



# THE MODULE HANDBOOK

## FACULTY OF BIOLOGY

### Phytohormones

<b>Module code</b>	BID 30903IUP
<b>Module level</b>	3 <sup>rd</sup> year of Undergraduate Program in Biology
<b>Abbreviation, if applicable</b>	-
<b>Sub-heading, if applicable</b>	-
<b>Courses included in the module, if applicable</b>	-
<b>Semester/term</b>	Odd
<b>Module coordinator(s)</b>	Dr. Kumala Dewi, M.Sc.St.
<b>Lecture(s)</b>	Dr. Kumala Dewi, M.Sc.St.
<b>Language</b>	English
<b>Classification within the Curriculum</b>	Elective
<b>Teaching format/class hours per week during the semester</b>	This course is organized into one class and planned to have 14 teaching weeks and 2 weeks of examination.
<b>Workload</b>	Estimated working hour: 10,5 hours/week.
<b>Credit points</b>	2-1 credits
<b>Requirements</b>	Plant Physiology (BIB 20901IUP)
<b>Learning goals/competencies</b>	<p><b>1. Knowledge and understanding</b> Students have knowledge and understanding on:</p> <ol style="list-style-type: none"><li>Chemistry and physical principal on structure and activity of hormone in plant cell.</li><li>Concept on principal and theory related to plant structure, function and reproduction.</li><li>Theory and materials for hormone analysis.</li><li>Natural processes related to function of hormone.</li><li>Application of plant hormones and growth relulator in agriculture or horticulture (for betterment of quality as well as improvement of plant productivity).</li></ol> <p><b>2. Ability/intellectual skill</b> Students have abilities to:</p> <ol style="list-style-type: none"><li>Carried out and make report on experiment related to plant hormones.</li><li>Prove hypotheses about role of plant hormones.</li><li>Integrated information from several sources (text book, internet, etc).</li></ol>



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### 3. Practical skill

Students have practical skills to:

- Planning and conducting appropriately on experiment/research related to plant hormones.
- Use effectively and efficiently of laboratory equipments for experiment or research.
- Analyze data and determine its truth.
- Use references and taking note effectively.
- Use computer programme.
- Writing and presenting scientific.

### 4. Managerial and transferable skill

Students have managerial and transferable skills to:

- Deliver presentation effectively.
- Group working.
- Implement and integrated knowledge on phytohormones into other related biological knowledges.
- Utilize information and communication technology.
- Organize resources and time efficiently.
- Learning independently with open minded.
- Learning effectively for self development.

### 5. Attitude

Students have attitudes to be:

- Have curiosity on new knowledges
- Appreciate original idea, concept and new discovery by others
- Observe and appreciate opinion of others

### Content

Phytohormones consists of several subtopics that cover the molecule structure, biosynthesis, metabolism, transport and function of phytohormones on plant growth and development. This subject will also discuss the application of plant hormones in agriculture and horticulture practices. In addition the methods for evaluating endogenous plant hormones will also be explained. Each plant hormone will be discussed in detail including the mechanism of hormone action in cell, tissue, organ and plant individual. The interaction between plant hormones will also be explained and discussed. The biosynthesis of hormones by rhizobacteria and its benefit for application as organic fertilizer will also be explained and discussed. Phytohormones is an election subject for students enrolled in Faculty of Biology UGM. Students undertake this subject should attend lectures of 2 credits and laboratory work of 1 credit. This subject is divided into 13 subtopics plus twice evaluations (mid semester exam and final exam). For laboratory work, students will be grouped and conduct experiments that have been prepared as well as to design a new mini project of their



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	own interest. In this mini project students will design, and carried out experiment and then present the result in class.
<b>Study/ exam achievements</b>	<p><b>1. Theory</b></p> <ul style="list-style-type: none"> <li>a. Midterm (30 %)</li> <li>b. Final examination (40 %)</li> <li>c. Mini review (20 %)</li> <li>d. Group presentation (10 %)</li> </ul> <p><b>2. Laboratory work</b></p> <ul style="list-style-type: none"> <li>a. Pretest (20 %)</li> <li>b. Report (30 %)</li> <li>c. Final test (30 %)</li> <li>d. Mini project (20 %)</li> </ul>
<b>Forms of media</b>	White board, LCD, notebook
<b>Literature</b>	<ol style="list-style-type: none"> <li>1. Chon, N.M.; N. Nishikawa-Koseki ; Y. Hirata ; H. Saka &amp; H. Abe 2000. Effects of Brassinolide on mesocotyl, coleoptiles and leaf growth in rice seedling. <i>Plant Prod. Sci.</i> 3 (4) : 360-365.</li> <li>2. Creelman, R. A. &amp; J. E Mullet 1997. Oligosaccharins, Brassinolides and Jasmonate: Nontraditional regulators of plant growth, development and gene expression. <i>The Plant Cell</i> 9 : 1211-1223.</li> <li>3. Davies, P.J. 1995. <i>Plant Hormones. Physiology, Biochemistry and Molecular Biology.</i> Kluwer Academic Publishers. Dordrecht/Boston/London.</li> <li>4. Hopkins, 1997. <i>Plant Physiology.</i> John Wiley &amp; Sons, New York.</li> <li>5. Jones, R., H. Ougham, H. Thomas and S. Waaland. 2012. <i>The molecular life of Plants,</i> Wiley-Blackwell</li> <li>Kanellis, A. K.; C. Chong : H. Kende &amp; D. Grierson (Eds.) 1997. <i>Biology and Biotechnology of Plant Hormone Ethylene.</i> Kluwer Acad., Publ., Dordrecht.</li> <li>6. Kende, H. &amp; J.A.D. Zeevaart 1997. The five classis plants hormones. <i>The Plant Cell</i> 9: 1197-1210.</li> <li>7. Lea, P. &amp; R.C. Leeggod (Eds.) 1999. <i>Plant Biochemistry and Molecular Biology.</i> John Wiley &amp; Sons Ltd. Chichester.</li> <li>8. Milborrow, B. V. 2001. The Pathway of Biosynthesis of abscisic acid in vascular plants: a review of the present state of knowledge of ABA biosynthesis. <i>J.Expt. Botany</i> 52 (359) :1-20.</li> <li>9. Mohr, H. &amp; Schopfer, 1995. <i>Plant Physiology.</i> Springer –Verlag, Berlin.</li> <li>10. Salisbury, F.B. &amp; C.W. Ross, 1999. <i>Plany Physiology.</i> Wadsworth Publishing Co., New York.</li> <li>11. Taiz, L. &amp; Ziegler, 1998. <i>Plant Physiology.</i> Sinnauer Associates, Inc. Publishers, Sunderland, Massachusets.</li> </ol>



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