《尊重智慧財產權，請使用正版教科書，勿非法影印書籍及教材，以免侵犯他人著作權》

**開課班級: 四熱農三A** **授課老師: 邱亞伯** **學分數: 3**

**課程大綱:**

講授以應用微生物的醱酵技術製造各種發酵產品之生產技術，如酒類工業、有機酸工業、發酵食品工業、胺基酸工業、酵素工業、菌體生產工業、抗生物質工業、核酸關連物質工業、微生物轉換醱酵工業、生理活性物質生產工業等，以及利用微生物之醱酵技術於培養植物細胞生產有用物質與生產細胞的方法。
使學生練習生產單細胞蛋白質之培養技術 、酒精醱酵技術 、有機酸醱酵技術 、胺基酸醱酵技術酵素生產醱酵技術 、抗生物質生產技術 、醱酵食品製造之技術以及培養植物細胞生產有用物質與大量生產有用細胞之培養技術等。

outline:

The course based on the knowledge of applied microbiology to discuss the related fermentation industry: brewing, organic acids, food fermentation, amino acids, enzymes, antibiotic, etc. The course also covered the technique of cell production. The lab covers the single cell protein, technique in alcohol fermentation、amino acids、enzymes、antibiotics production and food fermentation, and the cell production technique.

**教學型態:**

課堂教學+實習 (校內、校外)

**成績考核方式:**

平時成績:50%
期中考:15%
期末考:20%
其它:15% - Attendance Record%

**本科目教學目標:**

1.培育熱帶農業基礎人才。 2.發展農、林、漁、牧相關技術。
3.建立永續農業經營與國際合作觀。

**參考書目:**

**課程進度表：**

| 週次 | 起訖月日 | 授課單元(內容) | 備註 |
|---|---|---|---|
| 第1週 | 2.21~2.28 | Course Introduction | 8日正式上課。8~12日課程加退選，轉學(系)生、復學生及延修生選課，雙主修、輔系申請，12日申辦抵免學分截止日 |
| 第2週 | 2.28~3.07 | Lecture:;Introduction and History of Food Fermentation<br>Lecture: Biochemistry of Fermentation | |
| 第3週 | 3.07~3.14 | Lecture: Alcohol Fermentation<br>Fermentation Lab: Brewing of Beer<br>Group 1 - Light Lager<br>Group 2 - Light Lager<br>Group 3 - Dark Lager<br>Group 4 - Dark Lager Fermentation Lab:;Yeast gas production method<br>(Groups 5-8) | 28日(日)孔子誕辰紀念日/教師節(放假),29日(一)補假 |
| 第4週 | 3.14~3.21 | Lecture: Alcohol Fermentation<br>Fermentation Lab: Brewing of Beer<br>Group 5 - Black Beer;<br>Group 6 - Black Beer;<br>Group 7 - Pale Ale (English Bitters) Beer;<br>Group 8 - Pale Ale (English Bitters) Beer;<br>Fermentation Lab:;Yeast gas production method<br>(Groups 1-4) | 29日成績優異提前畢業者提出申請截止日 |
| 第5週 | 3.21~3.28 | Lecture: Lactic Acid Fermentation;(& Vegetable Fermentation) Fermentation Lab: Baking of Sourdough<br>Weeks 17 & 18;Makeup Class; for Group 4 - :;March 26th (Sat.); 9AM - 4PM | 6日(一)中秋節(放假)，10日(五)國慶日(放假) |
| 第6週 | 3.28~4.04 | Fermentation;Lab: How to make Yoghurt<br>Fermentation Lab: How to make Cream;Cheese | 14日學生宿舍安全輔導暨複合式防災疏散演練。18日多益測驗 |
| 第7週 | 4.04~4.11 | No Classes<br>Course Exams (Take Home) | 24日(五)補假，25日(六)光復暨古寧頭大捷日(放假)。 |
| 第8週 | 4.11~4.18 | Fermentation Lab: Processing of Hot sauce; | 30日校課程委員會 |
| 第9週 | 4.18~4.25 | Mid-Semester Exams:<br>Lab: Sensory Evaluation/Analysis of Brewed Products | 3~9日期中考試 |

| | | | |
|---|---|---|---|
| 第10週 | 4.25~5.02 | Fermentation Lab: Processing of Kombucha | 13日教務會議,16日教師期中成績上網登錄截止日 |
| 第11週 | 5.02~5.09 | Lecture:;Applied Food Microbiology & Spoilage<br>OR<br>Tentative Field Trip | |
| 第12週 | 5.09~5.16 | In-Class Activity: Student Presentations: Fermented Foods Around the World Presentation Time: 30 minutesQ&A: 15 minutesGroup 1 - Fermented Foods from EgyptGroup 3 - Fermented Foods from JapanGroup 5 - Fermented Foods from Maylasia/ThailandGroup 7 -;Fermented Foods from Belize | 24~28體育運動週。24日校園路跑。27日運動大會夜間開幕，28日運動大會活動，29日101週年校慶活動日，照常上班 |
| 第13週 | 5.16~5.23 | ;In-Class Activity: Student Presentations: Fermented Foods Around the World Presentation Time: 30 minutesQ&A: 15 minutes<br>Group 2 - Fermented Foods from FranceGroup 4 - Fermented Foods from United KingdomGroup 6 - Fermented Foods from IndiaGroup 8 -;Fermented Foods from Egypt | |
| 第14週 | 5.23~5.30 | In-Class Activities<br>Video Presentation:<br>Bioprocessing;Purification<br>How to Make KimchiAfter watching the 2nd video, students are invited to make Kimchi at home (from scratch).;<br>We discuss the details during the virtual class session. | 12日申請停修課程截止日 |
| 第15週 | 5.30~6.06 | Fermentation;Lab: Bakery Foods Lab (Provided by Students)Group 1 - BrownieGroup 2 -; Chicken pasta BakeGroup 3 - Banana BreadGroup 4 - SourdoughGroup 5 - Kuih Serimuka (Baked Glutinous rice)Group 6 -; Banana BreadGroup 7 -; Cinammon RollGroup 8 -; Muffin ; ; | |
| 第16週 | 6.06~6.13 | Lab: (Group Activity)Select/prepare a | 22日校務會議。25日行憲紀 |

| | | | |
|---|---|---|---|
| | | fermented productGroup 1 - Fruit VinegarGroup 2 - PiklisGroup 3 - PitaGroup 4 - PizzaGroup 5 - Chinese Fritters/Group 6 - Naan/pickleGroup 7 - Hot Sauce ProcessingGroup 8 - White Toast | 念日(放假) |
| 第17週 | 6.13~6.20 | Pre-Final Exams: In-Class (3rd Year Students) Senior Students;(Group 4);Makeup Class; ;- Week 5:;March 26th (Sat.); 9AM - 4PM | 1日(四)開國紀念日(放假) |
| 第18週 | 6.20~6.27 | Final Exams:<br>Senior Students;(Group 4);Makeup Class; - Week 5:;March 26th (Sat.); 9AM - 4PM | 5~11日期末考試，10~11日學生退宿 |