

EDUCATIONAL QUALITY ASSESSMENT

Management of Production Technologies

An evaluation of the quality of the **bachelor's programme Management of Production Technologies at Faculty of Mechanical Engineering at University of Zenica**

Final report / July 2012

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Part I

General

1. Introduction

In accordance with its mission, the assessment panel (henceforth: the panel) presents its findings and its evaluation **of bachelor's programme Management of Production Technologies at Faculty of Mechanical Engineering at University of Zenica** in this report.

This report can serve as a basis for the accreditation of the programme. This report is in accordance with the ESABIH guidelines, the panel assessed 7 criteria and 24 indicators.

2. The Assessment Panel

2.1 Composition

The assessment panel is composed in conformity with the ESABIH guidelines.

The panel assigned to evaluate the *bachelor's programme Management of Production Technologies at Faculty of Mechanical Engineering at University of Zenica* includes the following members:

Chairman: prof.Carlos Ramos
Expert 1: prof.Snježana Rezić
Student member: Igor Bošnjak

The assessment of *bachelor's programme Management of Production Technologies at Faculty of Mechanical Engineering at University of Zenica* was accompanied and supported by Maja Macan, Senior Official for Quality Assurance in the Agency for Development of Higher Education and Quality Assurance (HEA). She was appointed as secretary of this assessment.

2.2 Task Description

Based on the programme's self-evaluation report (SER) and the interviews that were conducted during the assessment visit, the assessment panel will provide the following in its report:

- An evaluation of the criteria and the indicators as defined in the ESABIH framework;
- An all-encompassing evaluation of the programme;
- A formulation of recommendations to bring about quality improvement in the programme.

2.3 Working Method

The assessment of the *bachelor's programme Management of Production Technologies at Faculty of Mechanical Engineering at University of Zenica* is conducted in conformity with the guidelines of the ESABIH project.

The panel's procedure is characterised by three identifiable phases:

- Phase 1 Preparation
- Phase 2 Visit to the institution of higher education
- Phase 3 Reporting

Phase 1 Preparation

Every panel member studies the self-evaluation report and its appendices.. The panel members also provide an individual checklist that lists all their questions, their temporary evaluation and their argumentation. The secretary creates a synthesis out of these lists. Following that, the synthesis is thoroughly discussed and provided with arguments.

Based on the discussion and the panel members' questionnaires; the secretary finally makes an inventory of the key points and priorities that should be kept in mind during the interviews and the inspection of materials.

Phase 2 Visit to the higher education institution

ESABIH consortium group provides a visit schedule template. The visit schedule of the *bachelor's programme Management of Production Technologies at Faculty of Mechanical Engineering at University of Zenica* is in accordance with that Template and is included as appendix.

During the assessment, the panel interviews a representative group of all the programme's stakeholders, it studies additional information and it visits the institution to be able to assess the students' accommodation and available facilities. The panel uses the checklists' and questionnaires' synthesis for interviews.

The visit schedule contains a few consultation meetings that allow the panel members to exchange their findings with each other and to come to mutual, more definitive evaluations.

At the end of the assessment visit, the panel's chairperson gives an oral report on the panel's experiences and findings, without uttering any explicit value judgments with regard to its contents.

Phase 3 Creation of the assessment report

Based on the self-evaluation report, the checklists and the motivations, the secretary draws up a draft of the assessment report, in dialogue with the chairperson and the other panel members. This draft assessment report describes the panel's evaluation and the motivation per criterium and per indicator. In addition to that, points of attention and possible recommendations for improvement are formulated if found necessary or desirable by the panel members.

The draft assessment report was sent to the study programme for the verification of factual errors and for the formulation of possible remarks with regard to the report's content. There was no programme's reaction on the report.

2.4 Forming an Opinion

In the first phase, the panel establishes an evaluation per indicator. Afterwards, the panel establishes an evaluation per criterium, based on the evaluation of the indicators that make up that criterium.

The criterium's evaluation always gives an overview of the indicators' evaluations. In case of a compensation of indicators, the evaluation on criterium level is followed by a motivation and the weighting factor that was used by the panel to come to an evaluation on criterium level. In all

other cases, the motivation of the evaluation on criterium level refers to the indicator's argumentation.

All evaluations and weightings follow the decision regulations as formulated in the ESABIH guidelines'. At indicator level, the panel grants one of the following scores from this quadruple scale: 'unsatisfactory', 'satisfactory', 'good' or 'excellent'. The score 'unsatisfactory' indicates that the programme does not comply with the generic quality demands for that indicator. The score 'satisfactory' implies that the generic quality demands are met.

The score 'good' indicates that the quality of the programme stands above the generic quality demands that are related to that indicator. The score 'excellent' implies that the quality of the indicator can be seen both nationally and internationally as an example of best practice. The panel intends to motivate every score given to the evaluated indicators as adequately as possible, taking into account the assessment criteria as formulated in the ESABIH framework.

On the basis of the indicator scores, the panel gives a summarising evaluation at criterium level. A positive evaluation means that the generic quality demands of a specific criterium are met, whereas a negative evaluation indicates that they are not.

Lastly, the panel makes a judgement on the overall quality of the programme at the end of the report.

Part II

Assessment Report

General information on Study Programme *Management of Production Technologies*

The Faculty of Mechanical Engineering of Zenica, as the independent scientific-research institution of higher education, was established in 1977. The establishment of the Faculty of Mechanical Engineering was preceded by the establishment of mechanical program in metallurgy at the Faculty of Metallurgy in Zenica. One of the essential preconditions for establishing another Faculty of Mechanical Engineering in the ex-Yugoslavia was setting up the Faculty of Mechanical Engineering in Zenica with departments (study programs) which didn't exist in other Faculties of Mechanical Engineering in Bosnia and Herzegovina (Sarajevo, Mostar, Banja Luka). Therefore, during the foundation in 1977, the Faculty of Mechanical Engineering had two departments: Mechanical Engineering in Metallurgy and Mechanical Engineering in Mining.

Due to prior and post war consequences, the economic situation was substantially changed. That change was mainly reflected in the restructuring of the basic capacities into capacities of higher finalization level. According to the existing regulations and obligation of the institutions for higher education to innovate educational plans and programs (curriculum), the restructuring and coordination with the modern scientific trends was completed in 2004 at the Faculty of Mechanical Engineering. The thorough analyses and research was carried out to specify the need for profiles of graduated engineers in the economical activities of the middle Bosnia.

On the basis of the research in 2004 and new economic conditions it is specified that graduated engineers must have the adequate level of general knowledge in the mechanical field as well as knowledge in the field of production mechanical engineering (production technology). The need for graduated mechanical engineers encapsulates the vast education which will enable engineers to cope with the broad spectre of tasks (from management and organization of production to innovations, designing, constructions and monitoring of the technological processes of production – all these requirements are incorporated in the new study program - Management of production technologies.)

The innovation of Educational plan and program during the year of 2004 included the adaptation of the curriculum to the principles of Bologna declaration, particularly in the segment of the Credit Transfer System. The study program is harmonized with the above mentioned principles and Credit Transfer System, while research-scientific process at the Management of production technologies is realized under the supervision of Cathedra for production technologies in three study cycles: 4 + 1 + 3.

After completing their study and diploma paper the candidate gets the degree Graduated mechanical engineer, department of Production Technology Management.

The Senate of Zenica University established the second study cycle of the department of Production Technology Management in 2008. That department was founded on the basis of elaboration about the justification of the master study (the second study cycle) at the Faculty of Mechanical Engineering in Zenica. Educational plan and program of the second study cycle is continuation of the first cycle and it expands scientific knowledge in the field of production engineering. The aim of the second cycle is to enable future masters for independent scientific and research work. After completing the second study cycle students achieve an academic title: master of profession.

In 2009/10 number of students for the first time enrolled in the first year of this study programme was 36, and in 2010/11 were 40.

Criterion 1. Educational Objectives

Indicator 1.1 Level and Orientation

Assessment criteria:

The educational objectives are focussed on getting the student to possess general and specific competences mentioned by the study programme. Graduates should have basic knowledge, skills and attitudes that are defined and planned by educational objectives. Students must have an understanding of the scientific-disciplinary basic knowledge that is specific for a certain domain of science, a systematic knowledge of the core elements of a discipline, including the acquisition of a coherent, detailed knowledge partly inspired by the latest developments of the discipline, and knowledge of the structure of the field of study and the connection with other fields of study.

The educational objectives are focussed on getting the student to master general competences such as:

- Obtaining and processing information;
- Ability to reflect critically and to be creative;
- Ability to perform leadership tasks;
- Ability to communicate information, ideas, problems and solutions;
- An attitude of life-long learning.
-

The educational objectives are also focused on getting the student to master general scientific or (academic) competences such as:

- A research attitude;
- Knowledge of research methods and techniques;
- Ability to collect relevant data that can influence the judgment of social, scientific and ethical questions;
- Ability to appreciate uncertainty and ambiguity;
- The limits of knowledge and the ability to problem guided initiating of research.

The educational objectives are focused on getting the student to master the specific competences of the domain and the scientific field of the study program.

The opinion of the assessment panel: Opinion 1.1

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The study Programme seems to meet the formulated objectives. The objectives of the Programme were conceived for the need for profiles of graduated engineers in the economic activities of the middle Bosnia. The purposes of study Programme are: education in the field of Mechanical Engineering, and production technologies, as well as achieving socially justified and required competencies and qualifications. Graduated engineers must have the adequate level of general knowledge in the mechanical field as well as knowledge in the field of Production Mechanical Engineering.

Recommendations for improvement:

We recommend the alignment with the European Qualification Framework, other national and international programmes and the professional needs and demands. In particular, the total number of ECTS is not 240 but 247. Diploma thesis is not included in semester (7 ECTS). The Management of the Faculty has recognized that the diploma thesis should be inserted in the 240 credits of the 4-year Programme, and we recommend that this curricular unit represents more than 7 credits (minimum 12 credits). Thus there is a mandatory recommendation to: involve the diploma thesis in the 240 credits of the Programme; and it must represent at least 12 credits in the last year of the Programme.

Indicator 1.2 Domain Specific Demands

Assessment criteria:

The educational objectives (mentioned as the end qualifications of the student) join the demands that are set by (foreign) colleagues and the relevant work field for an education within the domain (field of study/discipline and / or professional practice). They are in line with the regulations. The end qualifications for bachelor's degrees and master's degrees are derived from the scientific disciplines, the internationally performed research and the courses that are considered to put research into practice in the relevant professional field.

- General study programme objectives (desired final qualifications of the graduates at study programme level) and their genesis;
- Alignment of the objectives with the bachelor's/ master's competences in the Bologna declaration and European Qualification framework;
- Attention for the international dimension in the study programme's objectives;
- Attention for academic/professional/artistic skills in the objectives;
- Familiarity with the objectives among students and staff involved in the study programme;
- Profiling the study programme with regards to domestic and/or foreign study programmes in order to determine the study programme objectives and (including recent and imminent developments) to make the comparison with the own vision on the vocation/discipline;
- Alignment of the objectives with the professional regulations/legislation;
- Alignment of the objectives with the needs and wants of the intended work field;
- Genesis of the discipline-specific objectives.

The opinion of the assessment panel: Opinion 1.2

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The domain specific domains seem to meet the requirements. Some concerns exist relatively to the designation of the course "Management of Production Technologies", since the Programme is much more oriented to Mechanical Engineering. However, it was explained by the Faculty Management, and by the Employers, that the contents are adequate to the needs of the Zenica and middle Bosnia industrial needs

Recommendations for improvement:

It is important to motivate teachers to the need to involve more Management aspects, even in technology oriented subjects.

Opinion on Criterion 1, Educational Objectives: Opinion 1

Based on the opinions of:

Indicator 1.1, level and orientation: opinion 1.1,

Indicator 1.2, domain specific demands: opinion 1.2,

The assessment panel agree with the score “Good” for indicators 1.1 (level and orientation) and 1.2 (domain specific demands) of criterion 1 (Educational Objectives). Thus the panel score is “satisfactory” for this criterion.

Criterion 2. Curriculum

Indicator 2.1 Correspondence between Objectives and the Content of the Programme

Assessment criteria:

The programme is an adequate realization of the end qualifications of the education, as to level, orientation and demands specific for the domain. The end qualifications are adequately translated towards the learning objectives in (parts) of the programme. The content of the programme offers students the possibility to achieve the end qualifications.

- Translation of the objectives in the curriculum;
- Level (bachelor, master) and content of the study programme components;
- Presence of inter-disciplinary elements;
- International dimension in the study programme/internationalisation of the curriculum (policy, participation rate, cooperation forms, international contacts, etc.);
- Degree to which recent advancements in education at home and abroad have found expression in the curriculum;
- Procedures for curriculum revision and innovation;
- Participation of relevant stakeholders in curriculum development, revision and innovation.

The opinion of the assessment panel: Opinion 2.1

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

All activities referring to the educational process at the undergraduate, postgraduate and part time study are realized at the “cathedra level”. Appendix I shows the First Study Cycle Programme of Management in Manufacturing Technologies.

Recommendations for improvement:

No special recommendation has been pointed for indicator 2.1.

Indicator 2.2 Demands Professional and Academic Alignment

Assessment criteria:

The development of knowledge by students when there is an interaction between the education and the scientific research within relevant disciplines. The programme matches with the developments in the relevant scientific discipline(s) by demonstrable connections with topical scientific theories. The programme guarantees the development of scientific research skills. With certain courses, there are demonstrable connections with the topical practice of the relevant professions.

- Attention in the curriculum for knowledge development;
- Attention in the curriculum for skills that support professional functioning;
- Attention in the curriculum for work field experience: interaction with professional practice, attitude, content, level and guidance of practical training final projects, etc.;
- Alignment with recent (international) developments in the field/discipline and professional practice (among other things, as researcher);
- Research alignment of the study programme; among other things: feedback of (own) research to the study programme, active involvement of students in research within the study programme;
- Attention in the curriculum for development of research skills – conveying the research attitude – research skills. Interaction between study programme and academic services.

The opinion of the assessment panel: Opinion 2.2

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The scientific level of the curriculum seems adequate for the exercise of professional activities. There is an improvement in scientific data and the interaction with enterprises is sufficient. There are teachers with an important experience in Industry; students recognize the importance to have these teachers. Employers are satisfied with the technical skills of graduates, which is a good indicator of the alignment between the way subjects are presented to students and the current industrial practices in enterprises.

The Employers and other stakeholders are too satisfied with the preparation of the graduates of the Faculty. It was referred that few Engineers are not employed, but they are not from the Faculty, what means complete employment opportunities for graduates of the Faculty. Graduates from the faculty are usually well positioned in the enterprises and are involved in important and complex projects. Some work in fields different from Industry, what means the capability to adapt to new functions. They like to receive students in visits, a way to have a previous contact with possible future employees. Employers see the Faculty as a place where advanced knowledge can be obtained. There are several contracts between the Industry and the University for technology transfer. A list with 26 projects running on the last 6 years has been presented.

Recommendations for improvement:

The interaction with the Industry should be even better. Students refer a 2-week experience in Industry, and Employers would like to have Internships of students in their enterprises.

It was referred by the Management of the Faculty the existence of an EntrepreneurshipCentre, an Incubator, and the Scientific Park, for all the University. However these facilities were not shown during the visit, possibly because they are still in an incipient phase. Training of students for Innovation and Entrepreneurship is important in the future to guarantee mechanisms of creation of new jobs and opportunities.

Energy Efficiency is one of the topics that Employers referred as important and that need to be referred in the subjects of the Programme.

Indicator 2.3 Coherence Programme

Assessment criteria:

Students take a coherent course programme with regard to content.

- Sequential structure and coherence of the curriculum in terms of the standard process;
- Harmony of the curriculum in the cooperation with other university departments and institutions;
- Relation between the curriculum and flexible learning process.

The opinion of the assessment panel: Opinion 2.3

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

| The structure of programme is coherent. There is a logical sequence of courses.

Recommendations for improvement:

The number of optional (elective) courses is unsatisfactory. There is a recommendation to include optional courses from fields other than mechanical engineering and with cooperation with other departments. It is the way of improving flexible learning paths.

Indicator 2.4 Workload

Assessment criteria:

The actual amount of study hours per academic year is being checked and reaches the standard of 60 credits.

- The study programme fulfils the formal requirements with regard to the size of the curriculum for bachelor and master:
- It is possible to follow the programme adequately since factors that hinder the learning process are being eliminated as much as possible;
- Study time measurements and follow-up;
- Agreement between estimated and actual study time;
- Spread of the study time in the study programme;
- Presence of factors obstructing or promoting study and any steps.

The opinion of the assessment panel: Opinion 2.4

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The total number of ECTS should be 240, and not 247, to be aligned with the Bologna Declaration principles. Concerning the student workload, it is important the coordination between teachers of the same year in order to coordinate the dates when practical works, and reports should be made available.

Recommendations for improvement:

No special recommendation has been pointed for indicator 2.4.

Indicator 2.5 Coherence of the Organisation of the Learning Process and Contents

Assessment criteria:

The structure and the content of the curriculum are coherent and it is in line with modern didactic approaches (new teaching methodologies, innovations in teaching, etc.). The quality of the educational resources is high and there is an alignment of the learning resources with the didactic concept and the objectives (at study programme level).

- The didactic concept is in line with the objectives;
- The work forms are aligned with the didactic concept. Work forms used (lectures, working groups, project work, practical work, self-study, workshops, etc.);
- Alignment of the didactic work forms with the objectives, the didactic concept and the characteristics of the student intake;
- Attention for recent educational developments at home and abroad in the didactic concept and its elaboration;
- Variation of educational forms;
- Educational resources used and quality (syllabi, guides, courses, teaching and learning aids, etc.): Alignment of the learning resources with the didactic concept, the objectives (at study programme level and study programme component level) and the characteristics of the student intake.

The opinion of the assessment panel: Opinion 2.5

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

Active learning is realized through lecturing, practicum, internship, consultations, realization of programs and graphic works, term and research papers published at the conferences, seminars, students' manifestations and meetings.

Recommendations for improvement:

No special recommendation has been pointed for indicator 2.5.

Indicator 2.6 Diploma's Thesis

Assessment criteria:

Before obtaining the master's degree students have to make a final project, by which the student has to prove his/her analytic and synthetic capability or independent problem solving capability on academic level or his/her artistic capability. The final project reflects the general critical reflection of the student's intentions to do research.

- Place/relative weight of the master's thesis in the study programme;
- Content and concept of the master's thesis;
- Preparation for the master's thesis;
- Guidance of the master's thesis;
- Cooperation between students and researchers;
- Cooperation between students and the professional field;
- Orientation of the (proposed problem of the) master's thesis to the actual academic/professional context;
- Assessment of the master's thesis.

The opinion of the assessment panel: Opinion 2.6

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The diploma Thesis must be included in the 240 credits from ECTS, and with a minimum number of credits of 12 credits.

Recommendations for improvement:

It is recommended that the Diploma Theses correspond to internships periods in Enterprises or to participation in R&D or technology transfer projects, or even to the participation in international projects in foreign countries. The last semester should be arranged accordingly, since it is desirable that other subjects of this semester finish at the middle of the semester to allow students to dedicate the last half of the semester to the Internships.

Opinion on Criterion 2, Curriculum: Opinion 2

Based on the opinions of:

Indicator 2.1, correspondence between objectives and the content of the programme: opinion 2.1,

Indicator 2.2, demands professional and academic alignment: opinion 2.2,

Indicator 2.3, coherence programme: opinion 2.3,

Indicator 2.4, workload: opinion 2.4,

Indicator 2.5, coherence of the organization of the learning process and contents: opinion 2.5

Indicator 2.6, master's thesis: opinion 2.6

The assessment panel agree with the score "Good" for indicators 2.2 (demands professional and academic alignment), 2.3 (coherence programme), and 2.5 (coherence of the organization of the learning process and contents) and with the score "Satisfactory" for indicators 2.1 (correspondence between objectives and the content of the programme), 2.4 (workload), and 2.6 (final thesis) of criterion 2 (Curriculum). Thus the panel score is "satisfactory" for this criterion.

Criterion 3. Staff

Indicator 3.1 Quality of the Staff

Assessment criteria:

The staff is qualified for the educational, organizational realization of the programme. They are also qualified to take care of the content of the programme.

- Human resources policy (including recruitment, determination of tasks, appointments, promotions, evaluation procedure, advice and decision making bodies);
- Impact of substantive, educational and didactic qualities in the recruitment and promotion, evaluation and monitoring of the staff;
- Policy with regard to the staff for educational activities;
- Factors obstructing the pursuit of a good human resources policy;
- Professionalization (life-long learning approach) of the staff;
- Expertise of the teaching/academic staff (substantive, educational and didactic);
- Involvement of the teaching/academic staff;
- Technical, administrative and organisational expertise of the staff;
- Introduction and guidance of staff and equal opportunities policy.

The opinion of the assessment panel: Opinion 3.1

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The Scientific Council submits to the Senate of University proposals for public announcements for future permanent employees or collaborators for a certain scientific field or subject. The Senate of the University announces vacancies for all faculties at the end of the academic year for the next academic year.

The selection of candidates is based in quality and experience (number of published scientific articles and books, study rating, teaching experience – minimum two years).

When teachers and collaborators meet certain requirements, the procedure for their promotion is actuated. The proposal for their promotion is submitted to the Senate of University which makes a decision to announce vacancies.

There are 10 teachers with PhD degree.

Some Professors refer 5 to 10 hours of classes. Others refer 20 hours by week in R&D activities.

Professors are evaluated by students' pools twice a year. If they receive ranks below 2.5 the Faculty Dean contacts them. If this happens 2 consecutive times then a more drastic measure must be taken. However the Quality Assurance Office does not know this kind of situations in the Faculty.

Recommendations for improvement:

The insufficient number of full-time teaching staff members is pointed as a weakness.

The following recommendations are done:

- accept a lifelong learning approach related to the staff
- develop guidance for introduction and guidance of new staff
- establish indicators for measurement of educational and didactic expertise of the staff

Indicator 3.2 Demands Professional/Academic Alignment

Assessment criteria:

For some courses it is necessary that a sufficient amount of staff members have knowledge and insight with regard to the profession. The course matches with the following criteria with regards to the effort of staff made within a professional, academic education:

- Professional experience and knowledge of the professional practice among the staff with educational or education-supporting tasks;

- Research expertise and research activity in the practice and the development of the arts;
- Range of specialisations among the staff with research tasks;
- Educational contribution from the professional field and the staff's international contacts, including feedback with regards to the study programme, the participation in international networks and the partnerships with domestic and foreign partner institutions.

The opinion of the assessment panel: Opinion 3.2

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

There is a significant number of projects between the Faculty of Mechanical Engineering in Zenica with industrial companies in Zenica-Doboje canton and the region of central Bosnia. The research activity is also increasing.

Recommendations for improvement:

No special recommendation has been pointed for indicator 3.2.

Indicator 3.3 Quantity of Staff

Assessment criteria:

A sufficient amount of staff is being appointed to organize the course with the desired quality. Human resource policy is organized in a good and proper way. Recruitment policy is based on good selection of staff.

- Size of the workforce;
- Size of the workforce in proportion to the number of students;
- Ratios between the various categories of staff;
- Number and percentage of visiting professors;
- Age structure;
- Share of the various staff categories in education and research.

The opinion of the assessment panel: Opinion 3.3

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

In 2010 there were 30 permanently employed teachers and collaborators at the Faculty of Mechanical Engineering: 6 full professors, 6 associate professors, 5 assistant teachers, 12 senior assistants and 1 assistant. 20 non-lecturing staff members are reported.

The number of students is 556 (plus 90), what is reasonable for the number of teachers and non-lecturing staff as well.

Recommendations for improvement:

There are 11 teachers below the age of 40 years, and 19 above. This deserves some attention of the Management of the University, because the renewing of the teaching staff is important for handling new technologies, namely those involving knowledge of Information Technologies.

Opinion on Criterion 3, Staff: Opinion 3

Based on the opinions of:

Indicator 3.1, quality of staff: opinion 3.1,

Indicator 3.2, demands professional/academic alignment: opinion 3.2,

Indicator 3.3, quantity of staff: opinion 3.3,

The assessment panel agree with the score “Good” for all indicators 3.1 (quality of staff), 3.2 (demands professional/academic alignment), and 3.3 (quantity of staff) of criterion 3 (Staff). Thus the panel score is “satisfactory” for this criterion.

Criterion 4. Students

Indicator 4.1 Assessment and Testing (Learning Assessment)

Assessment criteria:

By means of assessments, tests and exams, students have been adequately tested. The learning assessment is in accordance with the proclaimed learning objectives (parts) of the programme.

- Student guidance during assessment;
- Organisation of tests and examinations;
- Various assessment standards with regards to the objectives of the study programme components and the study programme as a whole: concept, orientation of the evaluation to the (integrated) tests of knowledge, insight, skills and attitudes, degree of difficulty;
- Criteria and method of the assessment by the evaluators;
- Criteria and method of the assessment by the examination committee;
- Transparency of the assessment: Familiarity of students with the requirements connected to the evaluation;
- Familiarity of students and staff with the assessment procedures;
- Quality assurance of examination matters.

The opinion of the assessment panel: Opinion 4.1

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

Teachers register student's attendance and their motivation for active participation. That monitoring is followed by students score cards where teachers register all achievements before taking exams.

Pre-exam obligations are: regular attendance (lectures and practicum), active participation, seminar paper, graphic work, presentation, project task, internship, diploma paper, part-time exams, etc.

Test is mandatory and is performed according to specific rules of study Programme. There are written and oral tests or practical verification of student's knowledge.

Teachers must respect the highest standards expressed in the form of professional code.

The general idea is that teaching staff is involved in the Faculty, and they are available for students, for explanations, for showing the exams, etc.

Recommendations for improvement:

It is important that experienced Professors are always involved in the exams of students, including in the evaluation and classification, not just to confirm the classifications of Assistants.

Some Programs are time-consuming, and they are not scored properly.

Indicator 4.2 Practical Training

Assessment criteria:

The practical training enables students to acquire practical experience. Students develop professional skills and attitudes required for the independent practice under guidance and under conditions of increasing independence. The training is the result of an independent study on a problem that is relevant to the study programme and the field of action. The results of the training reflect the student's reasoning capacity, the information processing and critical reflection capacity and the competence in applying solution strategies in problem situations from professional practice.

- Place/relative weight of the practical training/thesis in the study programme;
- Contents and concept of the practical training;
- Preparation for the practical training;
- Guidance in the practical training;

- Assessment of the practical training.

The opinion of the assessment panel: Opinion 4.2

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The teaching is based on lectures and interactive relationship with students. Practical examples are included in teaching to instigate critical thinking, creation and independence among students. The application of knowledge is required.

There are many laboratories. Students are generally satisfied with the practical training, the same for employers.

Recommendations for improvement:

Training of Soft Skills is also desirable, namely in the first and second year for training students in these competencies from the very beginning. Some small projects train for developing soft skills too.

Indicator 4.3 Conditions of Admission

Assessment criteria:

Content of the programme fits in with the qualifications of the incoming students. Admission procedures are clear and transparent.

- Internal procedures for admission of students;
- Characteristics of the student intake and related policy;
- The curriculum is in line with the preliminary training;
- Specific activities with regard to the alignment between the preliminary training and the study programme.

The opinion of the assessment panel: Opinion 4.3

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

Candidates who have graduated from four-year secondary schools can enrol the first study cycle. The admissions office is responsible for: receiving documents of all candidates for the first study year and entrance exam, scoring candidates according to the conditions specified in public announcements and regulations of University and Faculty, then to publicly display the scoring list on the notice board and faculty web site. The admissions office prepares the rank-list with the names of candidates who must take the qualification test. After the qualification test admissions office discloses the final list of students who passed entrance test. Students are informed about the Faculty of Mechanical Engineering by their parents and other family member, that studied in the area, and by the web site, visits of Faculty Professors to Secondary schools (usually in March-April), and Open Day events.

Recommendations for improvement:

No special recommendation has been pointed for indicator 4.3.

Indicator 4.4 Student Involvement in the Improvement of the Teaching/Learning Processes

Assessment criteria:

The institution evaluates the curriculum and the teaching processes itself by introducing student enquiries and satisfaction questionnaires. Student representatives are involved in the decision making process and in the managerial structures.

- Handling the results of enquiries;

- Influence of students on curriculum;
- Participation of students in different decision making bodies and influence on managerial structures.

The opinion of the assessment panel: Opinion 4.4

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

Students' pools are organized twice a year: in autumn and spring. It is possible to obtain the student opinion concerning the teaching process, lectures, Practice, Admission office, and Library.

Recommendations for improvement:

No special recommendation has been pointed for indicator 4.4.

Indicator 4.5 Measures for Promoting Mobility, Including the Mutual Recognition of Credits

Assessment criteria:

The existence of bilateral and multilateral agreements with domestic and foreign institutions for the exchange of students. Participation of institution and students in different exchange programs. Existence of ECTS and/or internal credit system

- Existence of bilateral and multilateral agreements in the country and abroad;
- Existence of student exchange programs;
- Acceptance of credits gain during exchange programs;
- Existence of ECTS or other credit systems.

The opinion of the assessment panel: Opinion 4.5

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The following points have been pointed in the opportunities part of the SWOT analysis of the SER:

- Increasing mobility of teachers and students at the university, on national and international levels,
- Increase cooperation in teaching and research with academic and scientific institutions at the local, regional and global levels.
- Involvement in international graduate study and acceptance of partnership by foreign universities.

There are some international collaboration projects.

There is a good cooperation with the University of Tuzla (10 students moving both sides). International cooperation exists with countries like Austria, Germany, Spain, Slovakia and Norway.

ECTS is used in curricula, but it is not used as a tool for improvement of international students' mobility. The procedure for acceptance of credits gained during exchange programs is not defined. University and Faculty have signed bilateral and multilateral agreements in the country and abroad (more than 20 bilateral agreements with international institutions have been signed).

Some foreign professors visit the University and Faculty, and they organize seminars and workshops.

Recommendations for improvement:

The lack in R&D projects and funds is limiting international mobility. The support of Enterprises should also be asked for this purpose, some of them have international bases, and internships could be developed in these foreign countries.

It is recommended that the institution should be more focused to mobility through Erasmus Mundus, CEEPUS and other EU projects.

Indicator 4.6 Coaching of Students

Assessment criteria:

Coaching system is introduced. The coaching and the providing of information meet the students' needs.

- Existence of coaching system and regular consultations;
- Way of coaching students.

The opinion of the assessment panel: Opinion 4.6

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The Faculty provides the coaching of students, depending on the subjects. Students are divided in groups and Assistants support them before the exams. There are Tutoring and Mentoring mechanisms, but some formalization is necessary. Final years students act as demonstrators for practical laboratories and other subjects, in which the pass rate is critical, for additional exercises, and they are paid for this activity, a long tradition in the country.

Recommendations for improvement:

No special recommendation has been pointed for indicator 4.6.

Indicator 4.7 Information, Consultation and Complaint System

Assessment criteria:

- Way of handling students' complaints;
- Measures for student support;
- Information and advice during the study programme by the study programme/central services;
- Communication of educational objectives as well as education and examination regulations;
- Organisation and guidance of international student exchange (including guidance for and integration of foreign students).

The opinion of the assessment panel: Opinion 4.7

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

Students' pools are organized twice a year: in autumn and spring. It is possible to obtain the student opinion concerning the teaching process, lectures, Practice, Admission office, and Library.

Recommendations for improvement:

The main problem is the need to define a procedure to deal with the main complaints of students. This is especially important for students of the first year, since they are scared, and would like to have more communication with Assistants and Professors, who are available, but students of the first year have some fear in contacting the professors and assistants.

Opinion on Criterion 4, Students: Opinion 4

Based on the opinions of:

Indicator 4.1, assessment and testing: opinion 4.1,

Indicator 4.2, practical training: opinion 4.2,

Indicator 4.3, condition of admission: opinion 4.3,

Indicator 4.4, student involvement in the improvement of the teaching/learning process: opinion 4.4,

Indicator 4.5, measures for promoting mobility, including mutual recognition of credits: opinion 4.5

Indicator 4.6, coaching of students: opinion 4.6,

Indicator 4.7 information, consultation and complaining system: opinion 4.7,

The assessment panel agree with the score “Good” for indicators 4.1 (assessment and testing), 4.2 (practical training), 4.3 (conditions of admission), 4.6 (coaching of students), and 4.7 (information, consultation and complaint system), with the score “Satisfactory” for indicator 4.4 (student involvement in the improving of teaching / learning process), and with the score “Unsatisfactory” for indicator 4.5 (measures for promoting mobility, including mutual recognition credits) of criterion 4 (Students). Some effort is necessary for obtaining more opportunities of mobility for students. The panel score is “satisfactory” for this criterion.

Criterion 5. Means and Facilities

Indicator 5.1 Material Aspects

Assessment criteria:

Housing and facilities are adequate to realize the programme. Teaching tools are adequate for introducing new teaching methodologies and for introducing innovations in teaching process.

- Policy on premises and facilities;
- Size and quality (= degree to which they are geared to the objectives of the study programme) of lecture halls;
- Practical rooms and laboratories;
- Library facilities; books and periodicals;
- Self-study centres;
- Computer facilities;
- Study programme-related research infrastructure;
- Student and teacher facilities;
- Accessibility of the facilities;
- Size of the available financial resources.

The opinion of the assessment panel: Opinion 5.1

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The Faculty has 7 classrooms. The classroom surface per student is low in the first and second year and very good in the third and fourth. The total library collection of books is 57 000 inventory items, for all University. The number of computers in the Computer Centre is good; however few computers exist in the Laboratories.

Due to the support of the Austrian government, 5M€ have been recently invested in 20 Laboratories (6 or 7 of them for the Faculty). Money from contracts is also used for the equipment of Laboratories (3%-5% of the University budget). Equipment in some laboratories is really new, even for advanced technologies, like in LECAD for 3D Print and Scanning or in high precision measurement, and in CNC machines.

The Faculty of Mechanical Engineering has basic lecture halls, computer lecture hall, library and reading room. Since University Zenica has access to the databases EBSCOHOST, IPO and COBISS, students of study Programme "Management of production technology" could also use these resources.

Recommendations for improvement:

. These top level laboratories co-exist with other laboratories with old material. In some cases the renewing of material would be too expensive. But there are other situations, like in the Electrotechnical Laboratory, where with a limited investment it could be possible to have a new lab. Students should receive some training in Electronics too, namely because some new equipment has also electronic parts.

Although all this equipment in Labs, students of the two first years would like to have more visual identification of the equipment during the classes (by photos, projections or even direct contact with the equipments referred in the classes).

The Library of the Faculty should have more books and main scientific journals.

Other Recommendations:

- The number of computers should be increased in order to reduce the number of students per computer
- Teaching tools should be modernized, based on ICT and closely related to study the programme
- Install a wireless network in the campus

- Increase the surface area per student.

Opinion on Criterion 5, Means and Facilities: Opinion 5

Based on the opinions of:

Indicator 5.1, material aspects: opinion 5.1,

The assessment panel agree with the score “Good” for indicators 5.1 (material aspects) of criterion 5 (Means and Facilities). Thus the panel score is “satisfactory” for this criterion.

Criterion 6. Internal Quality Control

Indicator 6.1 Evaluation Results

Assessment criteria:

The course is being evaluated periodically through usage of different testable targets. Systematic measures to follow up on the teaching process are introduced. Quality structures are established and the quality of teaching within the study programme is permanently monitored.

- Description of the quality policy and of the approach of the internal quality assurance;
- Existence of quality structures;
- Depersonalised summary of the measured results of the study programme;
- Dynamics of evaluation procedures;
- Usage of results obtained during evaluation process.

The opinion of the assessment panel: Opinion 6.1

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

There is a committee for quality assurance. At Mechanical faculty members are: quality manager, vice-dean in charge of teaching, the chief of admissions office plus two representatives of teachers, and one student. Working procedures, competencies and responsibilities are defined by the system with adequate legal acts. Students' pools are organized twice a year: in autumn and spring. The Quality Assurance Office meets 4 or 5 times a year, namely for analysing the results of students' pool questionnaires. Results of these questionnaires are sent for the members of the Scientific Council. Measures are taken if a bad score happens.

Recommendations for improvement:

No special recommendation has been pointed for indicator 6.1.

Indicator 6.2 Measures for Improvement

Assessment criteria:

The results of evaluation are the starting point for a strategic and operational approach in the introduction, the improvement and the development of demonstrable measures necessary for the realization of the educational objectives. Improvement measures are based on threats and weaknesses noticed during the evaluation process.

- Degree to which past targets were achieved;
- Degree to which the targets for the future are well founded;
- Improvement actions in the study programme (allocation of resources, designation of responsibilities and powers, planning and monitoring project management);
- Special attention for the response to findings and recommendations of the former assessment visit and results of student evaluations.

The opinion of the assessment panel: Opinion 6.2

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

ECTS board on each faculty performs periodical control of students' workload according to assigned ECTS credit per teaching subject.

Recommendations for improvement:

There is a recommendation for the involvement of alumni and employers in the Quality Assurance office.

Indicator 6.3 Involving Co-workers, Students, Alumni and the Professional Field

Assessment criteria:

Co-workers, students, alumni and the professional field are being involved in the internal quality control.

- Performance of the boards and assessment panels involved in the internal quality assurance (including the student participation);
- Involvement of the staff in decision-making and evaluations as part of the internal quality assurance;
- Involvement of students in decision-making and evaluations as part of the internal quality assurance;
- Involvement of graduates and the professional fields in educational evaluations and curriculum innovations;
- Contacts between the study programme and the graduates/professional field.

The opinion of the assessment panel: Opinion 6.3

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

In the Report it is not shown how are different stakeholders involved in the internal QA, decision making process and evaluation. It is not explained if there are contacts between the study programme and graduates/professional field. Students and alumni have to be standard members of QA team, because they are best adapted in quality of studying.

Students are involved in the Quality Assurance process.

Recommendations for improvement:

Alumni and the Profesional Field are contacted in an informal and natural way.However they should be formely involved in the Quality Assurance process.

Opinion on Criterion 6, Internal Quality Control: Opinion 6

Based on the opinions of:

Indicator 6.1, evaluation results: opinion 6.1,

Indicator 6.2, measures for improvement: opinion 6.2,

Indicator 6.3, involving co-workers, students, alumni and professional field,

The assessment panel agree with the score “Good” for indicator 6.1 (evaluation results), and “Satisfactory” for indicators 6.2 (measures for improvement), and 6.3 (involving co-workers, students, alumni and the professional field) of criterion 6 (Internal Quality Control). Thus the panel score is “satisfactory” for this criterion.

Criterion 7. Results Achieved

Indicator 7.1 Realized Level

Assessment criteria:

The realized end qualifications are in accordance with the pursued competences as for level, orientation and domain specific demands.

- Degree to which objectives are achieved;
- Quality of the master's thesis;
- Quality of the practical training;
- Realisations in terms of internationalisation of the education: participation of students (number and percentage of students, ratio of incoming vs. outgoing students) and staff in international exchange programmes;
- Preparation of the graduates for entry into the job market;
- Content of the programme and level of employment;
- Satisfaction of the graduates about their employment;
- Appreciation for the graduates by the professional field;
- Satisfaction of the graduates about the study programme

The opinion of the assessment panel: Opinion 7.1

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

After the completion of the first study cycle (4 years) student gains the following competencies: Actively participates in designing, organizing and controlling production. Independently takes production measures, analyses results and monitor stochastic processes and draw conclusions.

During 2009 a survey was conducted among employers who engage graduated students of Mechanical faculty in Zenica and simultaneously a survey among graduated students was conducted referring to their satisfaction about study Programme and acquired knowledge.

Recommendations for improvement:

No special recommendation has been pointed for indicator 7.1.

Indicator 7.2 Educational Output

Assessment criteria:

Target figures are being set for the educational output in comparison with other relevant courses. The educational output meets these target figures.

- Policy of the study programme with respect to the study progress;
- Target figures used and their comparison to other relevant study programmes;
- Pass rates and discussion;
- Analysis of student advancement;
- Diploma supplement;
- Average study duration and assessment;
- Results of study into the study programme's failures and dropouts.

The opinion of the assessment panel: Opinion 7.2

The assessment panel formed an opinion based on the determination of and on the consideration of the following:

The completion rate in the academic year 2009/2010 in all mentioned terms is 24, 25% higher than in the previous academic year 2008/2009. Expressed in percentages the number of students who enrolled the second study year (full-time four-year study Programme) in the academic year 2010/2011 is about 15% , third about 32% and fourth 54% higher than in the academic year 2009/2010. When it comes to the full time three-year study Programme the number of students who enrolled in the academic year 2010/2011 the second year is about 18% and third about 46% higher than in the previous academic year 2009/2010.

Recommendations for improvement:

Management of the Faculty referred that the first year is a kind of filter for the students. However, due to the lack of interest of new generations in engineering fields, it is important to create conditions to motivate students, even those with more difficulties. Distance Learning could be used for this purpose. However, the Management of the Faculty recognized that the Distance Learning Centre, from the University, is not working well. Effort must be placed to change this situation.

There are additional classes of Mathematics for students with problems in this discipline.

The analysis of student advancement, diploma supplement, average study duration exist at the faculty (6,5 years is too much for the Department).

Recommendations:

- Shorten the length of study.
- Investigate the causes of poor passing.
- Analyze students' workload

Opinion on Criterion 7, Results Achieved: Opinion 7

Based on the opinions of:

Indicator 7.1, realized level: opinion 7.1,

Indicator 7.2, educational output: opinion 7.2,

The assessment panel agree with the score “Good” for indicator 7.1 (realized level), and “Satisfactory” for indicator 7.2 (educational output) of criterion 7 (Results Achieved). Thus the panel score is “satisfactory” for this criterion.

Global Opinion

The assessment panel based its opinion and its motivation on the following sources:

- The study programme's self-evaluation report (SER) and its appendices, the conducted interviews with all parties concerned,
- The available documents during the assessment visit,
- The requested documents,
- The study programme's reaction on the assessment report.

After the analysis of the documentation presented to the Assessment Panel, and the visit to the Faculty of Mechanical Engineering of the University of Zenica, for the evaluation of the Management of Production Technologies, the Panel members agree in a very positive opinion concerning this Programme, which is important for the regional and national economical activity, namely for the consolidation and improvement of the Industry. During the visit the Panel members interacted with several participants in this Programme (students, professors, other staff members, management, alumni, employers, etc). Some suggestions of improvement for the Programme have been referred in the form of recommendations. During the visit the Panel felt the interest of the Programme participants in following these suggestions, some of them already in progress. As conclusion the Panel agree in a "Satisfactory" level for the Programme of Management of Production Technologies of the Faculty of Mechanical Engineering of the University of Zenica.

Based on the opinions of:

Criterion 1, educational objectives and learning outcomes: opinion 1

Criterion 2, curriculum: opinion 2

Criterion 3, staff: opinion 3,

Criterion 4, students: opinion 4,

Criterion 5, means and facilities: opinion 5,

Criterion 6, internal quality control: opinion 6,

Criterion 7, results achieved: opinion 7,

the assessment panel holds the opinion that there is a satisfactory/unsatisfactory generic quality present in the study programme.

Overview of the Opinions

	Indicator Score	Criterion Score
Criterion 1: Educational Objectives and Learning Outcomes		Satisfactory
Indicator 1.1 Level and Orientation	Good	
Indicator 1.2 Domain Specific demands	Good	
Criterion 2: Curriculum		Satisfactory
Indicator 2.1 Correspondence between Objectives and the Content of the Programme	Satisfactory	
Indicator 2.2 Demands Professional and Academic Alignment	Good	
Indicator 2.3 Coherence Programme	Good	
Indicator 2.4 Workload	Satisfactory	
Indicator 2.5 Coherence of the Organization of the Learning Process and Contents	Good	
Indicator 2.6 Master's Thesis	Satisfactory	
Criterion 3: Staff		Satisfactory
Indicator 3.1 Quality of Staff	Good	
Indicator 3.2 Demands Professional/Academic Alignment	Good	
Indicator 3.3 Quantity of Staff	Good	
Criterion 4: Students		Satisfactory
Indicator 4.1 Assessment and Testing	Good	
Indicator 4.2 Practical training	Good	
Indicator 4.3 Condition of Admission	Good	
Indicator 4.4 Student Involvement in the Improvement of the Teaching/Learning Processes	Satisfactory	
Indicator 4.5 Measures for promoting Mobility, Including the Mutual recognition of Credits	Unsatisfactory	
Indicator 4.6 Coaching of Students	Good	
Indicator 4.7 Information, Consultation and Complaining System	Good	
Criterion 5: Means and Facilities		Satisfactory
Indicator 5.1 Material Aspects	Good	
Criterion 6: Internal Quality Control		Satisfactory
Indicator 6.1 Evaluation Results	Good	
Indicator 6.2 Measures for Improvement	Satisfactory	
Indicator 6.3 Involving Co-workers, Students, Alumni and the Professional Field	Satisfactory	
Criterion 7: Results Achieved		Satisfactory
Indicator 7.1 Realized Level	Good	
Indicator 7.2 Educational Output	Satisfactory	