GUIDELINES TO DESIGNING SYLLABI: WRITING INSTRUCTIONAL GOALS AND LEARNING OUTCOMES

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1. Brief introduction

International, European and national guidelines underline the increasing importance of promoting a student-centered approach to instruction that engages students in the teaching and learning process and helps them develop professional, cultural and social competences of value to society.

To create a student-centered classroom, professors have to reformulate their teaching and assessment practices so that the focus is on what the students "take home" from their educational path, in other words, on the intended outcomes of their learning. This applies to the entire Program of Study (where learning outcomes are stated in the program's regulations) and to the individual courses as well (where learning outcomes are stated in the syllabus).

One of the methodologies helping professors in this process is *constructive alignment,[1]* a design approach that contributes to constructing a consistent *learning environment* where teaching methods and assessment practices are aligned to the intended learning outcomes of the course.

This brief guide offers operating guidelines to writing the teaching syllabus and, more specifically, to defining educational goals and learning outcomes, considering them crucial for improving teaching activities and moving towards a *student-centered approach.*

2. Instructional goals and intended learning outcomes

Instructional goals: These communicate the general aim of the teaching activity and provide the content of the course and its relation to the rest of the program:
- They give direction to the course
- They are broader than learning outcomes.

Intended Learning Outcomes: These describe what a learner is expected to know, understand and be able to demonstrate after completion of a learning path.

Intended learning outcomes are measurable (theoretic knowledge and practical/methodological, applied skills) and are useful because[2]:
- They clarify expected knowledge and skills;

- They clearly communicate to students what is expected of them;

- They indicate the level of learning achieved;

- They are a way to show the connection between their learning and the assessment;

- They act as a showcase of information for other faculty members, students and stakeholders;

- They can help in measuring the workload;

- They can be used as a benchmark for similar courses.

Instructional goals and intended learning outcomes are both useful in that they keep the endpoint in mind. They state what the professor intends to accomplish with his or her teaching activities and, therefore, the expectations for student learning. For this reason, in writing the syllabus we propose the following:

- **Define the instructional goal(s) concisely and in general terms**
  The course aims to provide students with the basic principles of…
  The course aims to provide students with a general understanding of…

> *The purpose of the course is to introduce the topic of…*
> *The purpose of the course is to have students acquire knowledge and understand...*
> - **Provide from 3 to 8 intended learning outcomes that specify the general goal and the different cognitive processes (see taxonomies)**
> *By the end of this course, students are expected to be able to…* (see point 3 of this document)

3. Components of Intended Learning Outcomes

From reading the intended learning outcomes, students should have a clear vision of **what they are expected to know, understand and/or be able to demonstrate after completion of a learning process**.
Intended learning outcomes:
- Should be written with clear, understandable language and from the student's point of view (by the end of the course, *the student is expected to be able to…*");
- Should identify the level of performance or understanding required of the student (see paragraph 4) and the content that has to be learned;
- Should be measurable through a final assessment (that verifies "if and how well" the student has attained the intended learning outcome).

Therefore, an intended learning outcome should be made up of three elements:
1. a *VERB* that indicates what the student is expected to know and to be able to do at the end of the learning path;
2. a word(s) that indicate «on what» or «with what» the student is acting (generally the **OBJECT** of the verb);
3. a word(s) that indicate the nature (the **CONTEXT** or standard) of the required performance.

[After writing the intended learning outcome, we recommend reviewing it for consistency and completeness].

EXAMPLES:

VERB/DESIRED ACTION	OBJECT/CONTENT	CONTEXT
A. *Mechanical and electrical engineering* course: By the end of this course, students will be able to:		
DESCRIBE	The fundamental principles of the kinematics and kinetics of machinery and the concepts of stress and stress analysis	
SOLVE	mechanical problems	*that involve loading and motion*
PRESENT IN WRITING	analyses and results of experiments	*to qualified professionals who will be able to follow the process and obtain similar results*
B. Chemistry course: By the end of this course, students will be able to:		
DEMONSTRATE WORKING KNOWLEDGE	of the quantitative approach to physics and chemistry	
APPRECIATE THE IMPORTANCE	of thermodynamics and statistical mechanics	*for biological systems*
REVIEW	scientific articles	*in magazines and simple texts*
C. Philosophy course: By the end of this course, students will be able to:		
DEFINE	The fundamental structures of a philosophical argument	

ACQUIRE	the basic vocabulary	*needed to allow students to engage with theoretical problems without error*
UNDERSTAND	essential secondary literature	*with the purpose of preparing critical tools for speculative investigations*

4. How to write intended learning outcomes: 5 steps[3]

1. **Establish the general purpose of the course**: *Why is this course being taught? What is it for?* (see paragraph 2 on defining general instructional goals).

2. **Identify the main contents (object of the action):** *In formulating each learning outcome, teachers should start by defining the content that the students will learn during the course*

3. **Select desired cognitive levels and, accordingly, the verbs**: *Depending on the location of the unit within the whole program and on the contents offered, professors define the level of cognitive activity in relation to the content. Are students required to memorize the content? Or to understand it? Apply it? Analyze it? Evaluate it? Create it? There may be different levels and they can be of increasing complexity. In addition, TAXONOMIES can be used to help in the choice. Each level can be expressed with a corresponding verb (see paragraph 5).*

4. **Add context information (if necessary):** *This part may or may not be present in formulating a learning outcome. However, it can be useful because it fixes the range of action requested of the student (which can be of varying complexity) or the objective of the action.*

5. **Review your work to ensure clarity**: *The purpose of this final step is to review all the parts making up the intended learning outcome to ensure they are clear. It might be useful to show it to a colleague or a person outside of your organization and ask if it is easily understood.*

5. Taxonomies

Taxonomies classify learning domains in hierarchical form, and proceed from the simplest to the most complex forms of action. They are useful because[4]:

- they constitute the basis for defining the intended learning outcomes of a course and the cognitive processes required of students;
- they create a common language to communicate intended learning outcomes;
- they are a way to determine if intended learning outcomes are aligned with teaching and assessment activities;
- they offer a good standard of reference, helping to avoid constructing only basic-level learning outcomes.

Table 1 on page 7 shows a taxonomy[5] that can help professors choose desired cognitive levels (based on the content of the field of study and on the context) and also the most suitable action verb to define the intended learning outcome.

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[3] Source: adapted from http://www.teaching-learning.utas.edu.au/home

[4] Bloom, B.S. (1956). *Taxonomy of educational objectives: The classification of educational goals*. Handbook 1. Cognitive domain. New York: Longman.

[5] Bloom (1956) created a taxonomy of educational objectives (what students are expected to learn by the end of a learning activity), later revised by Anderson and Krathwohl, former students of Bloom (2001)

6. Constructive Alignment: from defining intended learning outcomes to choosing teaching, learning and assessment methods

Constructive Alignment [6] is an approach to designing teaching and learning activities that aims at constructing a consistent learning environment where teaching methods, learning activities and assessment practices are "aligned" with intended learning outcomes.

The "constructive" aspect draws from the constructivist approach to learning, whereby a person, in his or her interaction with the context, has an active role in his or her learning. Students, in fact, construct meaning through relevant learning activities. For this reason, if they know what the intended learning outcomes are and what level of learning they are required to attain, they are likely to be more motivated and interested in the contents and activities planned by the professor to help their learning.

The "alignment" aspect refers to the fact that the components of the teaching system - teaching methods and assessment tasks, in particular - have to be consistent with and aligned to the learning activities assumed in the intended outcomes. Biggs & Tang[7] structured this theory in subsequent steps:

1. **Clearly define intended learning outcomes** (expressed by verbs) by following the steps described above and specifying what the students will know and will be able to do by the end of the course.

2. **Choose teaching[8] and learning[9]** activities and resources that will allow students achieving and demonstrating the intended learning outcomes (methods, materials, support material…), creating an appropriate learning environment.

3. **Construct appropriate assessment tasks** to evaluate how well students are achieving the intended learning outcomes, judging their performance based on the level attained (from the lowest to the highest level of achievement of the learning outcome).

4. **Transform the judgment into a grade** according to the standard in use.

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[6] Biggs J., Tang C (2007)., *Teaching for Quality Learning at University*, Buckingham: Open University Press/McGraw Hill

[7] Biggs J., Tang C (2007)., *Teaching for Quality Learning at University*, Buckingham: Open University Press/McGraw Hill, pp.54-55

[8] Teaching activities are those set up by teacher to allow students to achieve the intended learning outcomes, for example, lessons, seminars (small group teaching), closed seminars, research seminars, exercises, workshops (hands-on classroom lessons), labs, demonstration lessons, internships/work placements, on-the-job practice, field work, online, distance or e-learning, etc.

[9] Learning activities refer to the actions taken by students to achieve intended learning outcomes, for example: attend lessons, read books and periodicals, research relevant material at the library and online, read or study text and other materials, summarize, learn to pose problems and resolve those posed by the teacher, conduct increasingly complex independent or group research projects (even if small-scale), practice technical, math or lab skills; practice professional skills, do research and write essays and reports; work with other students to co-produce an essay, a project, the solution to a problem; prepare and deliver oral presentations, both independently and with a group; constructively critique the work of others and make constructive use of the critique of others; chair a meeting (a seminar group, for example) or participate in a constructive manner; lead a group or be a collaborative part of one; work under tight deadlines, communicate questions and findings to others using various media, learn how to critique one's own work.

	Lower order thinking skills ⟶			Higher order thinking skills		
Main categories	**Remembering**	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Sample verbs	**Recognizing** • identifying **Recalling** • retrieving	**Interpreting** • clarifying • paraphrasing • representing • translating **Exemplifying** • illustrating • instantiating **Classifying** • categorizing • subsuming **Summarizing** • abstracting • generalizing **Inferring** • concluding • extrapolating • interpolating • predicting **Comparing** • contrasting • mapping • matching **Explaining**	**Executing** • carrying out **Implementing** • using	**Differentiating** • discriminating • distinguishing • focusing • selecting **Organizing** • finding coherence • integrating • outlining • parsing • structuring **Attributing** • deconstructing	**Checking** • coordinating • detecting • monitoring • testing **Critiquing** • judging	**Generating** • hypothesizing **Planning** • designing **Producing** • constructing

		• constructing models				

Table 1: Taxonomy of educational objectives [10]

7. Other Elements for a Complete Syllabus

Intended learning outcomes are a crucial part of a syllabus but students can find useful course information in other sections as well. Below you will find a *template* used by the University of Trento (viewable and fillable on Esse3), including brief instructions on how to fill it out. There are also two complete examples from two courses offered by one of the University's Programs.

Esse3 required sections of the syllabus	Instructions on what to write	Example from the "Economy of the environment and region" course, taught by professors G. Gios and R. Raffaelli for the Sustainability and Tourism Management master's degree program	Example from the "Service and Tourism Business Management" course, taught by professor M. Franch for the Sustainability and Tourism Management master's degree program[11]
Instructional goals and intended learning outcomes	Intended learning outcomes specify the knowledge (theoretical) and skills (practical, methodological, applied, etc.) that students must acquire through the course. State the specific purpose of the course, specifying what students are required to "know" and "know how to do" by the end of the lessons.	The instructional goal of the course is that of developing knowledge about: 1) the role of the environment in the economic system and in local development, and its relationship with tourism-related activities; 2) the various aspects of the concept of "sustainability" and related indicators; 3) the assessment methods aimed at estimating the economic impact of projects that entail changes to the quality of the environment; 4) cost-benefit analysis. Regular and active participation in the three teaching activities offered by the course (lectures, thematic research seminars, multidisciplinary laboratory) and in independent research activities will enable students to: a) recall the primary models applied in environmental economics; b) exemplify the different economic values associated to an environmental product/service; c) compare the various different environmental and sustainability indicators;	The instructional goal of the course is acquiring the knowledge and competences for the sustainable management of public and private businesses and organizations, including those working in the tourism sector. Regular and active participation in the three teaching activities offered by the course (lectures, thematic research seminars, multidisciplinary laboratory) and in independent research activities will enable students to: - pinpoint the relevant aspects of a management problem; - organize and integrate the data and information needed for finding a solution; - compare methods and tools discussed during the course and choose the ones most suited to the solution; - apply the method that is more aligned to the sustainable approach; - assess the applicability of customer satisfaction detection and measurement methods;

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[11] The "Service and Tourism Business Management" master's program, which was activated in the 2015-16 academic year, designed its course catalogue using the constructive alignment method.

Esse3 required sections of the syllabus	Instructions on what to write	Example from the "Economy of the environment and region" course, taught by professors G. Gios and R. Raffaelli for the Sustainability and Tourism Management master's degree program	Example from the "Service and Tourism Business Management" course, taught by professor M. Franch for the Sustainability and Tourism Management master's degree program[11]
		d) apply the indicators in assessing tourism sustainability in specific local contexts; e) weigh up the best non-demand curve approach to use for assessing the value of different types of environmental products and services; f) critically assess cost and benefit analyses. In terms of transversal skills, active participation in all of the teaching activities offered will enable students to learn how to organize group work, apply problem-solving techniques, and deliver a presentation, supporting the results achieved with compelling arguments.	- assess and use portfolio management and customer loyalty management methods. In terms of transversal skills, active participation in all of the teaching activities offered will enable students to learn how to organize group work, apply problem-solving techniques, and deliver a presentation, supporting the results achieved with compelling arguments.
Prerequisites	State the specific basic knowledge and/or skills that students must have before starting the course	Students must know the fundamentals of Microeconomics.	Students must know the fundamentals of Marketing and Business Economy and be inclined to integrate this knowledge with the knowledge they will acquire, to formulate consistent and complete answers to research questions arising out of the course and laboratory work.
Content/ program of the course	State the primary contents of the course in the order they will be presented.	The course program includes presentation and discussion of the following subjects: - Sustainability and sustainable development: definitions, evolution over time - Sustainable development and the environment: supplementations to Solow's model - The environmental Kuznets curve - Environmental indicators, PSR and DPSIR model and sustainability indicators - Sustainability and tourism	The course program includes presentation and discussion of the following subjects: - Origins and characteristics of Service Management; - The evolution into a service economy; - Definition and classification of services; - Methods for designing the service and the definition of quality in terms of customer satisfaction; - Methods for detecting and measuring customer satisfaction; - Tools for customer portfolio management and customer loyalty management.

Esse3 required sections of the syllabus	Instructions on what to write	Example from the "Economy of the environment and region" course, taught by professors G. Gios and R. Raffaelli for the Sustainability and Tourism Management master's degree program	Example from the "Service and Tourism Business Management" course, taught by professor M. Franch for the Sustainability and Tourism Management master's degree program[11]
		-Environmental impact assessment (EIA), strategic environmental assessment (SEA), assessment of incidence (AI) - Total Economic Value - The non-demand curve approaches for an economic evaluation of the environment - Cost-benefit analysis	
Teaching methods used and learning activities required of students	State: - the methods and tools in support of the teaching activities that the professor intends to adopt to achieve intended learning outcomes. - the learning activities that will be required of students	[…] Professors will use: a) lecture-style presentation; b) research themes given to small groups of students, who must discuss, analyze and present to the class the results achieved. c) multidisciplinary laboratory, working jointly with the Statistics course, for economic decision-making and management. The activity is done in groups, which starting off from a research question regarding the measurement of sustainability in tourism, must use the competences acquired in both courses to arrive at pinpointing the most appropriate indicators and calculating them in relation to specific local contexts.	[…] The professor will use: a) highly interactive lecture-style presentation during which students will be required to actively participate; b) research themes given to small groups of students, who must discuss, analyze and present to the class the results achieved; c) multidisciplinary laboratory, working jointly with the Quality Management and Environmental Management System certification course. The activity is done in groups, which starting off from a research question, must arrive at pinpointing and effectively presenting a hypothesis, highlighting the theoretical tools used from those learned in both courses. Cognitive maps will be used to support teaching activities and link together the various subjects covered in an easier way.
Assessment methods and criteria	State: - the methods of assessment of the specific knowledge/competences acquired, i.e. what will be used to assess proficiency (written/oral exam,	The methods that will be used to assess the knowledge and skills acquired are: a) written exam with open-ended questions to assess basic concepts. The highest achievable mark is 27/30; any additional points will come from the laboratory activity. b) Presentation of results with Power Point support to assess the multidisciplinary laboratory activity. The following will be	The methods that will be used to assess the knowledge and skills acquired are: a) oral exam to assess basic concepts. The highest achievable mark is 27/30; any additional points will come from the laboratory activity. b) Presentation of results with Power Point support to assess the multidisciplinary laboratory activity. The following will be

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	essay/project, progress tests, etc.) - the assessment criteria used	assessed: comprehension of the research question, use of the most appropriate theoretical tool for analysis from among those learned in the course, rigor in applying the chosen methods in searching for a response; the ability to effectively support and defend the results achieved, during the presentation. The mark will vary from 1 to 3 points.	assessed: comprehension of the research question, use of the most appropriate theoretical tool for analysis from among those learned in the course, rigor in applying the chosen methods in searching for a response; the ability to effectively support and defend the results achieved, during the presentation. The mark will vary from 1 to 3 points.
Reference literature/ Bibliography	Provide the recommended texts for at-home study and adopted bibliographic material.	Silvestri, 2005 Lezioni di Economia ecologica II ed Clueb, Bologna cap.8.1, 9.1,) Musu , 2003 Introduzione all'economia dell'ambiente ed. Il Mulino Bologna, cap V [...]	V.A. Zeithaml, M.J. Bitner, D.D. Gremler, E. Bonetti (2012) Marketing dei servizi, McGraw-Hill, M

An example of intended learning outcomes for several disciplines taught at **Stanford University** is available at the following link: https://vptl.stanford.edu/teaching-learning/teaching-practices/evaluation/stanfords-new-course-evaluations/writing-learning

8. Syllabus checklist

The checklist[12] below serves as a guide to writing the syllabus; it enables professors to check if they have included everything and if the information is logical and consistent:

- Did you specify the prerequisite knowledge students must have to take the course?

- Is the content articulated in detail?

- Is the general instructional goal defined clearly, with appropriate words?

- Have the intended learning outcomes been formulated correctly? Do they start with the phrase: "By the end of this course, students will be able to..."?

- Are the intended learning outcomes realistic and achievable? Are they articulated to reflect different cognitive levels of learning?

- Does the program include references for achieving what is mentioned in the intended learning outcomes?

- Is there alignment between the intended learning outcomes and teaching methods, and between learning methods and the rest of the curriculum?

- Are the learning assessment methods chosen in line with the intended learning outcomes?

9. How to communicate intended learning outcomes to students: A possible use of the syllabus

The syllabus is the first opportunity professors have to **encourage and guide students to take responsibility for their own learning[13]**, by clearly stating what knowledge and skills are expected and what are the teaching and learning processes to achieve them.

Besides publishing it using the appropriate platform (Esse3), it is important that you present the syllabus to students **at the beginning of your course** not only to give students a clear vision of the instructional goals and desired learning outcomes, but also to allow them to articulate their expectations and existing knowledge on the subject.

Another effective strategy is going over the syllabus throughout the semester as the course progresses[14], to **encourage students to use it as a reference to give meaning to assignments, also in anticipation of the final assessment**. They will gain a better understanding of each assignment and its logical consistency in relation to the expected final outcomes.

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[12] This is an elaborated version of Moon's *checklist* (Moon, 2002, pp. 139-140) adapted to the syllabus format used at the University of Trento

[13] O'brein, Millis & Cohen (2008), *The Course Syllabus: A Learning-Centered Approach*, second edition, San Francisco: Jossey-Bass.

[14] Weimer, M. (2002), *Learner-centered teaching: Five key changes to practice*. San Francisco: Jossey-Bass

10. Glossary [15]

Skills: These indicate the ability to apply knowledge and use know-how to complete tasks and solve problems. In the context of the European Qualifications Framework, skills are described as cognitive (comprising the use of logical, intuitive and creative thinking) or practical (comprising manual skills and use of methods, materials and tools).

Educational activities: Educational activities refer to the set of teaching activities offered in the Program of Study and that contribute to defining the Educational Path. These include courses, laboratories, internships, degree thesis, and other activities.

Competences: Competences refer to the proven ability to use the knowledge, skills and personal, social and/or methodological abilities in work or study situations and in professional and personal development. In the context of the European Qualifications Framework, competences are described in terms of responsibility and autonomy.

Knowledge: Knowledge is the outcome of the assimilation of information through learning. It refers to the body of facts, principles, theories and practices related to a field of work or study. In the context of the European Qualifications Framework, knowledge can be theoretical and/or practical knowledge.

Dublin descriptors: These are general descriptions of typical desired outcomes and skills associated with a degree that represents the end of any one of the three Bologna cycles. Descriptors consist of a set of criteria (knowledge and comprehension skills; applied knowledge and comprehension skills; use of independent judgment; communication skills; learning skills) phrased in terms of competence levels that enable to distinguish in a broad and general manner between the various cycles.

Assessment methods: Mid-term and final assessment of student learning, including the professor's clear indication of conduct. Some examples include: oral assessments (interrogations, presentations, demonstration of a practical ability, like, for example, in a laboratory or workplace; etc.), written exams (essays, reports, field diaries and reports, multiple choice questionnaires, knowledge or skills tests, problems to solve, analysis of cases, data and texts; review of texts, laboratory reports, etc.), professional portfolios, thesis, etc.

Program-specific instructional goals: These are the synthesis of the knowledge and skills that concur in the creation of the cultural and professional profile and which are detailed in the intended learning outcomes achieved through an Educational path.

Educational path: An educational path is the organized system of Educational activities contributing to the achievement of Instructional goals.

Intended learning outcomes: Intended learning outcomes describe what a learner will know, understand, and be able to do after completion of a learning process. Outcomes are defined in terms of knowledge, skills and competences.

Syllabus: The syllabus is the detailed program for each course taught under the Program of Study. In it, the professor clearly expresses the objectives and content of the course, specifying subject-matter, learning materials and methods of assessment. The syllabus may also contain other information that could be useful in favoring student attendance and independent study, thus promoting aware and active learning.

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[15] Sources: adapted and supplemented from: *European Qualification Framework* e *Documento ANVUR Accreditamento Periodico delle Sedi delle Università e dei Corsi di Studio. Linee Guida*. Versione Provvisoria in Consultazione, 4 Luglio 2016, p. 12

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- http://cei.umn.edu/support-services/tutorials/integrated-aligned-course-design/course-design-resources

- https://www.international.heacademy.ac.uk/

- http://www.niu.edu/facdev/_pdf/syllabus_checklist1.pdf