開課班級: 博觀賞魚專班二A **授課老師: 歐卡爾** **學分數: 2**

課程大綱:

1. General principles of vaccination 2. Vaccination strategies in aquaculture 3. Important considerations for fish vaccines 4. Influence of environmental parameters on vaccination 5. Types of vaccines in aquaculture 6. Adjuvants and their mechanism of actions 7. Vaccine formulation, vaccine composition, quality control 8. Immunization against bacterial, viral pathogens and parasites 9. Vaccination failure and adverse effects of vaccination 10. Biosafety and regulatory requirements for fish vaccines 11. Future fish vaccines 12. Practical: Preparation of vaccines; quality control; vaccine administration by different routes; assessment of immune response to vaccination- agglutination test, ELISA, challenge studies

outline:

In this course, students will be trained on the aspects of fish vaccines, production and safety issues. Further, more emphasis will be given to the possible requirements of fish vaccines in aquaculture. In depth knowledge will be gained on the immunological response of fish vaccines and their protection mechanism from different infectious fish pathogens.

教學型態:

課堂教學+小組討論

成績考核方式:

平時成績:20%
期中考:20%
期末考:50%
其它:10 % attendance%

本科目教學目標:

To learn the concepts of vaccination and the latest trends in fish vaccination. Knowledge on fish vaccination will be developed through lectures, group discussion, assignment submissions, student presentations and through small scale laboratory experiments.

參考書目:

1. Thompson K.D., Roberts R.J. In: Fish Vaccines. 1st ed. Adams A., editor. Springer; Basel, Switzerland: 2016. 2. Gudding R., Goodrich T. The History of fish vaccination. In: Gudding R., Lillehaug A., Evensen Ø., editors. Fish Vaccination. 1st ed. John. Wiley & Sons, Inc.; New. York, NY, USA: 2014. pp. 1 – 11. 3. Plant K.P., LaPatra S.E. Advances in fish vaccine delivery. Dev. Comp. Immunol. 2011;35:1256 – 1262. doi: 10.1016/j.dci.2011.03.007. 4. Tafalla C., B ø gwald J., Dalmo R.A. Adjuvants and immunostimulants in fish vaccines: Current knowledge and future perspectives. Fish Shellfish Immunol. 2013;35:1740 – 1750. doi: 10.1016/j.fsi.2013.02.029. 5. Brudeseth B.E., Wiulsr ø d R., Fredriksen B.N., Lindmo K., L ø kling K.E., Bordevik M., Steine N., Klevan A., Gravningen K. Status and future perspectives of vaccines for industrialised fin-fish farming. Fish Shellfish Immunol. 2013;35:1759 – 1768. doi: 10.1016/j.fsi.2013.05.029. 6. Adams A. Progress, challenges and opportunities in fish vaccine development. Fish Shellfish Immunol. 2019;90:210 – 214. doi: 10.1016/j.fsi.2019.04.066.

課程進度表：

週次	起訖月日	授課單元(內容)	備註
第1週	9.08~9.15	Recent insights on fish vaccine and its importance in aquaculture	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	9.15~9.22		
第3週	9.22~9.29	General principles of fish vaccination. vaccination strategies in aquaculture.	28日(日)孔子誕辰紀念日/教師節(放假),29日(一)補假
第4週	9.29~10.06	Epidemiology studies for fish vaccines- what we need to understand from the field?	29日成績優異提前畢業者提出申請截止日
第5週	10.06~10.13	Several reasons for vaccine failure and adverse effects of fish vaccines- a possible scenario	6日(一)中秋節(放假)，10日(五)國慶日(放假)
第6週	10.13~10.20		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	10.20~10.27		24日(五)補假，25日(六)光復暨古寧頭大捷日(放假)。
第8週	10.27~11.03		30日校課程委員會
第9週	11.03~11.10	Presentation from students on topics related to advance in fish vaccination-2	3~9日期中考試
第10週	11.10~11.17	The mucosal immune system of fish and the importance of mucosal vaccination	13日教務會議,16日教師期中成績上網登錄截止日
第11週	11.17~11.24	Correlates of protective immunity for fish vaccines- A case studies	
第12週	11.24~12.01	Vaccines of the future PART I- New adjuvants, concepts on Reverse vaccinology, New approaches to vaccine administration	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	12.01~12.08	Vaccines of the future PART II - New approaches to antigen delivery issues affecting antigen presentation, viral vector vaccines, bacterial vector vaccines	
第14週	12.08~12.15	DNA vaccines in aquaculture species and its regulation.	12日申請停修課程截止日
第15週	12.15~12.22	Status and future perspectives of vaccines for industrialized fin-fish aquaculture	
第16週	12.22~12.29	Advances in fish vaccine delivery	22日校務會議。25日行憲紀

			念日(放假)
第17週	12.29~1.05		1日(四)開國紀念日(放假)
第18週	1.05~1.12	Final examination – assignment submission	5~11日期末考試，10~11日學生退宿