



# THE MODULE HANDBOOK

## FACULTY OF BIOLOGY

### Cytogenetics

<b>Module code</b>	BIO 40403
<b>Module level</b>	Undergraduate
<b>Abbreviation, if applicable</b>	-
<b>Sub-heading, if applicable</b>	-
<b>Courses included in the module, if applicable</b>	-
<b>Semester/term</b>	4, 6, 8 / even
<b>Module coordinator(s)</b>	Dr. Budi Setiadi Daryono, M. Agr. Sc.
<b>Lecture(s)</b>	Dra. Tuty Arisuryanti, M.Sc., Ph.D. Dr. Niken Satuti Nur Handayani, M.Sc. Ganies Riza Aristya, S.Si., M.Sc.
<b>Language</b>	Indonesia
<b>Classification within the Curriculum</b>	Elective
<b>Teaching format/class hours per week during the semester</b>	This course is organised into 2 parallel classes and planned to have 14 teaching weeks and 2 weeks of examination.
<b>Workload</b>	Estimated working hour: 2 credit of theory and 1 credit of practical working
<b>Credit points</b>	2-1 credits
<b>Requirements</b>	Genetics (BIO 30401)
<b>Learning goals/competencies</b>	<b>1. Knowledge and understanding</b> <ol style="list-style-type: none"><li>Able to apply the principles of cell biology, mendellian genetics, probability theory, sex determination, pedigree concept and inbreeding to solve problems in cytogenetics</li><li>Have a basic theory and instrumentation capabilities, furthermore apply the scientific method to conduct research cytogenetics</li><li>Conduct a holistic approach to solve problems and make plans, benefits, risks, safety, trust and environmental impact.</li><li>Able to discuss actively and effectively.</li></ol> <b>2. Ability/intelectual skill</b>



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- a. Capable to access information and communication technologies to find solutions in the scientific understanding of cytogenetics
- b. Able to plan, conduct, analyze and prepare report on cytogenetics
- c. Able to work independently and in groups.
- d. Face a new environment with passion and able to adapt in it.

### 3. Practical skill

- a. Access sequence data from GenBank for genetic variation analysis using bioinformatics
- b. Analyse genetic variation of a population using free software i.e. MEGA, MESQUITE, and DnaSP

### 4. Managerial and transferable skill

- a. Capable to communicate and implement researches in cytogenetics for plant, animal and human welfare, microbia.
- b. Able to anticipate and solve problems in cytogenetics field.
- c. Professionally responsible to scientific ethics and the impact of scientific advances in the society.

### 5. Attitude

- a. Devoted to God Almighty
- b. Appreciating to previous contributors (researchers) in cytogenetics
- c. Appreciating the role of experimental plant, animals, human, microbia as model in cytogenetics

### Content

Have knowledge and understanding (Knowledge and Understanding) on the basic concepts of the Cellular Genetics, the activity of chromosomes during the cell cycle and meiosis, the event failed to separate (non disjunction) either on autosomes and the sex chromosomes and the impact, the genes that play a role in cell cycle and the impact in case of mutations in these genes, chromosome mutations both changes in the number of chromosomes and chromosome structure changes, the factors that contribute to the mutation of chromosomes, karyotype and benefits, inheritance patterns that occur when there are changes in the structure of chromosomes, differences euploidi and aneuploidy, euploid and aneuploid pattern of inheritance, the impact in the event of changes in the structure and number of chromosomes, the sex chromosomes systems on a wide variety of organisms and mechanisms for determining the sex and inheritance patterns that occur, special chromosomes (chromosome salivary gland, chromosome lampbrush, and B chromosome), the pattern



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	of inheritance outside of the core and the difference with the core inheritance pattern, familiar techniques developed in cytogenetics and its application in various fields.
<b>Study/exam achievements</b>	Midterm 30 % Final Examination 40 % Presentation, attendance, and Activity: 30 % Practical (elaborate more) 100 % <ul style="list-style-type: none"><li>• Weekly test 20 %</li><li>• Lab Activity 15 %</li><li>• Lab Report 25 %</li><li>• Final Test 40 %</li></ul>
<b>Forms of media</b>	White board, LCD, video, animation, webinar
<b>Literature</b>	<ol style="list-style-type: none"><li>1. Campbell, N.A., L.G. Mitchell, and J.B. Reece. 2006. Biology. Concept and Connection. The Benjamin Cummings Publ.Co.Inc., California (USA)</li><li>2. Griffith, A.J.F., J.F.Miller, D.T. Suzuki, R.C. Lewontin, and W.M. Gelbart. 1999. An Introduction to Genetic Analysis. W.H. Freeman &amp; Co., New York (USA)</li><li>3. Klug, W.S. and R. Cummings. 2000. Concept of Genetics. 6<sup>th</sup>.ed. Prentice Hall Inc., New Jersey (USA)</li><li>4. Passarge, E. 2001. Color Atlas of Genetics. 2<sup>nd</sup>.ed. Thieme Stuttgart, New York (USA)</li><li>5. Popescu, P. &amp; B. Dutrillaux. 2000. Techniques in Animal Cytogenetics. Springer-Verlag. Berlin</li><li>6. Suryo. 1995. Sitogenetika. Gadjah Mada University Press, Yogyakarta.</li><li>7. Summer, A.T. 2003. Chromosomes. Organization and Function. Blackwell Publ. (UK)</li></ol>