Annex 1: English-speaking consecutive degree program Advanced Manufacturing leading to the award of the degree Master of Science

Modules	**1. semester (winter term)**	**2. semester (summer term)**	**3. semester (winter term)**	**4. semester (summer term)**	**Workload/ Credit Points Total**
1. Basic modules Advanced Manufacturing (∑ 20 LP)					
1.1 Mathematics for Engineering Science *(This module is provided as block seminar in the first half of the semester.)*	150 AS 4 LVS (Ü2/P2) PVL: task complexes PL written test				150 AS / 5 LP
1.2 Digital Manufacturing	150 AS 4 LVS (V2/P2) PL: written test				150 AS / 5 LP
1.3 Additive Manufacturing *(This module is provided as block seminar in the second half of the semester.)*	150 AS 4 LVS (V2/P1/S1) 2 PVL: successfully completed internship (proven), patent report PL: written test				150 AS / 5 LP
1.4 Resource Efficiency from an Economic Perspective	150 AS 3 LVS (V2/Ü1) PL: written test				150 AS / 5 LP
2. Supplementary modules Research Methods and Soft Skills (∑ 10 LP)					
2.1 Research Methods		60 AS 2 LVS (S2) PL scientific abstract			60 AS / 2 LP
From the modules 2.2 to 2.13 modules of a scope of 8 CP in total have to be selected. Language modules in the own mother tongue are not eligible. Students, whose mother tongue is not German and who do not have a proof of German language proficiency on level A1 according to Common European Reference Framework for Languages, are obliged to select the modules 2.2 and 2.3. Students, whose mother tongue is not German and who do not have a proof of German language proficiency on level A2 according to Common European Reference Framework for Languages, are obliged to select module 2.3.					
2.2 German as foreign language I (level A1) *(This module can be selected each semester.)*	120 AS 4 LVS (Ü4) ASL: written test				120 AS / 4 LP
2.3 German as foreign language II (level A2) *(This module can be selected each semester.)*		120 AS 4 LVS (Ü4) ASL: written test			120 AS / 4 LP

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Modules	**1. semester (winter term)**	**2. semester (summer term)**	**3. semester (winter term)**	**4. semester (summer term)**	**Workload Credit Points Total**
2.4 German as foreign language III (level B1) *(This module can be selected each semester.)*	120 AS 4 LVS (Ü4) ASL: written test				120 AS / 4 LP
2.5 German as foreign language IV (level B2) *(This module can be selected each semester.)*	120 AS 4 LVS (Ü4) ASL: written test				120 AS / 4 LP
2.6 German as foreign language V (level C1) *(This module can be selected each semester.)*	120 AS 4 LVS (Ü4) ASL: written test				120 AS / 4 LP
2.7 English in study and science communication III (level C1) *(This module can be selected each semester.)*	120 AS 4 LVS (Ü4) 2 ASL: written test, oral examination				120 AS / 4 LP
2.8 English in study and science communication V (level C1) *(This module can be selected each semester.)*		120 AS 4 LVS (Ü4) PVL: scientific work ASL: oral examination			120 AS / 4 LP
2.9 English in study and science communication VI (level C1) *(This module can be selected each semester.)*		120 AS 4 LVS (T4) ASL: resume of a scientific text or discussion			120 AS / 4 LP
2.10 French I (level A1) *(This module can be selected each semester.)*	120 AS 4 LVS (Ü4) ASL: written test				120 AS / 4 LP
2.11 French II (level A2) *(This module can be selected each semester.)*		120 AS 4 LVS (Ü4) ASL: written test			120 AS / 4 LP
2.12 Spanish I (level A1) *(This module can be selected each semester.)*	120 AS 4 LVS (Ü4) ASL: written test				120 AS / 4 LP
2.13 Spanish II (level A2) *(This module can be selected each semester.)*		120 AS 4 LVS (Ü4) ASL: written test			120 AS / 4 LP

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Modules	**1. semester (winter term)**	**2. semester (summer term)**	**3. semester (winter term)**	**4. semester (summer term)**	**Workload Credit Points Total**
3. Profile modules Profile areas (∑ 40 LP) From the following four profile areas, one with the corresponding compulsory modules with a scope of 40 CP has to be selected:					
3.1 Hybrid Technologies					
3.1.1 Textile Process Chains		150 AS 3 LVS (V2/P1) PL: written test			150 AS / 5 LP
3.1.2 Applied Modelling and Simulation in Solid Mechanics I		150 AS 4 LVS (V2/Ü2) PL: oral examination			150 AS / 5 LP
3.1.3 Surface and Interface Engineering		150 AS 4 LVS (V2/S1/P1) PVL: presentation PL: written test			150 AS / 5 LP
3.1.4 Complex Materials for Manufacturing	150 AS 3 LVS (V2/P1) PL: written test		150 AS 3 LVS (V2/P1) PL: written test		150 AS / 5 LP
3.1.5 Calculation of Anisotropic Composite Materials	150 AS 3 LVS (V2/S1) PL: written test		150 AS 3 LVS (V2/S1) PL: written test		150 AS / 5 LP
3.1.6 Composite-based Hybrid Technologies	150 AS 3 LVS (V2/Ü1) PVL: exercise tasks PL: written test		150 AS 3 LVS (V2/Ü1) PVL: exercise tasks PL: written test		150 AS / 5 LP
3.1.7 Polymer-based Hybrid Structures			150 AS 4 LVS (V2/P2) PL: written test		150 AS / 5 LP
3.1.8 Forming Process Chains		150 AS 4 LVS (V2/Ü1/P1) PL: written test			150 AS / 5 LP

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SCHEDULE DOCUMENT

Modules	**1. semester (winter term)**	**2. semester (summer term)**	**3. semester (winter term)**	**4. semester (summer term)**	**Workload Credit Points Total**
3.2 Printed Functionalities					
3.2.1 Printing Processes		150 AS 4 LVS (V3/P1) PVL: successfully completed internship PL: written test			150 AS / 5 LP
3.2.2 Printed Electronics & Special Topics of Functional Printing		150 AS 4 LVS (V2/S2) PVL: oral examination PL: written test			150 AS / 5 LP
3.2.3 Surface and Interface Engineering		150 AS 4 LVS (V2/S1/P1) PVL: presentation PL: written test			150 AS / 5 LP
3.2.4 Automotive Sensor Systems		150 AS 4 LVS (V1/S3) 2 PL oral examination, written elaboration			150 AS / 5 LP
3.2.5 Printing Presses			150 AS 4 LVS (V3/Ü1) PVL: test within the exercise PL: written test		150 AS / 5 LP
3.2.6 Media Physics	150 AS 4 LVS (V2/S2) PL: oral examination		150 AS 4 LVS (V2/S2) PL: oral examination		150 AS / 5 LP
3.2.7 Research Lab	150 AS 4 LVS (V1/P3) PL: written report and presentation of results		150 AS 4 LVS (V1/P3) PL: written report and presentation of results		150 AS / 5 LP
3.2.8 Advanced Surfaces, Thin Films and Interfaces	150 AS 4 LVS (V2/T1/S1) PVL: presentation PL: oral examination		150 AS 4 LVS (V2/T1/S1) PVL: presentation PL: oral examination		150 AS / 5 LP

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Modules	1. semester (winter term)	2. semester (summer term)	3. semester (winter term)	4. semester (summer term)	Workload Credit Points Total
3.3 Work Design and Sustainability Management					
3.3.1 Resource Management: Challenges for Political Processes	150 AS 2 LVS (S2) PVL: presentation + handout PL: written test		150 AS 2 LVS (S2) PVL: presentation + handout PL: written test		150 AS / 5 LP
3.3.2 Life Cycle Engineering		150 AS 3 LVS (V2/Ü1) PL: written test			150 AS / 5 LP
3.3.3 Life Cycle-oriented Management		150 AS 3 LVS (V2/Ü1) PL: written test			150 AS / 5 LP
3.3.4 Sustainability Management/Environmental Management Accounting		150 AS 3 LVS (V2/Ü1) PL: written test			150 AS / 5 LP
3.3.5 IT-supported Evaluation of Material Flows and Process Chains	150 AS 2 LVS (FS2) 2 PL: written elaboration, oral presentation		150 AS 2 LVS (FS2) 2 PL: written elaboration, oral presentation		150 AS / 5 LP
3.3.6 Innovation and Value Creation	150 AS 2 LVS (S2) 2 ASL: recorded practical performances, seminar thesis		150 AS 2 LVS (S2) 2 ASL: recorded practical performances, seminar thesis		150 AS / 5 LP
3.3.7 Digital Ergonomics		150 AS 3 LVS (S2/Ü1) 2 ASL: recorded practical performances, seminar thesis			150 AS / 5 LP
3.3.8 Instrumentation			150 AS 3 LVS (V1/P2) PL: scientific poster with defense		150 AS / 5 LP

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Modules	**1. semester (winter term)**	**2. semester (summer term)**	**3. semester (winter term)**	**4. semester (summer term)**	**Workload Credit Points Total**
3.4 Production Systems					
3.4.1 Joining Technologies and Strategies		150 AS 3 LVS (V2/Ü1) PVL: exercise task PL: written test			150 AS / 5 LP
3.4.2 Forming Process Chains		150 AS 4 LVS (V2/Ü1/P1) PL: written test			150 AS / 5 LP
3.4.3 Machining Technologies			150 AS 4 LVS (V1/Ü1/P2) PL: written test		150 AS / 5 LP
3.4.4 Efficient Process Chains			150 AS 4 LVS (V2/Ü1/P1) PL: written test		150 AS / 5 LP
3.4.5 Geometrical Product Specification and Verification		150 AS 4 LVS (V2/Ü1/P1) PVL: successfully completed internship (proven) PL: oral examination			150 AS / 5 LP
3.4.6 Design and Control of Smart Production Systems		150 AS 4 LVS (V2/Ü1/P1) PL: written test			150 AS / 5 LP
3.4.7 Composite-based Hybrid Technologies	150 AS 3 LVS (V2/Ü1) PVL: exercise tasks PL: written test		150 AS 3 LVS (V2/Ü1) PVL: exercise tasks PL: written test		150 AS / 5 LP
3.4.8 Complex Materials for Manufacturing	150 AS 3 LVS (V2/P1) PL: written test		150 AS 3 LVS (V2/P1) PL: written test		150 AS / 5 LP

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Modules	**1. semester (winter term)**	**2. semester (summer term)**	**3. semester (winter term)**	**4. semester (summer term)**	**Workload Credit Points Total**
4. Supplementary modules Elective Courses (∑ 10 LP) From the not-selected profile areas modules not selected yet with a scope of 10 CP have to be selected.					
e.g. in case of selection of module 3.3.5 IT-supported Evaluation of Material Flows and Process Chains	150 AS 2 LVS (FS2) 2 PL: written elaboration, oral presentation				150 AS / 5 LP
e.g. in case of selection of module 3.3.2 Life Cycle Engineering		150 AS 3 LVS (V2/Ü1) PL: written test			150 AS / 5 LP
5. Research Module					
5 Research Project/Internship			300 AS P: 15 weeks or PR: 15 weeks 2 PL: project thesis, oral examination		300 AS / 10 LP
6. Module Master Thesis					
6 Master Project with colloquium				900 AS 2 PL: Master thesis, oral examination	900 AS / 30 LP
Specimen calculations: Total LVS in case of selection of profile area a) 3.1 Hybrid Technologies and modules 2.2, 2.3, 3.2.8, 3.3.4 b) 3.2 Printed Functionalities and modules 2.2, 2.3, 3.3.3, 3.3.6 c) 3.3 Work Design and Sustainability Management and modules 2.2, 2.3, 3.1.6, 3.4.5 d) 3.4 Production Systems and modules 2.2, 2.3, 3.3.2, 3.3.5	 a) 23 b) 21 c) 22 d) 21	 a) 24 b) 25 c) 22 d) 24	 a) 13 b) 16 c) 9 d) 14	 a)-d) 0	 a) 60 b) 62 c) 53 d) 59
Specimen calculations: Total LVS in case of selection of profile area a) 3.1 Hybrid Technologies and modules 2.2, 2.3, 3.2.8, 3.3.4 b) 3.2 Printed Functionalities and modules 2.2, 2.3, 3.3.3, 3.3.6 c) 3.3 Work Design and Sustainability Management and modules 2.2, 2.3, 3.1.6, 3.4.5 d) 3.4 Production Systems and modules 2.2, 2.3, 3.3.2, 3.3.5	a)-d) 870	a)-d) 930	a)-d) 900	a)-d) 900	a)-d) 3600

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PL	Prüfungsleistung (examination performance)
PV	Prüfungsvorleistung (pre-examination performance)
L	Anrechenbare Studienleistung (recognizable study performance) Arbeitsstunden (working hours)
ASL	
AS	Leistungspunkte (credit points)
LP	Lehrveranstaltungsstunden (hours of courses)
LVS	Vorlesung (lecture)
V	Fallstudie (case study)
FS	

S	Seminar (seminar)
Ü	Übung (exercise)
T	Tutorium (tutorial)
P	Praktikum (internship)
E	Exkursion (excursion)
K	Kolloquium (colloqium)
PR	Projekt (project)