# COURSE SYLLABUS AND ASSESSMENT TOOLS

## FST335 SENSORY EVALUATION OF FOODS

<table>
<thead>
<tr>
<th>Credit</th>
<th>3 (2-3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2 hours lecture and 3 hours laboratory work per weeks for 14 weeks)</td>
<td></td>
</tr>
</tbody>
</table>

| Semester      | 5       |

| Academic Year | 2011/2012 |

| Pre-requisite | Characteristics of Food Materials (FST332) and Statistics (STAT211) |

| Number of students | 110    |

| Delivery Method | Lecture and class discussion, independent study (literature search and homework), laboratory practice, statistical analysis and data interpretation, and report writing process. |

| Laboratory work | Students are divided into 4 groups (27-28 students per group) |

| Course Coordinator | Dede R Adawiyah |

| Contact | +62-251-8629855; +628128100413 |

| Lecturers | 1. Dede R Adawiyah (dede_adawiyah@yahoo.com)  
2. Budi Nurtama (nurtama@yahoo.com)  
3. Dias Indrasti (d_indrasti@yahoo.com)  
4. Elvira Syamsir (elvira_tpg@yahoo.com)  
5. Eko Hari Purnomo (ekohari_p@yahoo.com) |

| Laboratory work | 1. Dede R Adawiyah  
2. Budi Nurtama  
3. Elvira Syamsir  
4. Dian Herawati (dianherawati@yahoo.com) |

| Technician | Sri Martiani |

| Day and Time | Thursday, 9.40 – 11.20 am |

| Classroom  | AMN hall |

| Laboratory work | 1. Group I: Monday, 09.00 am – 12.00 pm  
2. Group II: Monday, 12.00 – 3.00 pm  
3. Group III: Tuesday, 1.00 – 4.00 pm  
4. Group IV: Wednesday, 9.30 am – 12.30 pm |

| Laboratory | Sensory Laboratory 1 (SEAFAST Center) |
I. Course Description

The Sensory Evaluation course discusses about using human senses to observe/measure food characteristics and acceptability, and its application in quality control and research. The course discusses the introduction of sensory attributes related to food products quality and acceptance; sensory mechanism; physico-psychological foundation in sensory testing; Good Sensory Practice, including requirements of sensory laboratory, panel preparation and selection, sample preparation in sensory testing; sensory testing methods; and statistic application in sensory data processing; and application of sensory evaluation in food industry. This course also covers laboratory work in order to improve student’s success skill.

II. General Learning Outcomes

After completing this course, the students are expected to be able to make a decision to choose the right method of sensory test, panelist and sample handling to minimize bias according to objective of project (quality control, product development, research). The students are also expected to have ability to analyze the sensory data using statistics role and to conclude the result. In relation to learning outcomes recommended in IFT education standard, after completing this course, students are expected to learn:

1. The basic principles of sensory analysis and their application in food product development and food quality assurance.
2. The source and variability of raw food material and their impact on food processing operations.
3. The principles of sensory evaluation in practical, real-world situations and problems
4. Application of computers to solve problems related to sensory evaluation of foods.
5. Application statistical principles in analysis of sensory evaluation data.
6. Application the principles of sensory evaluation to control and assure the quality of food products.

This course also contributes to the improvement of success skill, especially the student’s skill to demonstrate the use of oral and written communication skills, commit to the highest standards of professional integrity and ethical values, work and/or interact with individuals from diverse cultures, work effectively with others, competently use library resources, manage time effectively, handle multiple tasks and pressures.

III. Specific Learning Outcomes

Upon successful completion of this course, student will be able to:
1. Describe the characteristics and roles of sensory testing in food industry (C2, comprehension).
2. Describe sensory attributes on food product (C2, comprehension-analysis).
3. Describe the influence of physicochemical and psychological factors on sensory testing to anticipate the kind of psychological errors in sensory testing (C2, comprehension).
4. Conduct sensory tests that comply with good sensory practices and demonstrate how to organize laboratory requirement, prepare and sample serving, and panel preparation (C3-C4, application-analysis).
5. Use and compare different types of different test (coverall and attribute difference test) in food process control and food quality (C3-C4, application-analysis).
6. Apply and compare descriptive tests to identify and characterize the sensory properties of foods (C3-C4, application-analysis).
7. Apply and compare types of affective tests (qualitative and quantitative) in food product acceptance (C3-C4, application-analysis).
8. Apply the principle and statistical methods to analyze sensory data and evaluate the results (C3-C6, application-evaluation).

IV. Textbooks and Lecture Notes
A. Textbooks
5. O’Mahony, M. Sensory Evaluation of Foods. Marcel Dekker, Inc., NY, USA.

B. Lecture Notes
2. Lecture note (ppt and pdf file) are also available in web at www.seafast.ipb.ac.id/moodle/sensory

V. Course Outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Sub-topics</th>
<th>Lecturers</th>
</tr>
</thead>
</table>
| 1    | Course Introduction | • Scope, objective, rule and assessment tools in course  
        • Understanding characteristics and importance of sensory evaluation in food industry | DRA/BNU |
| 2    | Statistical Principle in Sensory Testing | • Type of scale in sensory evaluation  
        • Binomial distribution  
        • Chi-square and Friedman  
        • Analysis of variance | DRA/BNU |
| 3,4  | Sensory Attribute and Sensory Mechanism | • Appearance (vision)  
        • Odor/aroma/fragrance (olfaction)  
        • Consistency and texture (touch and tactile)  
        • Flavor (gustation, chemical and trigeminal)  
        • Noise (hearing) | DRA/BNU |
| 5    | Physiology and Psychology Principle in Sensory Testing | • Physiological factors  
        • Psychological factors  
        • Sensory threshold | DRA/DIN |
| 7,8  | Good Sensory Practice | • Laboratory requirement  
        • Preparation and sample serving  
        • Preparation of sensory panel | DRA/BNU |
| 9,10 | Difference Test | • Overall difference test  
        • Attribute difference test | DRA/DIN |
| 11   | Descriptive Test | • Descriptive panel  
        • Quantitative descriptive analysis  
        • Spectrum descriptive analysis  
        • Time intensity analysis | DRA/DIN |
| 12,13| Affective Test | • Quantitative methods  
        • Qualitative methods | DRA/BNU |
| 14   | Application of Sensory Testing | • Sensory evaluation in food product development  
        • Sensory evaluation in quality control | GUEST LECTURE |

Note: DRA (Dede R Adawiyah), WAY (Waysima)

Laboratory Work Outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Sub-topics</th>
<th>Instructors</th>
</tr>
</thead>
</table>
| 1    | Introduction to Laboratory/Practical Class | • Arrangement of group member or team work  
        • Rules and structure of sensory laboratory practical class | DRA |
<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Sub-topics</th>
<th>Instructors</th>
</tr>
</thead>
</table>
| 2, 3 | Statistical Computer Program for Sensory Data Analysis | • Guidelines of report writing in form of log book  
• Binomial (excel spreadsheets)  
• Chi-square, Friedman test (SPSS)  
• Analysis of variance (SPSS)  
• Student t-Test (excel) | BNU |
| 4    | Sensory Attribute Perception | Sensory attribute perception | DHE |
| 5    | Sensory Threshold | Detection and Recognition threshold | DRA |
| 6    | Difference Test | • Triangle test,  
• Duo trio test  
• Two out of five test | ESY |
| 7    | Difference Test | • Simple difference test  
• Directional difference test | ESY |
| 8    | Difference Test | Different from control test | DHE |
| 9    | Affective Test | • Simple ranking  
• Pairwise ranking test | DHE |
| 10   | Rating Test | • Category scale  
• Line scale | DHE |
| 11   | Panel Selection | • Matching test (basic taste)  
• Descriptive or basic odor/ aroma  
• Acuity test (triangle test) | DRA |
| 12   | Descriptive Test | • Quantitative descriptive test  
• Focus group discussion | DRA |
| 13   | Presentation of Group Assignment | | DRA, ESY, DHE, DIN |

Note: DRA (Dede R Adawiyah), DHE (Dian Herawati), ESY (Elvira Syamsir), DIN (Dias Indrasti)

VI. Structure of Laboratory/Practical work:

1. Students are divided into four groups. Each group is further divided into 8 sub-groups consisting of 3-4 students per sub-group). The sub-group works as a team to meet laboratory work requirement.
2. Student attendance in all scheduled laboratory work is compulsory. For legitimate excuses supported by written permission, one may attend laboratory session in another group.
3. There are two groups in every laboratory practice with different activities: Group I act as a panel leader group and Group II acts as panel group. A panel leader group consists of 3-4 students responsible to manage the practical work. The panel is responsible to test the samples provided by the panel leader group.
4. There are four laboratory practical assistants recruited from four-year students. They are responsible to supervise group activities.
5. Refer detail explanation of laboratory activities and working schedule of each group in your laboratory manual.
VIII. Assessment Tools

A. Written Examinations

1. Mid and final written examinations will be held during examination period scheduled by the Register’s office.
2. The mid and final examinations will cover course topics delivered in week 1-7 and 8-14, respectively.
3. Each written examination will be composed of multiple choice questions (with 4-5 options) and essay at different cognitive levels. Time allocation: 120 minutes. Maximum scores: 100.
4. Dishonesty or cheating during examination, such as obtaining or receiving illegal help or obtaining unauthorized information about an examination beforehand will result in failure of the course. Disciplinary actions will be imposed if a student is found to have seriously violated any of the rules contained in the Code of Conduct: warning, reduction of grades, suspension or expulsion.
5. Answer keys and scores will be posted on announcement board soon after exam papers are graded.
6. The following are samples of questions at different cognitive levels.

Example 1 (C1 Knowledge)
Consumer panel is:
A. Trained panel
B. Semi-trained panel
C. Untrained panel
D. Expert panel
E. A and C are correct

Example 2 (C2 Comprehension)
In rating attribute test, how to decrease standard deviation of score between panel:
A. Sequence of tasting should be the same
B. Number of sample is uniform
C. Using reference sample
D. Increase the number of panel
E. All the answers are correct

Example 3 (C3, application)
Which panelist selection and training criterion should not be applied to all sensory test situations?
A. consistent correct responses
B. healthy personnel status
C. lack of food allergies
D. socioeconomic level and cultural background
E. ability to recognize duplicate samples

Example 4 (C4 Analysis)
Determine stimulus threshold from the data by BET methods (ASTM) and frequency method!
### Example 5 (C6: Evaluation)

A leading beverage company produced a soft drink that has been accepted widely by consumers. To fulfill health issue, the company wants to produce new variant with low calorie claim by replace usual sweetener (sucrose) with other low calorie sweeteners without any sensory difference. Please explain the right sensory methods in every sequence of product development!

### B. Individual Assignment

1. There are three topics of individual assignment: (1) Assessment of Sensory Laboratories lay out and condition at SEAFAST Center compared to sensory laboratory standard; (2) Correlation of objective and subjective/sensory measurement; (3) Review a journal article related to sensory testing.

2. Assignment must be submitted in the form of electronic file by uploading the file in Learning Management System (LMS) for Sensory Evaluation course at www.seafast.ipb.ac.id/moodle/sensory. The uploading of assignment will be rejected if the paper submission exceeds the due date. Late paper submission will receive zero point.

3. The score will range from 50-100. The paper grading is based on the completeness of information and the availability of cited references.

4. Zero grades will be given to any plagiarism. Plagiarism includes any work copied in whole or in part from another individual’s work.

### C. Group Assignment: Writing Paper and Oral Presentation

1. The member of group is the same with laboratory practical work.

2. Each group is responsible to write a paper regarding the use of sensory methods as a tool in evaluation of food product quality. Group must evaluate the suitability of selected sensory methods, assigned panel, samples presentation, data processing methods and the result related to sensory attributes.

3. The paper is presented orally in week 13 during laboratory work session.

4. The score will be based on the qualities of paper (50%) and oral presentation (50%).
5. The paper is graded based on the following criteria (maximum score for each criteria is 100): (1) Clarity and accuracy of case study description stated in introduction section (25%), (2) Arguments stated in literature review section (40%); (3) Conclusion (15%), (4) Cited references (10%), and (5) Writing structure (10%).

6. The oral presentation is graded based on (1) clarity and accuracy of information delivered during oral presentation (40%); (2) ability to answer the questions during discussion session (40%); and (3) presentation technique (20%). Evaluation and grading of oral presentation is based on the following rubric.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Excellent (90-100)</th>
<th>Strong case (80-89)</th>
<th>Developing (70-79)</th>
<th>Limited (60-69)</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material presentation quality</td>
<td>Power point presentation is very clear (font selection and arrangement, color combination, visibility of character), systematic, free of word error, excellent appearance, not wordy, free of plagiarism.</td>
<td>Power point presentation is clear (font selection and arrangement, color combination, visibility of character), systematic, some of word error, excellent appearance, not wordy, free of plagiarism.</td>
<td>Power point presentation is less clear (font selection and arrangement, color combination, visibility of character), systematic, some of word error, excellent appearance, not wordy, free of plagiarism.</td>
<td>Power point presentation is not clear (font selection and arrangement, color combination, visibility of character), a lot of word error is found, very wordy, no illustration, not well prepared, unoriginal use of information.</td>
<td>25</td>
</tr>
<tr>
<td>Clarity and accuracy of information delivered during oral presentation</td>
<td>Information is delivered clearly (1), strong background and relevant cited references (2), strong explanation or discussion (3), clear and correct conclusion/recommendation (4), precise choice of word(s) (5)</td>
<td>Meet of &gt;3 criteria assessment</td>
<td>Meet of 1-2 criteria assessment</td>
<td>Information of the case is not clear, a lot of missing or inaccurate information, inaccurate citation, source of information is not clear, no clear or irrelevant conclusion or recommendation inappropriate use of word(s)</td>
<td>25</td>
</tr>
<tr>
<td>Ability to answer the questions during discussion session</td>
<td>Very clear and correct explanation with strong rational argument, with the support of relevant cited references</td>
<td>Clear and correct explanation with strong rational argument, with the support of relevant cited references</td>
<td>Clear and correct explanation with weak rational argument, with the support of less relevant cited references</td>
<td>Unclear and irrational explanation, fail to answer the questions, comment is not taken seriously</td>
<td>25</td>
</tr>
<tr>
<td>Presentation</td>
<td>On time</td>
<td>Meet of &gt;3</td>
<td>Meet of 1-2</td>
<td>Longer or</td>
<td>25</td>
</tr>
</tbody>
</table>
### Criteria and Assessment Tools

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Excellent (90-100)</th>
<th>Strong case (80-89)</th>
<th>Developing (70-79)</th>
<th>Limited (60-69)</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>technique and communication with audience</td>
<td>presentation (1), excellent interaction with audience (such as body language supports the delivery of presentation materials) (2), loud and clear pronunciation (3), self confident (4), empathic towards audience in answering questions (5).</td>
<td>criteria assessment</td>
<td>criteria assessment</td>
<td>shorter presentation than allocated time, no interaction or empathy with audience, unclear pronunciation, loss of orientation, no self confidence or over confident.</td>
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</tbody>
</table>

### D. Student Activities and Laboratory Report

Laboratory practical work is mostly assigned to evaluate the success skills, such as ability in oral and written communication, work and/or interact with individuals from diverse cultures (in a group), work effectively with others, manage time effectively, handle multiple tasks and pressures.

In each practical work, there are two groups, the panel leader group and the panel group. The panel leader group will be evaluated in terms of their success skills in terms of (1) presenting on time (individual mark); (2) preparing group worksheet and score sheet; (3) readiness to conduct the practical work, (4) clearness of briefing, and (5) responsibility of used equipments and food materials. Evaluation and grading of student’s laboratory work is based on the following.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Excellent (90-100)</th>
<th>Good (75-90)</th>
<th>Limited (60-75)</th>
<th>No grade (0)</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance/ Punctuality</td>
<td>Panel group: Student attends before instruction session by panel leader</td>
<td>Panel group: Student attends at the time of instruction session</td>
<td>Panel group: Student attends after instruction session</td>
<td>Student does not attend the lab work</td>
<td>20</td>
</tr>
<tr>
<td>Panel leader group: Student attends before preparation session</td>
<td>Panel leader group: Student attends at the time of preparation time or 5 minutes after the session begin</td>
<td>Panel leader group: Student attends after 5-15 minutes after the session begin</td>
<td>student attends more than 15 minutes after preparation begin or does not attend in preparation session</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation</td>
<td>Panel group: Student correctly answers 90-100%</td>
<td>Panel group: Student correctly answers 80-89% of</td>
<td>Panel group: Student correctly answer 60-79%</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Criteria</td>
<td>Excellent (90-100)</td>
<td>Good (75-90)</td>
<td>Limited (60-75)</td>
<td>No grade (0)</td>
<td>Weight (%)</td>
</tr>
<tr>
<td>--------------</td>
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<tr>
<td>of pre-lab</td>
<td>pre-lab</td>
<td>of pre-lab</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Panel leader group:  
Student has well prepared worksheet and questionnaire | Panel leader group:  
Student has not fully prepared worksheet and questionnaire |                |             |            |
| Participation | Student fully active participates and contributes in group (for panel leader group) or class (for panel group) at the whole lab work | Student less active participates and contributes in group (for panel leader group) or class (for panel group) at the whole lab work | Student passively participates and contributes in group (for panel leader group) or class (for panel group) at the whole lab work | 30 |
| Behavior     | Student behaves accordingly and shows professional ethics with no disruption |                | Student behaves inappropriately, often disruptive and unaware of ethics | 20 |

The panel will be evaluated in terms of (1) presence on time (individual mark), (2) pre-lab quiz, and (3) individual report. Evaluation and grading of laboratory report is based on the following rubric.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Excellent (90-100)</th>
<th>Strong case (80-89)</th>
<th>Developing (70-79)</th>
<th>Limited (60-69)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall writing format</td>
<td>Sentences vary in length and well formed (1), word choice is consistently precise (2), writing is free of error (3), and writing format obeys the writing guideline (4), free of plagiarisms or other inappropriate use of information (5).</td>
<td>Meet of 3-4 criteria assessment</td>
<td>Meet of 1-2 criteria assessment</td>
<td>Paragraph is poorly constructed and disorganized; full of plagiarisms; frequent typographic error</td>
</tr>
<tr>
<td>Logical framework</td>
<td>Flow of thinking is very clearly reflected in the paper. There is very clear link between subsequent parts of the paper. Critical analysis is used to evaluate the data or information</td>
<td>Flow of thinking is clearly reflected in the paper. There is clear link between subsequent parts of the paper. Critical analysis is used to evaluate</td>
<td>Flow of thinking is less clear reflected in the paper or report. There is less clear link between subsequent parts of the paper. Critical analysis is less used to</td>
<td>No clear connection between subsequent parts of the paper.</td>
</tr>
</tbody>
</table>
## Course Syllabus and Assessment Tools

### IX. Grading

<table>
<thead>
<tr>
<th>Assessment Tools</th>
<th>% of Grade</th>
<th>Maximum Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Quiz</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Pre-lab</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Lab work participation</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Midle Examination</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Final Examination</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Assignment</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total Score</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Grade classification:
A ≥ 80; AB: 75-79; B: 70-74; BC: 65-69; C: 55-64; D: 45-54; E< 45
# Assessment Tools to Measure the Achievement of Learning Outcomes in Sensory Evaluation of Foods Course (FST 335)

<table>
<thead>
<tr>
<th>Code</th>
<th>Learning Outcomes</th>
<th>Topics Covered in this Course</th>
<th>Cognitive Levels</th>
<th>Assessment Tools</th>
</tr>
</thead>
</table>
| IV.C.1 | be able to apply statistical principles to food science applications (cover in some extend) | ▪ Statistical principle and methods in data analysis and to conclude determination from sensory testing. | C4 | ▪ Written exam  
 ▪ Assignment  
 ▪ Group assignment  
 ▪ Laboratory work written (reports) |
| IV.D.1 | be able to apply the principles of food science to control and assure the quality of food products (cover in some extent) | ▪ Characteristics and function of sensory testing in food industry  
 ▪ Sensory methods (difference/discriminaton test, descriptive test and affective test)  
 ▪ Methods of sensory testing to solve the problem that related with food product development and quality assurance. | C1-C4 | ▪ Written examinations  
 ▪ Group assignment (paper & presentation)  
 ▪ Laboratory work (reports, team work, quiz) |
| IV.E.1 | understand the basic principles of sensory analysis (cover in detail) | ▪ Characteristics and function of sensory testing in food industry.  
 ▪ Sensory attributes entitled on food product and sensory mechanism  
 ▪ Physiological and psychological factors on sensory testing to anticipate the kind of psycho-logical errors in sensory testing  
 ▪ Good sensory practices including laboratory requirement, preparing and serving sample, and panel preparation.  
 ▪ Scope, principles, | C2-C4 | ▪ Written examinations  
 ▪ Individual assignment  
 ▪ Group assignment (paper & presentation)  
 ▪ Laboratory work (reports, team work, quiz) |
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<tr>
<td></td>
<td></td>
<td>objectives, and to apply sensory methods (difference/discrimination test, descriptive test and affective test)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI.A.1</td>
<td>demonstrate the use of oral and written communication skills (cover in some extent)</td>
<td>▪ Laboratory report, individual assignment and group assignment (paper and presentation) ▪ A good panel leader group</td>
<td>C3-C6</td>
<td>▪ Laboratory practical work ▪ Individual assignment ▪ Group assignment</td>
</tr>
<tr>
<td>VI.C.2</td>
<td>work and/or interact with individuals from diverse cultures (cover in detail)</td>
<td>▪ A team work in laboratory group ▪ Laboratory report in a tight schedule</td>
<td></td>
<td>▪ Students activity in laboratory practical work ▪ Group assignment</td>
</tr>
<tr>
<td>VI.E.1</td>
<td>work effectively with others (cover in some extent)</td>
<td>▪ A good panel leader group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI.E.2</td>
<td>provide leadership in a variety of situations (cover in some extent)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI.G.1</td>
<td>manage time effectively (cover in some extent)</td>
<td>Work in laboratory effectively</td>
<td></td>
<td>▪ Students activity in laboratory practical work</td>
</tr>
<tr>
<td>VI.G.2</td>
<td>facilitate group projects (cover in some extent)</td>
<td>Finish report in tight schedule with targets stated in logbook</td>
<td></td>
<td>▪ Laboratory report</td>
</tr>
</tbody>
</table>