2001) The road to bioethanol. A strategic perspective of the US Department of Energy's National Ethanol Program. In *Glycosyl Hydrolases for Biomass Conversion* (Himmel, M.E., Baker, J.O. and Saddler, J.N., eds), pp. 2–25, American Chemical Society
- 7 Fernando, S. et al. (2006) Biorefineries: current status, challenges, and future direction. Energy Fuels 20, 1727–1737
- 8 Keller, F.A. (1996) Integrated bioprocess development. In *Handbook on Bioethanol: Production and Utilization* (Wyman, C.E., ed.), pp. 351–380, (Chapter 16), Taylor & Francis
- 9 Mosier, N. et al. (2005) Features of promising technologies for pretreatment of lignocellulosic biomass. Bioresour. Technol. 96, 1986–1993
- 10 Wyman, C.E. et al. (2005) Coordinated development of leading biomass pretreatment technologies. Bioresour. Technol. 96, 1959–1966
- 11 O' hgren, K. et al. Effect of hemicellulose and lignin removal on enzymatic hydrolysis of steam-pretreated corn stover. Bioresour. Technol. (in press) <http://www.sciencedirect.com/science/journal/09608524>
- 12 So'nderstro'm, J. et al. (2005) Separate versus simultaneous saccharification and fermentation of two-step steam pretreated softwood for ethanol production. J. Wood Chem. Technol. 25, 187–202
- 13 Wingren, A. et al. (2005) Effect of reduction in yeast and enzyme concentrations in a simultaneous-saccharification-and-fermentation based bioethanol process – technical and economic evaluation. Appl. Biochem. Biotechnol. 121, 485–499
- 14 Schell, D.J. and Duff, B. (1996) Review of pilot plant programs for bioethanol conversion. In *Handbook on Bioethanol: Production and Utilization* (Wyman, C.E., ed.), pp. 381–394, (Chapter 17), Taylor & Francis

**មហាវិទ្យាល័យ កសិកម្ម
និង កែច្នៃអាហារ**
(Faculty of
Agriculture and Food
Processing)

វេជ្ជបណ្ឌិត
Agriculture and Food
Processing
(Department)

ឆ្នាំទី 3
(Year of Study)

រដូវកាលទី 1
(Semester)

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមុខវិជ្ជា:

(Course Code)

ចំណងជើងមុខវិជ្ជា:

Course Title: New Cutting Edge, Pre-Intermediate

ក្រេឌីត: ២ (ស្មើ/Equal 30 ម៉ោង/Hours)

(Credit)

មុខវិជ្ជាតម្រូវឱ្យរៀនជាមុន:

Prerequisite:

សាស្ត្រាចារ្យសម្របសម្រួល:

(Coordinated Lecturer) CHEY RATHA

សាស្ត្រាចារ្យចូលរួម^១:

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម^២:

(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម^៣:

(Invited Lecturer³)

ភ្នាក់ងារពិសេស^១:

(Guest Speaker¹)

ភ្នាក់ងារពិសេស^២:

(Guest Speaker²)

តារាងពិពណ៌នាអំពីមុខវិជ្ជា

Module Description Form

ចំណងជើងមុខវិជ្ជា Course Title	General English (New Cutting Edge, Pre-Intermediate)
មូលហេតុ Rationale	<i>General English is by far most important subject, which covers a variety of skills in English. It is employed to improve students' knowledge in English in year three.</i>
គោលបំណងសរុប Overall Course Aim or Objective	<i>The course used here is intended to equip students with both Linguistic and communicative competency.</i>
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	<i>Theoretically, General English is the crucial subject as it covers multi-skills as writing, Listening, Reading and Speaking.</i>
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	<i>At the end of this course students will be able to:</i> <ul style="list-style-type: none"> - <i>practice using various English grammatical structures</i> - <i>recognize various language terms</i> - <i>practice speaking, writing and listening skills</i>
ការបរិយាយមុខវិជ្ជា Course Description	<i>By far General English is very important subject used for students in bachelor's English programme as it will provide students with both language and skills that they can master it in the English context.</i>
លទ្ធផលដែលសិស្សត្រូវបានរំពឹងថា Student Outcome	<i>By the end of the course student will be able to:</i> <ul style="list-style-type: none"> - <i>Improve skills doing listening</i> - <i>Improve reading speed and skills</i> - <i>Practice doing exercises</i> - <i>Identify the structure of vocabulary and language itself.</i>

តារាងផែនការសម្រាប់ការរៀនមុខវិជ្ជា

Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:					
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល បង្រៀន Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី ១ Session 1	Class Orientation Module 11: The best things in life	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ២ Session 2	Reading and vocabulary Hobbies and interests Reading When an Interest becomes	1:30 h	Whole Class Teaching	Chey Ratha	Classroom

	an Obsession				
ពេលទី ៣ Session 3	Language focus 1 Gerunds (-ing forms) after verbs of liking and disliking Language focus 2 Like doing and would like to do	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ៤ Session 4	Grammar Practice Practice on like and would like Reading and Speaking Task: Survey about the most important things in life Wordspot (like) Practice Exercises in Module 1	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ៥ Session 5	Module 12: Got to have it! Vocabulary Every objects Reading The World's Most Popular	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ៦ Session 6	Language focus 1 Present simple passive Language focus 2 Past simple passive	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ៧ Session 7	Reading and speaking Task: Decide what you need for a jungle trip Fact file: Bedaira Taking part in <i>Survival</i>	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ៨ Session 8	Real life Listening Making suggestions Practice Exercises in Module 2 Assignment given	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ៩ Session 9	Module 13: Choosing the right person Vocabulary and speaking Personal characteristics Listening Interview with the manager of Vacation Express	1:30 h	Whole Class Teaching	Chey Ratha	Classroom

ពេលទី ១០ Session 10	Language Focus 1 Present perfect continuous with <i>how long, for and since</i> Reading Looking for work with Vacation Express Midterm exam	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ១១ Session 11	Language Focus 2 Present perfect continuous and Present perfect simple Wordspot (how)	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ១២ Session 12	Reading, speaking, and writing Task: Choosing a manager for a pop group Finding out who want to become manager of SPOTS! Completing an application form Practice Exercises in Module 3	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ១៣ Session 13	Module 14: Money, money, money Vocabulary and speaking Money Reading Money Facts	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ១៤ Session 14	Language focus 1 Past perfect Practice Reading jokes	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ១៥ Session 15	Language focus 2 Past time words Newspaper headlines Speaking Task: Tell a story from pictures	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ១៦ Session 16	Wordspot (make) Listening Real life Dealing with money Practice Exercises in Module 4	1:30 h		Chey Ratha	Classroom
ពេលទី ១៧ Session 17	Module 15: Imagine ... Reading	1:30 h	Whole Class Teaching	Chey Ratha	Classroom

	The story of a song Song: Imagine				
ពេលទី ១៨ Session 18	Language focus 1 Conditional sentences with <i>would</i> Language focus 2 will and would Assignment due date	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ១៩ Session 19	Reading and speaking Task: Choose people to start a space colony Discussion: Who the best candidates and why.	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
ពេលទី ២០ Session 20	Consolidation Modules 11-15 Review	1:30 h	Whole Class Teaching	Chey Ratha	Classroom
សរុប		30 Hours			
ការវាយតម្លៃលើ សមត្ថភាពសិស្ស Assessment scheme	Attendance 10%				
	Homework and quiz 10%				
	Assignment 10%				
	Mid-term 20 %				
	Final Exam 50%				
				
	Total 100%				
បញ្ជីឯកសារយោង List of References					
Cunningham, S., Moor, P., & Carr, C. J. (2005). <i>New Cutting Edge, Pre-Intermediate</i> . Edinburgh Gate, Harlow Essex: Pearson Education Limited.					
Jones, W. P. (1994). <i>Target Vocabulary 1</i> . London: Penguin Books Ltd.					
Thomas, J. B. (1990). <i>Elementary Vocabulary</i> . Edinburgh Gate, Harlow Essex: Pearson Education Limited.					
Walker, E., & Elsworth, S. (2000). <i>New Grammar Practice for Intermediate Students</i> . Edinburgh Gate, Harlow Essex: Pearson Education Limited.					
Wyatt, R. (2004). <i>Check Your Vocabulary English Workbook</i> . London: Bloomsbury Publishing Plc.					

បរិវេណវិទ្យា
(Faculty)

កសិកម្ម និងកែច្នៃអាហារ

មេតេរីយ៉ា កែច្នៃអាហារ
(Department)

ឆ្នាំទី 3
(Year of Study)

រដូវកាលទី 1
(Semester)

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមុខវិជ្ជា: FPR3401

(Course Code)

ចំណងជើងមុខវិជ្ជា: បច្ចេកទេសវេចខ្ចប់

Course Title: Food Packaging

ក្រេឌីត: 2(1,1) ស្មើ/Equal 45 ម៉ោង/Hours)

(Credit)

មុខវិជ្ជាតម្រូវឱ្យរៀនជាមុន: បច្ចេកវិទ្យាអាហារ គីមីជីវៈ មីក្រូជីវៈ

Prerequisite: Food Technology, Biochemistry, Microbiology

សាស្ត្រាចារ្យសម្របសម្រួល: ពេជ ច័ន្ទ

(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer³)

ភ្នាក់ងារពិសេស: _____

(Guest Speaker¹)

ភ្នាក់ងារពិសេស: _____

(Guest Speaker²)

តារាងពិពណ៌នាអំពីមុខវិជ្ជា

Module Description Form

ចំណងជើងមុខវិជ្ជា Course Title	បច្ចេកវិទ្យា វេចខ្ចប់ Packaging Technology
មូលហេតុ Rationale	(បញ្ជាក់ពីមូលហេតុដែលនាំឱ្យមានការបញ្ចូលមុខវិជ្ជានេះក្នុងកម្មវិធីសិក្សា) (Provide the reason why this course is included into the curriculum) This course is very important for student, who will become manager in food processing to preserve food, keep quality and safety for long shelf life and good handling for transport.
គោលបំណងសរុបមុខវិជ្ជា Overall Course Aim or Objective	(នៅចុងបញ្ចប់នៃមុខវិជ្ជា តើចំណេះដឹងអ្វីដែលនិស្សិតនឹងទទួលបាន?) (At the end of the course, what knowledge will the students acquire?) student will gain knowledge of: physical properties and microbiology of food. Oxydation of foods, Food Packaging materials, Paper and paper board containers, Metal containers, Glass containers, Plastic containers, New trends in the Technology of food Presservation, Retortable Packaging, Aseptic Packaged Foods, Free Scavenging Packaging, Frozen Food and Oven-Proof Trays, Gas Exchange Packaging, Vacuum Packaging, Packaging Fresh and Processed Foods: Fruits, Vegetables, Fresh Meat, Meat By-Products, Sea Food Products, Dairy Products, Cake and Snack Foods, Physical Distribution of Packaged foods.
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	(នៅចុងបញ្ចប់នៃមុខវិជ្ជា តើនិស្សិតនឹងមានសមត្ថភាពពិពណ៌នាអំពីអ្វីខ្លះ?) (At the end of the course, what will the students able to describe?) Students are able to manage Food Packaging Technology, use appropriate kind of Packaging Materials from fresh Fruits, Vegetables, Fresh Meat, Process foods all kind.
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	(នៅចុងបញ្ចប់នៃមុខវិជ្ជា តើនិស្សិតនឹងមានសមត្ថភាពធ្វើអ្វីខ្លះ?) (At the end of the course, what will the students able to do?) Student are able to implement preserve foods, knows physical properties and microbiology of food. Oxydation of foods, selection of right packaging materials for the right foods from fresh fruit and vegetables, meat to processed food with available packaging materials and packaging equipments.
ការបរិយាយមុខវិជ្ជា Course Description	(បរិយាយពីមាតិកាសំខាន់ៗដែលត្រូវបង្រៀន) (Describe main contents to be taught) -Physical properties and microbiology of food. -Oxydation of foods, -Food Packaging materials: Paper and paper board containers, Metal containers, Glass containers, Plastic containers, - Packaging and Energy consumption -Packaging System and Technology of Food materials - New trends in the Technology of food Presservation, -Retortable Packaging, -Aseptic Packaged Foods, -Free Scavenging Packaging, -Frozen Food and Oven-Proof Trays, -Gas Exchange Packaging, -Vacuum Packaging, -Packaging Fresh and Processed Foods: Fruits, Vegetables, Fresh Meat, Meat By-Products, Sea Food Products, Fish Meat- by products, Dairy Products, Cake and Snack Foods, -Physical Distribution of Packaged foods.
លទ្ធផលដែលនិស្សិតទទួលបាន Student Outcome	(នៅពេលបញ្ចប់មុខវិជ្ជានេះ តើនិស្សិតនឹងរំពឹងទុកអ្វីខ្លះ?) (On the completion of the course, what will the students expect?) Students have ability to become manager in Farm/food processing establishment from raw material-processed and packed food by selection of packaging technologies and kind of packaging materials with natural property of foods.

គារពងផែនការសម្រាប់ការរៀនមុខវិជ្ជា

Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:					
Food Packaging					
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល បង្រៀន Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី ១ Session 1	Introduction of food packaging	1h 30 min	Lectures presentation and photos	Pich Chan	Room at the UBB
ពេលទី ២ Session 2	Physical properties of food	1h 30 min	Lectures presentation and photo, some practice	Pich Chan	Room at the UBB
ពេលទី ៣ Session 3	Microbiology of food.	1h 30 min	Lectures presentation and photos some practice	Pich Chan	Room at the UBB
ពេលទី ៤ Session 4	Oxydation of foods,	1h 30 min	Lectures presentation and photos some practice	Pich Chan	Room at the UBB
ពេលទី ៥ Session 5	Introduction of new food Packaging materials	1h 30 min	Lectures presentation and photos some practice	Pich Chan	Room at the UBB
ពេលទី ៦ Session 6	Paper and paper board containers,	1h 30 min	Lectures presentation and photos, some practice	Pich Chan	Room at the UBB
ពេលទី ៧ Session 7	Paper and paper board containers(Cont.)	1h 30 min	Lectures presentation and photos, some practice	Pich Chan	Room at the UBB
ពេលទី ៨ Session 8	Metal containers,	1h 30 min	Lectures presentation and photos, some practice	Pich Chan	Room at the UBB
ពេលទី ៩ Session 9	Metal containers,(Cont.)	1h 30 min	Lectures presentation and photos, some practice	Pich Chan	Room at the UBB
ពេលទី ១០ Session 10	Glass containers	1h 30 min	Lectures presentation and photos, some practice	Pich Chan	Room at the UBB
ពេលទី ១១ Session 11	Plastic containers,	1h 30 min	Lectures presentation and photos, some practice	Pich Chan	Room at the UBB
ពេលទី ១២ Session 12	Plastic containers (Cont.)	1h 30 min	Lectures presentation and photos, some practice	Pich Chan	Room at the UBB
ពេលទី ១៣ Session 13	Packaging and Energy consumption	1h 30 min	Lectures presentation and photos, some practice	Pich Chan	Room at the UBB
ពេលទី ១៤ Session 14	-Packaging System and Technology of Food materials	1h 30 min	Lectures presentation and photos, some practice	Pich Chan	Room at the UBB

ពេលទី ១៥ Session 15	- <i>New trends in the Technology of food Presservation,</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ១៦ Session 16	- <i>Retortable Packaging,</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ១៧ Session 17	<i>Retortable Packaging(Cont.)</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ១៨ Session 18	- <i>Aseptic Packaged Foods,</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ១៩ Session 19	<i>Aseptic Packaged Foods, (cont.)</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២០ Session 20	<i>Free Scavenging Packaging</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២១ Session 21	<i>Free Scavenging Packaging,(cont.)</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២២ Session 22	- <i>Frozen Food and Oven-Proof Trays,</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២៣ Session 23	<i>Gas Exchange Packaging,</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២៤ Session 24	<i>Vacuum Packaging,</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២៥ Session 25	<i>Packaging Fresh and Processed Foods: Fruits</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២៦ Session 26	<i>Packaging Fresh and Processed Foods: Vegetables</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២៧ Session 27	<i>Packaging Fresh and Processed Foods: Frsh Meat, Meat By-Products,</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២៨ Session 28	<i>Sea Food Products, Fish Meat- by products,</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ២៩ Session 29	<i>Dairy Products, Cake and Snack Foods,</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
ពេលទី ៣០ Session 30	<i>Physical Distribution of Packaged foods.</i>	1h 30 min	<i>Lectures presentation and photos, some practice</i>	<i>Pich Chan</i>	<i>Room at the UBB</i>
សរុប		៤៥ ម៉ោង			

<p>ការវាយតម្លៃសមត្ថភាពសិស្ស Assessment scheme</p>	<p><i>(តើអ្នកវាយតម្លៃសមត្ថភាពសិស្សយ៉ាងដូចម្តេច?)</i> (How do you assess the ability of the students?)</p> <ul style="list-style-type: none"> • វត្តមាន (Attendance) 10% • កិច្ចការ (Assignment) 20% • ប្រឡងពាក់កណ្តាលឆ្នាំ (Mid-term Exam) 20% • ប្រឡងបញ្ចប់ឆ្នាំ (Final Exam) 50%
<p>បញ្ជីឯកសារយោង List of References</p>	
<p><i>(រាយឈ្មោះសៀវភៅសំខាន់ៗសម្រាប់ឱ្យសិស្សអាន)</i> (List important books for the students to read)</p> <p>ឈ្មោះអ្នកនិពន្ធ (ឆ្នាំបោះពុម្ព). ចំណងជើងសៀវភៅ។ កន្លែងបោះពុម្ព/ឈ្មោះរោងពុម្ព។ ប្រទេសដែលបោះពុម្ព។ Author's Name (Year of Publication). Title of Books. Name of Publishing Company. Country.</p> <ol style="list-style-type: none"> 1. Takashi Tadoya, Kanagawa University Hiratsuka, Japan, 1990, Food Packaging, Academic Press, INC, San Diego, Boston, New York, London, Sedney, Tokyo, Toronto. 2. Donald L. Downing, PH.D. Prof. of Food Precessing, 1996, A complete Course in Canning, CTI Publication, INC, USA. 3. J.Scott Smith and Y.H.Hui, 2004, Food Processing, Principles and Applications.Blackwell Publishing, USA. 4. K.A. Buckle, Ass.Prof. School of Food Science and Technology,1985, Diagnosis of Spoilage in Canned Foods and Related Products.National Library of Australia, Card Number and ISBN 0 9597441 8 5. 5. Frances Pouch Downes and Keith Ito, 2001. Compendium of Methods for the Microbiological Examination of Foods. American Public Health Association, UAS. 	

បរិក្ខារវិទ្យាសាស្ត្រ
(Faculty)

កសិកម្ម និងកែច្នៃអាហារ

មេតេរីយ៉ា កែច្នៃអាហារ
(Department)

ឆ្នាំទី ៣
(Year of Study)

រដូវកាលទី ១
(Semester)

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមុខវិជ្ជា: FPR2308

(Course Code)

ចំណងជើងមុខវិជ្ជា: សាធារណៈ និង បច្ចេកវិទ្យា

Course Title: Sanitation and Regulation

ក្រេឌីត: ៣(៣,០)

ស្មើ/Equal ៤៥ ម៉ោង/Hours)

(Credit)

មុខវិជ្ជាតម្រូវឱ្យរៀនជាមុន: បច្ចេកវិទ្យាអាហារ

Prerequisite: Food Technology

សាស្ត្រាចារ្យសម្របសម្រួល: លោក ច័ន្ទ

(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer³)

ភ្នាក់ងារពិសេស: _____

(Guest Speaker¹)

ភ្នាក់ងារពិសេស: _____

(Guest Speaker²)

ការពិពណ៌នាអំពីមុខវិជ្ជា

Module Description Form

ចំណងជើងមុខវិជ្ជា Course Title	សន្តិសុខ និង បច្ចេកវិទ្យា Sanitation and Regulation(Total Quality Control of Agricultural Product)
មូលហេតុ Rationale	(បញ្ជាក់ពីមូលហេតុដែលនាំឱ្យមានការបញ្ចូលមុខវិជ្ជានេះក្នុងកម្មវិធីសិក្សា) (Provide the reason why this course is included into the curriculum) This course is very important for student,who will be become manager in food processing/farming establishment or work in food control authority.
គោលបំណងសរុបមុខវិជ្ជា Overall Course Aim or Objective	(នៅចុងបញ្ចប់នៃមុខវិជ្ជា តើចំណេះដឹងអ្វីដែលនិស្សិតនឹងទទួលបាន?) (At the end of the course, what knowledge will the students acquire?) To train student total quality management on safety and quality control from farm to table based on international guideline and practice for international market access.
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	(នៅចុងបញ្ចប់នៃមុខវិជ្ជា តើនិស្សិតនឹងមានសមត្ថភាពពិពណ៌នាអំពីអ្វីខ្លះ?) (At the end of the course, what will the students able to describe?) Student will understand on: hygiene, good manufacturing practice, hazard analysis critical control point, quality assurance on food safety and quality from farm to table, SPS-agreement/measure to international food trade, Cambodian law and sub- decreerelated to food safety from farm totable.
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	(នៅចុងបញ្ចប់នៃមុខវិជ្ជា តើនិស្សិតនឹងមានសមត្ថភាពធ្វើអ្វីខ្លះ?) (At the end of the course, what will the students able to do?) Student are able to implement safety requirement and total quality management system on farm and food establishment based on international guideline practices to access thier produt in international market. On the other hand,student are able work as inspector in food control authority.
ការបរិយាយមុខវិជ្ជា Course Description	(បរិយាយពីមាតិកាសំខាន់ៗដែលត្រូវបង្រៀន) (Decribe main contents to be taught) Total Quality Management (TQM) Quality Control (QC) Quality control circle (QC circle) Quality Assurance (QA) Ingredient Specifications and Supplier Certification Program Statistical Methods of Quality Control in the Food Industry Manufacturing Audits: Control of Processing Operations 5 S Good agricultural practice(GAP) Good farm practice (GFP) Good Hygiene practice (GHP) Good Manufacturing practice(GMP) Hazard Analysis Critical Control Point (HACCP) Product Quality Audits at the Retail Level Sanitary and Phytosanitary Agreement/WTO Sanitary and Phytosanitary Measures
លទ្ធផលដែលនិស្សិតទទួលបាន Student Outcome	(នៅពេលបញ្ចប់មុខវិជ្ជានេះ តើនិស្សិតនឹងរំពឹងទុកអ្វីខ្លះ?) (On the completion of the course, what will the students expect?) Student will understand on total quality management of food safety and quality from farm to table based on international guideline and practice to access international food trade.They will become manager in food processing or government official in food control authority.

គារាងផែនការសម្រាប់ការរៀនមុខវិជ្ជា

Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:					
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល បង្រៀន Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី ១ Session 1	-Total Quality Management (TQM) -Quality Control (QC) -Quality control circle (QC circle)	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២ Session 2	-Total Quality Management (TQM) -Quality Control (QC) -Quality control circle (QC circle)	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ៣ Session 3	-Good agricultural practice (GAP)/ Good farm practice (GFP)	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ៤ Session 4	-Good agricultural practice(GAP)/ Good farm practice (GFP	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ៥ Session 5	-Good agricultural practice (GAP)/ Good farm practice (GFP)	90 mn	Lectures and photo presentation	Pich Chan	Room at the UBB
ពេលទី ៦ Session 6	-Good agricultural practice(GAP)/ Good farm practice (GFP	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ៧ Session 7	-Quality Assurance (QA) -Ingredient Specifications and Supplier Certification Program	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ៨ Session 8	-Quality Assurance (QA) -Ingredient Specifications and Supplier Certification Program	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ៩ Session 9	-Quality Assurance (QA) -Ingredient Specifications and Supplier Certification Program	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ១០ Session 10	-Quality Assurance (QA) -Ingredient Specifications and Supplier Certification Program	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ១១ Session 11	-Manufacturing Audits: Control of Processing Operations	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ១២ Session 12	-Manufacturing Audits: Control of Processing Operations	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ១៣ Session 13	-Good Manufacturing practice(GMP) Good Hygiene Practice (GHP) 5 S	90 mn	Lectures and presentation	Pich Chan	Room at the UBB

ពេលទី ១៤ Session 14	-Good Manufacturing practice(GMP) Good Hygiene Practice (GHP) 5 S	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ១៥ Session 15	-Good Manufacturing practice(GMP) Good Hygiene Practice (GHP) 5 S	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ១៦ Session 16	Mit-Term	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ១៧ Session 17	-Good Manufacturing practice(GMP) Good Hygiene Practice (GHP) 5 S	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ១៨ Session 18	Hazard Analysis Critical Control Point (HACCP) The HACCP 12 Tasks... The HACCP system is based on 7 principles:	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ១៩ Session 19	Hazard Analysis Critical Control Point (HACCP) The HACCP 12 Tasks... The HACCP system is based on 7 principles:	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២០ Session 20	Hazard Analysis Critical Control Point (HACCP) The HACCP system is based on 7 principles:(continue)	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២១ Session 21	Hazard Analysis Critical Control Point (HACCP) The HACCP system is based on 7 principles:(continue)	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២២ Session 22	Hazard Analysis Critical Control Point (HACCP) Evaluation of implemented HACCP plan	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២៣ Session 23	Hazard Analysis Critical Control Point (HACCP) Evaluation of implemented HACCP plan	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២៤ Session 24	Sanitary and Phytosanitary Agreement/WTO	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២៥ Session 25	Sanitary and Phytosanitary Agreement/WTO	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២៦ Session 26	Sanitary and Phytosanitary Agreement/WTO Codex Alimentarius	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២៧ Session 27	Sanitary and Phytosanitary Agreement/WTO Codex Alimentarius	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ២៨ Session 28	Sanitary and Phytosanitary Agreement: OIE	90 mn	Lectures and presentation	Pich Chan	Room at the UBB

ពេលទី ២៩ Session 29	Sanitary and Phytosanitary Agreement: IPPC	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
ពេលទី ៣០ Session 30	Sanitary and Phytosanitary Measures of Cambodia Laws sub-degrees Prakas	90 mn	Lectures and presentation	Pich Chan	Room at the UBB
សរុប		៤៥ ម៉ោង			
ការវាយតម្លៃលើសមត្ថភាពសិស្ស Assessment scheme	(ឆ្លើយតាមតម្លៃសមត្ថភាពសិស្សយ៉ាងម្តេច?) (How do you assess the ability of the students?) <ul style="list-style-type: none">• (Attendance) 10%• (Assignment) 10%• (Mid-term Exam) 10%• Final Exam) 70%				
បញ្ជីឯកសារយោង List of References					
(រាយនាមសៀវភៅសំខាន់ៗសម្រាប់អ្នកសិស្សអាន) (List important books for the students to read) ឈ្មោះអ្នកនិពន្ធ (ឆ្នាំបោះពុម្ព). ចំណងជើងសៀវភៅ។ កន្លែងបោះពុម្ព/ឈ្មោះរោងពុម្ព។ ប្រទេសដែលបោះពុម្ព។ Author’s Name (Year of Publication). Title of Books. Name of Publishing Company. Country. 1/ Food Hygiene, Basic Texts Third Edition 2003. Joint FAO/WHO Food Standards Programme CODEX ALIMENTARIUS COMMISSION 2/. Dr. Rechard Bonne: Guidelines on HACCP, GMP and GHP for ASEAN Food SMEs,2005 A GUIDE OF GOOD PRACTICES FOR THE PRODUCTION OF FOOD THAT IS SAFE FOR HUMAN CONSUMPTION EC-ASEAN Economic Cooperation Programme on Standards, Quality & Conformity Assessment (Asia/2003/069-236) 3/.Recommended International code of practice, General Principles of Food Hygiene. CAC,RCP 1-1969, Rev.3 (1997), Amended 1999.Training in Integrated Quality System Development for Agri- food Processing Industries of ASEAN’s SMEs. 4/. Hazard Analysis and Critical Control Point (HACCP) System and Guideline for its Application. Annex to CAC/RCP 1-1969, Rev. 3 (1997) , Training in Integrated Quality System Development for Agri- food Processing Industries of ASEAN’s SMEs. 5/. Training in the Application of the HACCP Method, Training of Trainers Manual. EC-ASEAN Economic Cooperation Programme on Standards, Quality and Conformity Assessment Food Sub-Programme, CONTRACT REFERENCE ASIA/2003/069-236. 6/. General presentation by SANCO: http://ec.europa.eu/food/training/good_hygiene_practice_en.htm 7/.GHP/GMP & HACCP guidelines in English: http://ec.europa.eu/food/training/haccp_en.pdf 8/.www.wto.org/sps-Agreement 9/. www.Codexalimentarius.net 10/.www.oie.itn 11/.www. ippc.itn 12, សៀវភៅណែនាំអំពី ស៥, ក្រសួងឧស្សាវរីនិងថាមល,មជ្ឈមណ្ឌលផលិតភាពជាតិនៃកម្ពុជា/ 2006 13/.J. Andre Vasconcellos, 2005, Boca Raton London New York Washington, D.C. Quality Assurance for the Food Industry, A Practical Approach,					

Faculty

***Agriculture and food
Processing***

***Department
Horticulture, Animal
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Processing***

Year of Study 4 and 3

Semester I

COURSE OUTLINE

Course Code : Elective Course

Course Title: Grain Logistics and Trade

Credit: 3 (3.0) , Equal: 45 Hours)

Prerequisite: Compulsory

Coordinated Lecturer: Yoo Sang

Invited Lecturer¹ : _____

Invited Lecturer² : _____

Invited Lecturer³ : _____

Guest Speaker¹ : _____

Guest Speaker² : _____

Module Description Form	
Course Title	Grain Logistics and Trade
Rationale	<p><i>(Provide the reason why this course is included into the curriculum)</i></p> <p><i>This lecture is basic course for the students of Faculty of Agriculture and Food Processing which is necessary for the grains like Corn and Rice that are more important than those production. That is closely related with between former Post Harvest Technology and the grain quality control, logistics and international trade.</i></p>
Overall Course Aim or Objective	<p><i>(At the end of the course, what knowledge will the students acquire?)</i></p> <p><i>To provide students under the faculty of Agriculture and Food Processing with basic knowledge of Grain Quality Management, Logistics and International Trade.</i></p>
Theoretical Objectives	<p><i>(At the end of the course, what will the students able to describe?)</i></p> <p><i>Student will be able to describe the basic Knowledge of Grain Quality, Trade and Logistics.</i></p>
Practical Objectives	<p><i>(At the end of the course, what will the students able to do?)</i></p> <p><i>They also understand diversified grains such as Paddy Rice, Corn and Soybean.</i></p>
Course Description	<p><i>(Describe main contents to be taught)</i></p> <p><i>This course deals with and gives understand of basic concept of; Major Logistic Component , Logistics System Design & Management, Logistics Technology Development, Uniform Grain Storage, Practice, Identity preserved Logistical Overview, Infrastructure & Port Development , Quality Management, Grading Spec. System of Rice, Standards for International Trade for Rice,</i></p>
Student Outcome	<p><i>(On the completion of the course, what will the students expect?)</i></p> <p><i>Students will understand not only the importance of Post Harvest Technology but Grain Quality Management also Logistics and Local and International Trade so that they can work at the grainlogistics company and also they can run a private trade business by themselves</i></p>

Module Learning Plan					
Course title:	Grain Logistics and Trade				
Sessions	Contents	Duration	Teaching method	Lecturers	Place
Session 1	Logistics: Major Logistic Component	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 2	Logistics System Design & Management	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 3	Logistics Technology Development	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 4	Transportation System	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 5	Uniform Grain Storage Practice	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 6	Bulk and Container Transportation	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 7	Identity preserved Logistical Overview	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 8	By-product Logistics	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 9	Infrastructure & Port Development	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 10	Quality Management Grading Spec. System of Rice	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 11	Standards for International Trade for Rice	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 12	(CAC) Codex Alimentarius Commission Standard	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 13	Essential Composition & Quality Factors	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 14	(SPS) Sanitary and Phyto-Sanitary) Requirement	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 15	Mid-term	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 16	Fumigation and Grain Protect Quality Standard for Corn & Soybean	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 17	Grain Inspection Equipment	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 18	Cambodia Rice	90 mn	Lecture with LCD	Yoo Sang	classroom

	Cambodia Economy of Rice				
Session 19	Cambodia Rice Export Policy	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 20	Cambodia Rice Problem	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 21	Helping Cambodia Farmers	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 22	Marketing Rice Uses	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 23	Marketing Channels & Constraint	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 24	World Market and Trade	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 25	The Global Market & Trend	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 26	Marketing Tools and Risk Management	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 27	Trade How to procure Grains	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 28	General Provisions for Bidding Standard and Contract Terms	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 29	Basic document Employed by the Grain Trade, Standard Charter Parties	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 30	Summary of the Lectures	90 mn	Lecture with LCD	Yoo Sang	classroom
Total		៩៥ ម៉ោង			
Assessment scheme	<p><i>(How do you assess the ability of the students?)</i></p> <p><i>The Percentage of Attendance 10%</i> <i>Assignment Report 20%</i> <i>Midterm Examination 20%</i> <i>Final Examination 50%</i></p>				

List of References

(List important books for the students to read)

Author's Name (Year of Publication). Title of Books. Name of Publishing Company. Country.

1)- IDENTITY PRESERVED GRAIN LOGISTICAL

Heidi Reichert* Transportation Services Branch United States Department of Agriculture
And Kimberly Vachal Upper Great Plains Transportation Institute North Dakota State University,
Washington, DC January 27 – 28 - 2003

2)- Logistics & Trade Of PADDY/RICE

3)- IRRI Rice Grain Quality, *By JF Rickman and M Gummert, IRRI, Los Banos Philippines*

4)- Buying U.S. Grains Importer Manual, ©2008 U.S. Grains Council. All Rights Reserved. 1400 K
Street NW, Suite 1200, Washington, DC 20005

5)- Logistics Process of Imported Grains, Yoo Sang(2007), Graduate School of Business
Administration, Inha University, Incheon, Korea

6)-Grain Trading Systems and Market Information, FAO/University of Pretoria workshop
Presented by Stephen Kiuri Njuki , RATES Program, March 23rd – 24th , 2006

7)- USDA Grain:World Markets and Trade

8)-Cambodia_Rice Export Policy

9)-Grain Handling and Transportation System, Prepared by WESTAC, Published May 1998

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***Agriculture and food
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***Department
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Processing***

Year of Study 4 and 3

Semester I

COURSE OUTLINE

Course Code : Elective Course

Course Title: Grain Logistics and Trade

Credit: 3 (3.0) , Equal: 45 Hours)

Prerequisite: Compulsory

Coordinated Lecturer: Yoo Sang

Invited Lecturer¹ : _____

Invited Lecturer² : _____

Invited Lecturer³ : _____

Guest Speaker¹ : _____

Guest Speaker² : _____

Module Description Form	
Course Title	Grain Logistics and Trade
Rationale	<p><i>(Provide the reason why this course is included into the curriculum)</i></p> <p><i>This lecture is basic course for the students of Faculty of Agriculture and Food Processing which is necessary for the grains like Corn and Rice that are more important than those production. That is closely related with between former Post Harvest Technology and the grain quality control, logistics and international trade.</i></p>
Overall Course Aim or Objective	<p><i>(At the end of the course, what knowledge will the students acquire?)</i></p> <p><i>To provide students under the faculty of Agriculture and Food Processing with basic knowledge of Grain Quality Management, Logistics and International Trade.</i></p>
Theoretical Objectives	<p><i>(At the end of the course, what will the students able to describe?)</i></p> <p><i>Student will be able to describe the basic Knowledge of Grain Quality, Trade and Logistics.</i></p>
Practical Objectives	<p><i>(At the end of the course, what will the students able to do?)</i></p> <p><i>They also understand diversified grains such as Paddy Rice, Corn and Soybean.</i></p>
Course Description	<p><i>(Describe main contents to be taught)</i></p> <p><i>This course deals with and gives understand of basic concept of; Major Logistic Component , Logistics System Design & Management, Logistics Technology Development, Uniform Grain Storage, Practice, Identity preserved Logistical Overview, Infrastructure & Port Development , Quality Management, Grading Spec. System of Rice, Standards for International Trade for Rice,</i></p>
Student Outcome	<p><i>(On the completion of the course, what will the students expect?)</i></p> <p><i>Students will understand not only the importance of Post Harvest Technology but Grain Quality Management also Logistics and Local and International Trade so that they can work at the grainlogistics company and also they can run a private trade business by themselves</i></p>

Module Learning Plan					
Course title:	Grain Logistics and Trade				
Sessions	Contents	Duration	Teaching method	Lecturers	Place
Session 1	Logistics: Major Logistic Component	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 2	Logistics System Design & Management	90 mn	Lecture with LCD	Yoo Sang	classroom
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Session 16	Fumigation and Grain Protect Quality Standard for Corn & Soybean	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 17	Grain Inspection Equipment	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 18	Cambodia Rice	90 mn	Lecture with LCD	Yoo Sang	classroom

	Cambodia Economy of Rice				
Session 19	Cambodia Rice Export Policy	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 20	Cambodia Rice Problem	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 21	Helping Cambodia Farmers	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 22	Marketing Rice Uses	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 23	Marketing Channels & Constraint	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 24	World Market and Trade	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 25	The Global Market & Trend	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 26	Marketing Tools and Risk Management	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 27	Trade How to procure Grains	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 28	General Provisions for Bidding Standard and Contract Terms	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 29	Basic document Employed by the Grain Trade, Standard Charter Parties	90 mn	Lecture with LCD	Yoo Sang	classroom
Session 30	Summary of the Lectures	90 mn	Lecture with LCD	Yoo Sang	classroom
Total		៩៥ ម៉ោង			
Assessment scheme	<p><i>(How do you assess the ability of the students?)</i></p> <p><i>The Percentage of Attendance 10%</i> <i>Assignment Report 20%</i> <i>Midterm Examination 20%</i> <i>Final Examination 50%</i></p>				

List of References

(List important books for the students to read)

Author's Name (Year of Publication). Title of Books. Name of Publishing Company. Country.

1)- IDENTITY PRESERVED GRAIN LOGISTICAL

Heidi Reichert* Transportation Services Branch United States Department of Agriculture
And Kimberly Vachal Upper Great Plains Transportation Institute North Dakota State University,
Washington, DC January 27 – 28 - 2003

2)- Logistics & Trade Of PADDY/RICE

3)- IRRI Rice Grain Quality, *By JF Rickman and M Gummert, IRRI, Los Banos Philippines*

4)- Buying U.S. Grains Importer Manual, ©2008 U.S. Grains Council. All Rights Reserved. 1400 K
Street NW, Suite 1200, Washington, DC 20005

5)- Logistics Process of Imported Grains, Yoo Sang(2007), Graduate School of Business
Administration, Inha University, Incheon, Korea

6)-Grain Trading Systems and Market Information, FAO/University of Pretoria workshop
Presented by Stephen Kiuri Njuki , RATES Program, March 23rd – 24th , 2006

7)- USDA Grain:World Markets and Trade

8)-Cambodia_Rice Export Policy

9)-Grain Handling and Transportation System, Prepared by WESTAC, Published May 1998

មហាវិទ្យាល័យ
(Faculty)

កសិកម្ម និងកែច្នៃអាហារ

មេធាវី កែច្នៃអាហារ
(Department)

ឆ្នាំទី ៣
(Year of Study)

សមាសទី ១
(Semester)

University of Battambang

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមុខវិជ្ជា: FPR2304

(Course Code):

ចំណងជើងមុខវិជ្ជា: Food Preservation

Course Title:

ក្រេឌីត: 3 (2:1) (ស្មើ/Equal 60 ម៉ោង/Hours)

(Credit)

មុខវិជ្ជាតម្រូវឱ្យរៀនជាមុន: Maths, Physic Chemistry, Microbiology

Prerequisite:

សាស្ត្រាចារ្យសម្របសម្រួល: Mr. NEANG Pisey

(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម៖

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម៖

(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម៖

(Invited Lecturer³)

ភ្នាក់ងារពិសេស៖

(Guest Speaker¹)

ភ្នាក់ងារពិសេស៖

(Guest Speaker²)

ការពិពណ៌នាអំពីមុខវិជ្ជា

Course Description Form

ចំណងជើងមុខវិជ្ជា Course Title	Food Preservation
មូលហេតុ Rationale	The program intends to provide students essential knowledge and/or know-how in performing their job in any field related to Food. Food Preservation is an important course providing scientific approach used in food processing or food technology.
គោលបំណងសរុបមុខវិជ្ជា Overall Course Aim or Objective	This course aims at training students on food preservation techniques. It is designed to provide a feeling for the variety of techniques aiming at microbiological and/or biochemical stability, to enable students to recognize different food transformation process, and to lay a foundation for further study.
ការបរិយាយមុខវិជ្ជា Course Description	<p>The course consists of 4 majors components :</p> <ol style="list-style-type: none"> 1. Introduction to food preservation 2. Techniques of physical process <ol style="list-style-type: none"> 2.1. Heat treatments (pasteurization, sterilization) 2.2. Cold treatments (refrigeration, freezing) 2.3. Dehydration/Drying 2.4. Modified-controlled Atmosphere packaging 2.5. Removal of bacteria by filtration 2.6. Electromagnetic radiation (microwave, ultraviolet, ionization, infrared radiation) 3. Techniques of chemical and biological process <ol style="list-style-type: none"> 3.1. Salting, adding of sugar, vinegar or alcohol 3.2. Food additives 3.3. Smoking 3.4. Lactic fermentation 3.5. Alcohol fermentation 4. Comparison analysis on food preservation techniques
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	<p>Students will learn :</p> <ol style="list-style-type: none"> 1- Approach to preserve foods or to develop foods from different raw materials 2- Advantages and limitations of different food preservation techniques
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	<p>Students will learn to :</p> <ol style="list-style-type: none"> 1- Transform some fruits using solar dryer and other equipments. 2- Do document research on the fermentation of cucumbers and cabbages
លទ្ធផលដែលសិស្សត្រូវបានរំពឹងទុក Student Outcome	<p>Upon the completion of the course, students will be able to :</p> <ol style="list-style-type: none"> 1- Develop or preserve different kinds of foods from raw materials (especially fruits, vegetables, cereals and fish) 2- Know why and which preservation techniques should be chosen facing to real situation/problems

ការរៀនសូត្រសម្រាប់ការរៀនមុខវិជ្ជា Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:	Food preservation 1 (Physical process)				
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី ១ Session 1	Introduction to food preservation <i>Term & definition</i>	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ២ Session 2	Food spoilage & food preservation techniques	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ៣ Session 3	Heat treatment <i>Principal & type of heat treatment</i>	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ៤ Session 4	Safety and quality issues	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ៥ Session 5	Microbial inactivation	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ៦ Session 6	Temperature dependence	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ៧ Session 7	Industrial techniques	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ៨ Session 8	Industrial techniques	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ៩ Session 9	Cold preservation Introduction	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ១០ Session 10	Refrigeration-Chilling	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ១១ Session 11	Freezing	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ១២ Session 12	Filtration Membrane process Principle, type of membrane filtration, osmosis phenomenon	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ១៣ Session 13	Characteristic Clogging behavior	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ១៤ Session 14	Polarization Effect on food	1.5 h	Class teaching and exercises	Neang Pisey	Class

ពេលទី ១៥ Session 15	Application with palm fruit Post-filtration contamination	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ១៦ Session 16	Modified-controlled atmosphere packaging or storage	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ១៧ Session 17	Modified-controlled atmosphere packaging or storage	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ១៨ Session 18	Dehydration - Drying	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ១៩ Session 19	Dehydration - Drying	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ២០ Session 20	Comparison of physical process	1.5 h	Class teaching and exercises	Neang Pisey	Class
ពេលទី ២១ Session 21	Manufacturing process of dried banana and juices	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ២២ Session 22	Application of Drying technique : banana	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ២៣ Session 23	Application of Drying technique : banana	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ២៤ Session 24	Application of Drying technique : banana	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ២៥ Session 25	Application of Drying technique : banana	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ២៦ Session 26	Application of Drying technique : banana	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ២៧ Session 27	Application of Drying technique : banana	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ២៨ Session 28	Application of heat treatment : pineapple juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ២៩ Session 29	Application of heat treatment : pineapple juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៣០ Session 30	Application of heat treatment : pineapple juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៣១ Session 31	Application of heat treatment : pineapple juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៣២ Session 32	Application of heat treatment : pineapple juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៣៣ Session 33	Application of heat treatment : pineapple juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៣៤ Session 34	Application of heat treatment : dragon juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៣៥ Session 35	Application of heat treatment : dragon juice processing	1.5 h	Experiment	Neang Pisey	Lab

ពេលទី ៣៦ Session 36	Application of heat treatment : dragon juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៣៧ Session 37	Application of heat treatment : dragon juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៣៨ Session 38	Application of heat treatment : dragon juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៣៩ Session 39	Application of heat treatment : dragon juice processing	1.5 h	Experiment	Neang Pisey	Lab
ពេលទី ៤០ Session 40	Application of heat treatment : dragon juice processing	1.5 h	Experiment	Neang Pisey	Lab
សរុប		60 h			

ការវាយតម្លៃលើ សមត្ថភាពសិស្ស Assessment scheme	Attendance	10%
	Assignments	20%
	Mid-term test	20%
	Final Examination	50%
	Total	100%
បញ្ជីឯកសារយោង List of References		
Shafiur Rahman (2007). <i>Handbook of food preservation</i> . 2 ed. Taylor & Francis Group. USA. Romeo T. Toledo (2007). <i>Fundamentals of food process engineering</i> . 3 ed. Springer Science & Business Media. New York.		

បរិច្ឆេទ
(Faculty)

កសិកម្ម និងកែច្នៃអាហារ

មេត្តាជ្រាប កែច្នៃអាហារ
(Department)

ឆ្នាំទី ៣
(Year of Study)

សមាសទី ១
(Semester)

University of Battambang

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមេរៀន: FPR2307

(Course Code):

ចំណាត់ថ្នាក់: Quality Assurance 1

Course Title:

ក្រេឌីត: 2 (2:0) (ស្មើ/Equal ម៉ោង/Hours)
(Credit)

មុខវិជ្ជាប្រូរ៉េគីរ៉េន:

Prerequisite: Statistics, Microbiology

សាស្ត្រាចារ្យសម្របសម្រួល: Mr. NEANG Pisey

(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម:

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម:

(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម:

(Invited Lecturer³)

ភ្នាក់ងារស្តីពី:

(Guest Speaker¹)

ភ្នាក់ងារស្តីពី:

(Guest Speaker²)

ការពិពណ៌នាអំពីមុខវិជ្ជា

Course Description Form

ចំណងជើងមុខវិជ្ជា Course Title	Quality Assurance
មូលហេតុ Rationale	Facing to the globalization and the development of world trade, Quality is becoming crucial for all actors: Consumers are more concerned about what they used and/or consume; Industries need to satisfy the need of customer/consumer in order to gain their confidence; Authorities try to take measures in order to assure the safety and stability of society by means of legislation, standards, guidelines, etc. Many quality assurance systems and tools are therefore being implemented in a wide range of firms in order to respond to these three principal driving forces.
គោលបំណងសរុបមុខវិជ្ជា Overall Course Aim or Objective	This course aims at training students on quality. It is designed to provide a feeling for a variety of quality assurance systems and tools used in different firms, especially in food and agricultural sector, to enable students to recognize the issues and approach related to quality, and to lay a foundation for further study or training.
ការបរិយាយមុខវិជ្ជា Course Description	The course consists of 6 components : 1- Introduction to Quality Assurance (Term and definition, Quality management approach, Quality assurance systems /tools) 2- Basic concept of Good Hygienic Practices 3- 7 QC Tools, 5 Whys, Deming's Cycle, Process Cartography 4- Hazard Analysis and Critical Control Points (HACCP) 5- Total Quality Management (TQM) 6- ISO 9001: 2000 and ISO 22000: 2005
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	Students will learn : 1- Approach to manage the quality in food or agricultural firms 2- Simple quality assurance tools such as 7 QC tools 3- Quality assurance systems such as HACCP, TQM and ISO
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	The practical objectives of the course are to make students to learn to: 1- Identify root causes of a problem using fish born diagram 2- Identify the CCP along food chain using CCP decision tree
លទ្ធផលដែលសិស្សត្រូវបានរំពឹងថា Student Outcome	Upon the completion of the course, students will be able to : 1- Get concept of quality, quality assurance and good hygiene practices 2- Use the 7 QC tools 3- Recognize the quality assurance systems such as HACCP, TQM and ISO

តារាងផែនការសម្រាប់ការរៀនមុខវិជ្ជា

Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:	Quality assurance 1				
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី ១ Session 1	Introduction to QA Term & definition Notion of Quality	1.5 h	Class teaching and exercises		Class
ពេលទី ២ Session 2	Introduction to QA Quality management approach	1.5 h	Class teaching and exercises		Class
ពេលទី ៣ Session 3	Basic concept of Good Hygienic Practices What is GHP? Food hygiene, Food contamination	1.5 h	Class teaching and exercises		Class
ពេលទី ៤ Session 4	<i>Basic concept of Good Hygienic Practices</i> Areas examined under GHP (1)	1.5 h	Class teaching and exercises		Class
ពេលទី ៥ Session 5	Total Quality Management Introduction	1.5 h	Class teaching and exercises		Class
ពេលទី ៦ Session 6	<i>Total Quality Management</i> 5S	1.5 h	Class teaching and exercises		Class
ពេលទី ៧ Session 7	<i>Total Quality Management</i> 5S	1.5 h	Class teaching and exercises		Class
ពេលទី ៨ Session 8	<i>Total Quality Management</i> Visual management	1.5 h	Class teaching and exercises		Class
ពេលទី ៩ Session 9	<i>Total Quality Management</i> KAIZEN	1.5 h	Class teaching and exercises		Class
ពេលទី ១០ Session 10	<i>Total Quality Management</i> KAIZEN	1.5 h	Class teaching and exercises		Class
ពេលទី ១១ Session 11	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១២ Session 12	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៣ Session 13	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៤ Session 14	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៥ Session 15	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class

ពេលទី ១៦ Session 16	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៧ Session 17	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៨ Session 18	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៩ Session 19	<i>Total Quality Management</i> Reviews	1.5 h	Class teaching and exercises		Class
ពេលទី ២០ Session 20	<i>Total Quality Management</i> Reviews	1.5 h	Class teaching and exercises		Class
សរុប		30 h			

ការវាយតម្លៃលើ សមត្ថភាពសិស្ស <i>Assessment scheme</i>	Attendance	10%
	Assignments	20%
	Mid-term test	20%
	Final Examination	50%
	Total	100%
បញ្ជីឯកសារយោង List of References		
Vasconcellos J. Andres (2005). Quality assurance for food industry: a practical approach. CRC Press LLC. Florida.		
Codex Alimentarius Commission (2003). Recommended International code of practice general principles of food hygiene. CAC/RCP 1-1969, Rev. 4-2003.		
Ryu Fukui, Yoko Honda, Harue Inoue and all (2003). Handbook of TQM and QCC. IDB. Japan.		

បរិច្ឆេទ
(Faculty)

កសិកម្ម និងកែច្នៃអាហារ

មេត្តាជ្រាប កែច្នៃអាហារ
(Department)

ឆ្នាំទី ៣
(Year of Study)

សមាសទី ១
(Semester)

University of Battambang

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមេរៀន: FPR2307

(Course Code):

ចំណាត់ថ្នាក់: Quality Assurance 1

Course Title:

ក្រេឌីត: 2 (2:0) (ស្មើ/Equal ម៉ោង/Hours)
(Credit)

មុខវិជ្ជាប្រូរ៉េគីស៊ីត:

Prerequisite: Statistics, Microbiology

សាស្ត្រាចារ្យសម្របសម្រួល: Mr. NEANG Pisey

(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម:

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម: _____

(Invited Lecturer³)

ភ្នាក់ងារចិសេស: _____

(Guest Speaker¹)

ភ្នាក់ងារចិសេស: _____

(Guest Speaker²)

ការពិពណ៌នាអំពីមុខវិជ្ជា

Course Description Form

ចំណងជើងមុខវិជ្ជា Course Title	Quality Assurance
មូលហេតុ Rationale	Facing to the globalization and the development of world trade, Quality is becoming crucial for all actors: Consumers are more concerned about what they used and/or consume; Industries need to satisfy the need of customer/consumer in order to gain their confidence; Authorities try to take measures in order to assure the safety and stability of society by means of legislation, standards, guidelines, etc. Many quality assurance systems and tools are therefore being implemented in a wide range of firms in order to respond to these three principal driving forces.
គោលបំណងសរុបមុខវិជ្ជា Overall Course Aim or Objective	This course aims at training students on quality. It is designed to provide a feeling for a variety of quality assurance systems and tools used in different firms, especially in food and agricultural sector, to enable students to recognize the issues and approach related to quality, and to lay a foundation for further study or training.
ការបរិយាយមុខវិជ្ជា Course Description	The course consists of 6 components : 1- Introduction to Quality Assurance (Term and definition, Quality management approach, Quality assurance systems /tools) 2- Basic concept of Good Hygienic Practices 3- 7 QC Tools, 5 Whys, Deming's Cycle, Process Cartography 4- Hazard Analysis and Critical Control Points (HACCP) 5- Total Quality Management (TQM) 6- ISO 9001: 2000 and ISO 22000: 2005
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	Students will learn : 1- Approach to manage the quality in food or agricultural firms 2- Simple quality assurance tools such as 7 QC tools 3- Quality assurance systems such as HACCP, TQM and ISO
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	The practical objectives of the course are to make students to learn to: 1- Identify root causes of a problem using fish born diagram 2- Identify the CCP along food chain using CCP decision tree
លទ្ធផលដែលសិស្សត្រូវបានរំពឹងថា Student Outcome	Upon the completion of the course, students will be able to : 1- Get concept of quality, quality assurance and good hygiene practices 2- Use the 7 QC tools 3- Recognize the quality assurance systems such as HACCP, TQM and ISO

តារាងផែនការសម្រាប់ការរៀនមុខវិជ្ជា

Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:	Quality assurance 1				
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី ១ Session 1	Introduction to QA Term & definition Notion of Quality	1.5 h	Class teaching and exercises		Class
ពេលទី ២ Session 2	Introduction to QA Quality management approach	1.5 h	Class teaching and exercises		Class
ពេលទី ៣ Session 3	Basic concept of Good Hygienic Practices What is GHP? Food hygiene, Food contamination	1.5 h	Class teaching and exercises		Class
ពេលទី ៤ Session 4	<i>Basic concept of Good Hygienic Practices</i> Areas examined under GHP (1)	1.5 h	Class teaching and exercises		Class
ពេលទី ៥ Session 5	Total Quality Management Introduction	1.5 h	Class teaching and exercises		Class
ពេលទី ៦ Session 6	<i>Total Quality Management</i> 5S	1.5 h	Class teaching and exercises		Class
ពេលទី ៧ Session 7	<i>Total Quality Management</i> 5S	1.5 h	Class teaching and exercises		Class
ពេលទី ៨ Session 8	<i>Total Quality Management</i> Visual management	1.5 h	Class teaching and exercises		Class
ពេលទី ៩ Session 9	<i>Total Quality Management</i> KAIZEN	1.5 h	Class teaching and exercises		Class
ពេលទី ១០ Session 10	<i>Total Quality Management</i> KAIZEN	1.5 h	Class teaching and exercises		Class
ពេលទី ១១ Session 11	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១២ Session 12	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៣ Session 13	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៤ Session 14	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៥ Session 15	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class

ពេលទី ១៦ Session 16	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៧ Session 17	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៨ Session 18	<i>Total Quality Management</i> 7 QC Tools	1.5 h	Class teaching and exercises		Class
ពេលទី ១៩ Session 19	<i>Total Quality Management</i> Reviews	1.5 h	Class teaching and exercises		Class
ពេលទី ២០ Session 20	<i>Total Quality Management</i> Reviews	1.5 h	Class teaching and exercises		Class
សរុប		30 h			

ការវាយតម្លៃលើ សមត្ថភាពសិស្ស <i>Assessment scheme</i>	Attendance	10%
	Assignments	20%
	Mid-term test	20%
	Final Examination	50%
	Total	100%
បញ្ជីឯកសារយោង List of References		
Vasconcellos J. Andres (2005). Quality assurance for food industry: a practical approach. CRC Press LLC. Florida.		
Codex Alimentarius Commission (2003). Recommended International code of practice general principles of food hygiene. CAC/RCP 1-1969, Rev. 4-2003.		
Ryu Fukui, Yoko Honda, Harue Inoue and all (2003). Handbook of TQM and QCC. IDB. Japan.		

មហាវិទ្យាល័យ
(Faculty)

ដេប៉ាតឺម៉ង់
(Department)

ឆ្នាំទី
(Year of Study)

ឆមាសទី
(Semester)

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមុខវិជ្ជា:

(Course Code)

ចំណងជើងមុខវិជ្ជា: Quality Assurance I

Course Title: _____

ក្រេឌីត _____ (ស្មើ/Equal _____ ម៉ោង/Hours)

(Credit)

មុខវិជ្ជាតម្រូវឱ្យរៀនមុន: Statistics

Prerequisite: _____

សាស្ត្រាចារ្យសម្របសម្រួល: _____

(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម^១: _____

(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម^២: _____

សាស្ត្រាចារ្យចូលរួម^៣: _____

(Invited Lecturer³)

វាគ្មិនពិសេស^១: _____

(Guest Speaker¹)

វាគ្មិនពិសេស^២: _____

(Guest Speaker²)

តារាងពិពណ៌នាអំពីមុខវិជ្ជា

Module Description Form

ចំណងជើងមុខវិជ្ជា Course Title	Quality Assurance I
មូលហេតុ Rationale	The productivity and the competitiveness are one of major concerns for any micro and macro-economic systems as the business world has been becoming more challenging. The success of any organization depends on customer satisfaction and QA is a fundamental system for achieving this objective and ensuring the sustainable development of the organization.
គោលដៅរបស់មុខវិជ្ជា Overall Course Aim or Objective	This course aims at providing to students the total quality concept and techniques for managing, controlling, and improving quality in order to bring success to their future organization.
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	<p>Upon successfully completing this course, the student will:</p> <ul style="list-style-type: none"> - Understanding the quality management system and its benefits - Knowledge about the Japanese and Western concepts related to quality management - Knowledge about national and international standards and regulations
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	<p>Upon successfully completing this course, the student will:</p> <ul style="list-style-type: none"> • Be familiar with quality management principles and concepts • Realize the role of QMS in continual improvement • Know the role of QC and QA • Understand quality components for product design and development • Know how to develop, implement and maintain QMS.
ការបរិយាយមុខវិជ្ជា Course Description	<p>The course contains following aspects:</p> <ol style="list-style-type: none"> 1. Basic concepts of Quality (definition and perceptions, historical perspective, components of quality, PDCA cycle) 2. Cost of quality 3. QMS principles and Deming's cycle 4. Quality standards and regulations 5. Quality Function Deployment (QFD) 6. QMS Documentation 7. QC and QA systems 8. Food quality components 9. Food safety issues and trends <p>Lectures, reading, reflection, teamwork, video projection and practice will be used for this course.</p>
លទ្ធផលដែលនិស្សិតទទួលបាន Student Outcome	<p>Students who successfully complete this course will have:</p> <ul style="list-style-type: none"> - Able to put in place an appropriate quality management system for their organization in accordance international quality standards - Becoming a responsible QC/ QA staff or manager in his/her future organization - Becoming a dynamic actor for the success and the development in his/her future organization

តារាងផែនការសម្រាប់ការរៀនមុខវិជ្ជា Module Learning Plan

ចំណងជើង មុខវិជ្ជា Course title:	Quality Assurance I				
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល បង្រៀន Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី១ Session 1	Overview on Quality and Quality Systems (Benefits, Definition, Perceptions)	1.5h	Lecture + video projection	OL Tola	Class
ពេលទី២ Session 2	Quality historical perspective (Quality Gurus)	1.5h	Lecture	OL Tola	Class
ពេលទី៣ Session 3	Components of quality	1.5h	Lecture	OL Tola	Class
ពេលទី៤ Session 4	Cost of quality	1.5h	Lecture	OL Tola	Class
ពេលទី៥ Session 5	Deming's cycle	1.5h	Lecture	OL Tola	Class
ពេលទី៦ Session 6	QMS principles	1.5h	Lecture	OL Tola	Class
ពេលទី៧ Session 7	Quality standards and regulations	1.5h	Lecture	OL Tola	Class
ពេលទី៨ Session 8	Quality standards and regulations	1.5h	Lecture	OL Tola	Class
ពេលទី៩ Session 9	Quality Function Deployment (QFD)	1.5h	Lecture + group work	OL Tola	Class
ពេលទី១០ Session 10	Quality Function Deployment (QFD)	1.5h	Lecture + group work	OL Tola	Class
ពេលទី១១ Session 11	Mid-term exam	1.5h	Exam	OL Tola	Class
ពេលទី១២ Session 12	QMS documentation	1.5h	Lecture	OL Tola	Class
ពេលទី១៣ Session 13	QMS documentation	1.5h	Lecture	OL Tola	Class
ពេលទី១៤ Session 14	QC system (process and lab control)	1.5h	Lecture	OL Tola	Class
ពេលទី១៥ Session 15	QA system (preventive and corrective measures)	1.5h	Lecture	OL Tola	Class
ពេលទី១៦ Session 16	Sensory quality	1.5h	Lecture + video projection	OL Tola	Class
ពេលទី១៧ Session 17	Nutritional quality and health claims on food labels	1.5h	Lecture + video projection	OL Tola	Class
ពេលទី១៨ Session 18	Microbiological quality	1.5h	Lecture + video projection	OL Tola	Class

Session 18					
ពេលទី១៩ Session 19	Convenience quality	1.5h	Lecture + video projection	OL Tola	Class
ពេលទី២០ Session 20	Food safety issues and trends	1.5h	Lecture + video projection	OL Tola	Class
សរុប					
ការវាយតម្លៃ លើសមត្ថភាព សិស្ស <i>Assessment scheme</i>	(តើអ្នកវាយតម្លៃសមត្ថភាពនិស្សិតយ៉ាងដូចម្តេច?) (How do you assess the ability of the students?)				
	<ul style="list-style-type: none">• Attendance 10%• Assignment 20%• Mid-term Test 20%• Final Exam 50%				
បញ្ជីឯកសារយោង List of References					
<ul style="list-style-type: none">• អុល គុណ (២០១២) ស្គាល់ឧត្តមជនម្នាក់ផ្នែកគុណភាព និង គ្រប់គ្រង http://docs.technola.net/index.php/quality/465-2012-11-25-15-28-59• អុល គុណ (២០១២) គំនិតល្អៗរបស់គ្រូគុណភាព Deming http://docs.technola.net/index.php/quality/quality-articles/quality-gurus/466-deming• AUT (2013) Quality function deployment, available at http://www.ciri.org.nz/downloads/Quality%20Function%20Deployment.pdf• Bernal L., Dornberger U., Suvelza A., Byrnes T. (2009) Quality function deployment (QFD) for services, available at http://www.vgu.edu.vn/fileadmin/pictures/studies/MBA/Handbook_QFD_Services.pdf• Evans J.R. & Lindsay W.M. (1999) The Management and control of quality, South-Western College Publishing, 4th edition• Finch B.J. (2006) Operations Now, McGraw-Hill, 2nd edition, p. 174-249• ISO (2012) Quality management principles, available at http://www.iso.org/iso/qmp_2012.pdf• Kawamura T. (2005) Overview of Total Quality Management• Hitoshi Kume (1985) <i>Statistical methods for quality improvement</i>, AOTS• Hitoshi Kume (1996) <i>TQM Promotion Guide Book</i>, JSA• Nayatani Y., Eiga T., Futami R., Miyagawa H. (2004) <i>The seven new QC tools: practical applications for managers</i>, 3A Corporation, 2e edition• Saxena Surendra (?) Determining components of service quality, available at http://www.conexl.com/docs/101/QOSOFSHORE.pdf• Umeda Masao (2001) <i>Seven key factors for success on TQM</i>. JSA. 2^e edition					

មហាវិទ្យាល័យ
(Faculty)
កសិកម្ម និង
កែច្នៃអាហារ

មេធាវីកម្ម កែច្នៃអាហារ
(Department)

ឆ្នាំទី៣
(Year of Study)

រមាសទី ១
(Semester)

គម្រោងមេរៀន

COURSE OUTLINE

លេខកូដមុខវិជ្ជា: FPR 3402
(Course Code)

ចំណងជើងមុខវិជ្ជា: ការរក្សាទុក

Course Title:

ក្រេឌីត២(១១) ស្មើ/Equal១៥:៣០ ម៉ោង/Hours)
(Credit)

មុខវិជ្ជាតម្រូវឱ្យរៀនជាមុន: សរីរវិទ្យាសរីរាង្គបច្ចេកវិទ្យាទុកដាក់
Prerequisite:

សាស្ត្រាចារ្យសម្របសម្រួល:
(Coordinated Lecturer)

សាស្ត្រាចារ្យចូលរួម: _____
(Invited Lecturer¹)

សាស្ត្រាចារ្យចូលរួម: _____
(Invited Lecturer²)

សាស្ត្រាចារ្យចូលរួម: _____
(Invited Lecturer³)

ភក្តីសម្តែង: Dr. ទូចវិសាលសុខ
(Guest Speaker¹)

ភក្តីសម្តែង: _____
(Guest Speaker²)

Module Description Form

ចំណងជើងមុខវិជ្ជា Course Title	បច្ចេកវិទ្យាការរក្សាទុក
មូលហេតុ Rationale	ក្រាមអំពើមជ្ឈដ្ឋានធម្មជាតិផលិតផលចំណីអាហារក្រោយការប្រមូលផលពី ផលិតផលកសិកម្មក្រោយពីទទួលទិន្នផលផលិតផលកសិកម្មទាំងនេះឆាប់ខូចគុណភាពអាហារ។
គោលបង្វែរបស់មុខវិជ្ជា Overall Course Aim or Objective	បន្ថយការខូចខាតក្នុងរយៈពេលដូចគ្នាពីពេលមុនបង្កើនរយៈពេលការរក្សាទុកដោយបន្ថយការខូចខាតគុណភាពអាហារ។
គោលបំណងផ្នែកទ្រឹស្តី Theoretical Objectives	កាត់បន្ថយភ្នាក់ងារដែលបណ្តាលអោយផលិតផលខូចរៀបចំលក្ខណៈនិងស្ថានភាពដែលបង្កអោយមានការរីកចម្រើនដល់ភ្នាក់ងារបង្កអោយផលិតផលខូច។
គោលបំណងផ្នែកអនុវត្ត Practical Objectives	ស្វែងយល់និងគិតគូរមើលការបង្កការខូចខាតលើផលិតផលពិតដែលកំពុងជួបប្រទះរកវិធីដោះស្រាយ។
ការបរិយាយមុខវិជ្ជា Course Description	លក្ខខណ្ឌសំណើមសីតុណ្ហភាពបរិយាកាសការរៀបចំទុកដាក់ផលិតផលបរិមាណការរក្សាទុក និងតម្លៃសមស្របមួយ។
លទ្ធផលដែលសិស្សត្រូវទទួលបាន Student Outcome	វិធីទុកដាក់ផលិតផលតម្លៃសេដ្ឋកិច្ចរបស់ផលិតផលការរក្សាទុក

Module Learning Plan

ចំណងជើងមុខវិជ្ជា: Course title:					
ពេល Sessions	មាតិកាមេរៀន Contents	រយៈពេល បង្រៀន Duration	វិធីសាស្ត្របង្រៀន Teaching method	សាស្ត្រាចារ្យ Lecturers	កន្លែងបង្រៀន Place
ពេលទី ១ Session 1	ការអនុវត្តការវិភាគវាយតម្លៃ អាចចំណេញក្នុងការរក្សាទុក Application of cost-benefit analysis to storage	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ២ Session 2	ប្រតិបត្តិការការដកសំណើម ដោយប្រើចលនាខ្យល់ការដក ដោយចលនាខ្យល់ត្រជាក់	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន

	projects Aeration, Refrigerated Aeration				
ពេលទី ៣ Session 3	បញ្ហាផ្សេងៗដែលមានឥទ្ធិពល ក្នុងការជ្រើសរើស ឧបករណ៍ Factors influencing the choice of bulk store	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៤ Session 4	ឧបករណ៍ផ្សេងៗការរក្សាទុកពី បុរាណ ចលនារបស់ខ្យល់ Ancillary equipment Air Movement	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៥ Session 5	កម្ដៅខ្យល់ ខ្យល់ក្ដៅដកសំណើម ការប្រើប្រាស់វត្ថុធាតុដើមជា ចំហេះសំរាប់បានខ្យល់ក្ដៅ Air Heating Air Heating Use of Biomass	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៦ Session 6	ប្រតិបត្តិការការសម្ងួត Drying operations	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៧ Session 7	តម្លៃនិងឥទ្ធិពលជម្រុញលើក ទឹកចិត្តក្នុងការរក្សាទុកការ ជ្រើសរើសឧបករណ៍ និងការធ្វើ អោយប្រសើរឡើងក្នុងការត្រួត ពិនិត្យ Costs and incentives to store Alternative and supplementary control measures	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៨ Session 8	ធ្វើអោយប្រសើរឡើងក្នុងរក្សា ទុកនៅតាមទីជនបទ តួនាទីរបស់ការរក្សាទុកគិតក្នុង កម្រិតសេដ្ឋកិច្ច Improvement to storage on the farm The role of storage in the economy	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ៩ Session 9	ត្រួតពិនិត្យសត្វល្អិតបំផ្លាញ ផ្សេងៗ Control of rodent pests	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន
ពេលទី ១០ Session 10	ឥទ្ធិពលសរីរវិទ្យា Biodeterioration	១ម៉ោង ៣០	LCD	ប្រាក់ស៊ីណា	ថ្នាក់រៀន

ពេលទី ១១ Session 11	សម្ព័ន្ធគ្រាប់ធញ្ញជាតិ គិតកម្រិតឧបករណ៍បក់ខ្យល់។ កាធន់ស្ទះឧបករណ៍បក់ខ្យល់។ Grain drying The selection and sizing of a fan to move air. The major resistance to the flow of air.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១២ Session 12	សំងួតគ្រាប់ធញ្ញជាតិ គិតកម្រិតឧបករណ៍បក់ខ្យល់។ កាធន់ស្ទះឧបករណ៍បក់ខ្យល់។ Grain drying The selection and sizing of a fan to move air. The major resistance to the flow of air.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១៣ Session 13	កំដៅដោយខ្យល់ លក្ខណៈកំដៅដោយខ្យល់ពី លក្ខណៈ។ Air heating. Heater can be divided two types.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១៤ Session 14	កម្ដៅដោយខ្យល់ លក្ខណៈកម្ដៅដោយខ្យល់ពី លក្ខណៈ។ Air heating. Heater can be divided two types.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១៥ Session 15	ប្រើប្រាស់ផលិតផលសម្រេចកែច្នៃ ប្រេងឧស្ម័នធាតុការអនុវត្តច្រើន។ Use of Biomass oil and gaz are the conventional fuel employed in heated air dryers.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១៦ Session 16	ប្រើប្រាស់ផលិតផលសម្រេចកែច្នៃ ប្រេងឧស្ម័នធាតុការអនុវត្តច្រើន។ Use of Biomass oil and gaz are the conventional fuel employed in heated air dryers.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ១៧ Session 17	កាកសំណល់ផលិតផលកសិកម្ម។ ការប្រើប្រាស់ផលិតផលក្នុងកម្រិត សេដ្ឋកិច្ចជាជម្រើសរបស់ពិភពលោក។ ក។ Grate furnace	១ម៉ោង ៣០		ភ្នាក់ងារជំនាញ ខាងក្រៅ	រាងចក្រវីស្ថាប័ន ឯកជនខាងក្រៅ

	The used of grates is probably the most commonly used method world-wide.				
ពេលទី ១៨ Session 18	កាកសំណល់ផលិតផលកសិកម្ម។ ការប្រើប្រាស់ផលិតផលក្នុងកម្រិត សេដ្ឋកិច្ចជាជម្រើសរបស់ពិភពលោក។ Grate furnace The used of grates is probably the most commonly used method world-wide.	១ម៉ោង ៣០		ភ្នាក់ងារជំនាញ ខាងក្រៅ	រាងចក្រវីស្ថាបន៍ ឯកជនខាងក្រៅ
ពេលទី ១៩ Session 19	បច្ចេកវិទ្យាផ្សេងៗនិងបញ្ហា ចោទកើតមាន។ Various technical and the problems.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២០ Session 20	បច្ចេកវិទ្យាផ្សេងៗនិងបញ្ហា ចោទកើតមាន។ Various technical and the problems.	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២១ Session 21	ការសម្ងួត Dry ration	១ម៉ោង ៣០		ភ្នាក់ងារជំនាញ ខាងក្រៅ	រាងចក្រវីស្ថាបន៍ ឯកជនខាងក្រៅ
ពេលទី ២២ Session 22	ការសម្ងួត Dry ration	១ម៉ោង ៣០		ភ្នាក់ងារជំនាញ ខាងក្រៅ	រាងចក្រវីស្ថាបន៍ ឯកជនខាងក្រៅ
ពេលទី ២៣ Session 23	ការត្រៀមជាមុនចលនារបក់ ដោយខ្យល់។ Pre-drying Aeration	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៤ Session 24	ការត្រៀមជាមុនចលនារបក់ ដោយខ្យល់។ Pre-drying Aeration	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៥ Session 25	លក្ខណៈរូបរបស់គ្រាប់ធញ្ញជាតិ។ Physical properties of grain	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៦ Session 26	លក្ខណៈរូបរបស់គ្រាប់ធញ្ញជាតិ។ Physical properties of grain	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៧ Session 27	បរិមាណម្យ៉ាងក្នុងខ្នាតមាឌ Bulk density	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៨ Session 28	បរិមាណម្យ៉ាងក្នុងខ្នាតមាឌ Bulk density	១ម៉ោង ៣០		ប្រាក់ស៊ីណា	មន្ទីរពិសោធន៍
ពេលទី ២៩ Session 29	សន្និដ្ឋាននិងកិច្ចពិភាក្សានិងការ បញ្ហាចោទ Resume and discussion and	១ម៉ោង ៣០		កិច្ចពិភាក្សារបស់ និស្សិត	មន្ទីរពិសោធន៍

	question				
ពេលទី ៣០ Session 30	សន្និដ្ឋាននិងកិច្ចពិភាក្សានិងការ បញ្ហាចោទ Resume and discussion and question	១ម៉ោង ៣០		កិច្ចពិភាក្សារបស់ និស្សិត	មន្ទីរពិសោធន៍
សរុប		៤៥ ម៉ោង			
ការវាយតម្លៃលើ សមត្ថភាពសិស្ស Assessment scheme	ប្រលងពាក់កណ្តាលផ្តាច់ព្រ័ត្រប្រលងបញ្ចប់សំណួរពិភាក្សាជាក្រុមរបាយការណ៍ការងារអនុវត្តន៍។				
បញ្ជីឯកសារយោង List of References					
(រាយឈ្មោះសៀវភៅសំខាន់ៗសម្រាប់ឱ្យនិស្សិតអាន) (List important books for the students to read)					
ឈ្មោះអ្នកនិពន្ធ (ឆ្នាំបោះពុម្ព). ចំណងជើងសៀវភៅ។ កន្លែងបោះពុម្ព/ឈ្មោះរោងពុម្ព។ ប្រទេសដែលបោះពុម្ព។ Author’s Name (Year of Publication). Title of Books. Name of Publishing Company. Country.					