ALLEGATO N. 2

Art. 1 – Type of Master's Programme
For the 2019/2020 academic year, the University of Pavia will ofter a Level I Master's degree in "Race Engineering" in the Department of Industrial and Information Engineering.
The Master's programme will have the teaching, logistical and organizational support of the ASC S.r.l. (Centro di Guida Sicura Quattroruote – the Quattroruote Magazine Safe Driving Centre – and the Vairano racetrack), and SkyDrive.

<u>*Edizione:*</u> II

<u>*Disciplinary area:*</u> *Industrial Engineering*

ART. 2 - EDUCATIONAL OBJECTIVES, CAREER OPTIONS AND APPEAL OF THE DEGREE PROGRAMME
The aim of the Master's programme is to produce highly qualified professionals with a solid preparation in managing competition race cars. Specific competence will be gained by the students in the techniques for car set up in a virtual manner through CAE as well as through the possibility of experimenting on the track, during the entire duration of the programme, with a Formula 4 and auto GT car driven by a professional pilot. The learning environment is highly innovative and includes classroom lessons along with test sessions on the track of the Quattroruote magazine's Centro di Guida Sicura, during which students will have hands-on learning of the techniques and methodologies of *Race Engineering* activities (from race car management to radio communications to the psychological aspects in relations between the pilot and the team). All participants will follow an introductory course in advanced driving techniques specifically designed for the programme, a fundamental feature of which is the interaction with professional *Race Engineers* for the entire length of the programme.

The training programme for the Master's ends with specific training on a VI-Grade compact static simulator installed in a room in the Vistarino building and with a specific training module on the SkyDrive dynamic simulator at the Monza Speedway.

Career opportunites for graduates involve all the racing units and race teams in motor sports competitions in Europe and the world. More specifically, the competencies acquired from the Master's programme represent a key factor in permitting students to quickly and successfully become part of a racing team. At present this type of engineering professional, strongly requested by the market, is not associated with any specific academic programme.

The Level I Master's in "**Race Engineering**" is offered to international students who are young engineers with a passion for *motor racing*.

Affiliated with the programme are firms such as McLaren, Pirelli, CD Adapco/Siemens, Seat, Thyssen Presta, AudiSport, ZF-TRW, X-Trac, Ycom, AF corse, and Brembo.

ART. 3 – MASTER'S DEGREE PROGRAMME
The Master degree programme lasts **one year** (**1,500 total hours – 60 course credits**) and includes classroom lessons at the University of Pavia (Engineering building and the Vistarino building), the ASC Quattrorotte – Centro di Guidi Sicura (at the Vairano racetrack in Vidigulfo, Pavia) as well as practical activities at the ASC – Centro di Guida Sicura (at the Vairano racetrack) and the Monza Speedway, technical visits to racing facilities, an internship at the end of the programme at a participating company, seminars, study activities, and individual preparation and training.
The Master's programme is set to begin in October 2019.

The institutional seat for the programme is the Engineering Faculty, where the classroom lessons, seminars and meetings with firms take place along with practicals at the calculator. In the Vistarino building, the seat of the Fondazione Alma Mater Ticinensis, which is also where the Master's in Design and Development of Vehicle Dynamics takes place, classroom lessons will be given in addition to seminars and meetings with firms and training activities using the compact driving simulator.

The technical seminars are given by researchers from the University of Pavia and other universities, among which the Frederick II University of Naples, the University of Pisa, the Polytechnic University of Milan, and by professionals from companies such as VI-Grade, Pirelli, MegaRide, McLaren, CD Adapco/Siemens, X-trac, Ycom, Brembo, Porsche and AudiSport. Also planned are technical visits to the Danisi Engineering Driving Simulator Center, the Pirelli laboratories, and the Pirelli track in Vizzola Ticino.

The group of educational activities corresponds to **60 educational credits (CFUs).**

Enrolled students must attend at least 75% of the overall hours set aside for the educational activities.

The period for educational activities cannot be interrupted.

Students cannot transfer to similar Master's programmes at other universities.

Since it is aimed primarily at an international market, the courses may be given in English, based on the number and nationalities of the students enrolled.

Module	SSD (disciplinary area)	Content	Number of classroom hours	Number of hours of practicals/lab courses	Hours of indiv. study	Total hours	Course credits
I)		Integrated teaching: Designing the Vehicle Dynamics					
1) Fundamentals of Vehicle Dynamics	ING-IND/13 ING-IND/14 ING-IND/15 ING-IND/06	Fundamentals of vehicle dynamics. Aerodynamics. Tires.	60	0	90	150	6
2) Virtual Dynamics, Design and Simulation	ING-IND/13	Multibody analyses: Introduction. Adams Car. Real-time analyses. From real-time virtual Dynamics to Dynamic driving simulator.	8	32	60	100	4
3) VI-Grade Static Simulator training	ING-IND/13	Experimental training with static driving simulator.	8	32	60	100	4
II)		Integrated teaching: Propulsion and Control					
4) Propulsion: ICE, Hybrid, Electric	ING-IND/08, ING-IND/32	Thermal engines. Principal characteristics and performance. Architecture. Consumption. Electric engines. Generators. Accumulation systems. Fuel supply. Recharging. Connection systems. Wiring. Protocols. Diagnostics.	30	0	45	75	3
5) Vehicle Dynamics Control	ING-INF/04	Introduction to the main regulators. Brake, stability and traction control systems. Vector control.	10	0	15	25	1
III)		Integrated teaching: Vehicle experimentation and pilot/vehicle interaction					

6) Advanced Driving Course	ING-IND/13 ING-IND/34 ING-INF/05 ING-INF/06 BIO/09	Driving experience and training	2	8	15	25	1
7) Skydrive Dynamic Simulator	ING-IND/13	Simulation of race track activities propaedeutic to the final examination	10	0	15	25	1
8) Race Track Management and Vehicle Set Up for Performance	ING-IND/13 ING-IND/14 ING-IND/04	Basic knowledge and tools evaluation. Manuals and regulations. Methodology for an effective race car setting. Analyses of Track tests.	18	72	135	225	9
9) Race Engineering Science	ING-IND/13 ING-INF/05 ING-INF/06 BIO/09	Every day task and performance evaluation. Development of a methodology to 'read driver's mind'. Teambuilding.	10	0	15	25	1
10) Data acquisition	ING-IND/12 ING-IND/13	Data acquisition systems. Data analysis. Transducers and sensors. Experimental training.	8	32	60	100	4
11) Biomechanics: Driver/Vehicle interaction	ING-IND/13 ING-IND/34, ING-INF/05, BIO/09	Methodologies and instruments to evaluate pilot/vehicle interaction. Comfort and performance. Integrated measurement and control system. Physiology of the pilot. Psychophysical stress and physiological adaptation. Environmental factors.	20	0	30	50	2
Total hours: partial			184	176	540	900	36
IV) Internship-work placement-seminars						550	22
Final exam	50	2					
Total hours	1500	60					

ART. 4 – IN-COURSE ASSESSMENTS

Learning is assessed during the course by the teachers giving the lessons and practicals, leading the seminars and the practical tests, and supervising the students' work.

There is no specific mark for course examinations and the final exam.

ART. 5 – FINAL EXAM AND AWARDING OF THE DEGREE

Students who have completed the Master's degree by carrying out all the required activies and obligations and passed the final exam, consisting of the presentation and discussion of a thesis, will be awarded a Level I Master's degree in **"Race Engineering".**

The final exam entails the presentation and discussion of a written thesis on the internship carried out by the candidate.

ART. 6 - FACULTY

Teaching will be carried out by faculty from the University of Pavia and from other universities as well as by highly-qualified outside experts.

ART. 7 – ADMISSION REQUIREMENTS

The Master's programme is aimed at students who possess:

1. *a degree in accordance with D.M. (Ministerial Decree) 270/2004 pertaining to the class of degrees in:*

- Industrial Engineering - L-9

  with particular reference to degree programmes in mechanical, aerospace, electrical, energy, mechatronics, industrial, materials, and automotive engineering.

2. *a degree in accordance with D.M. 509/99 pertaining to the class of degrees in:*

- Industrial Engineering - 10

  with particular reference to degree programmes in mechanical, aerospace, electrical, energy, mechatronics, industrial, materials, and automotive engineering.

3. *a second-cycle degree in accordance with D.M. 270/2004 pertaining to one of the following classes:*

- Mechanical Engineering - LM-33
- Aerospace and Astronautical Engineering - LM-20
- Electrical Engineering - LM-28
- Energy and Nuclear Engineering - LM-30
- Materials Science and Engineering - LM-53
- Automation Engineering - LM-25

4. *a specialist degree in accordance with D.M. 509/99 pertaining to one of the following classes:*

- Mechanical Engineering - 36/S
- Aerospace and Astronautical Engineering - 25/S
- Electrical Engineering - 31/S
- Energy and Nuclear Engineering - 33/S
- Materials Science and Engineering - 61/S
- Automation Engineering - 29/S
-

5. *a degree in accordance with the previous regulations in:*

- Mechanical Engineering
- Industrial Engineering
- Aerospace Engineering
- Electrical Engineering
- Nuclear Engineering
- Materials Engineering

In the case of admissions applications from foreign students, the Faculty Board will evaluate the equivalence of the foreign degree and the Italian degree required for admission to the Master's programme.

The maximum number of enrolled students is **14**.
The minimum number to activate the degree programme is **7**.
The Faculty Board may also decide that the conditions exist to increase he enrolment in the programme.

If the number of applicants exceeds the maximum number called for, a Committee made up of a Coordinator and two members of the Master's faculty will determine a ranking based on merit (expressed in hundredths) which takes into account the following evaluation criteria:

1. Up to a maximum of 30 points for the final degree mark, divided as follows:

   - 10 points for a final degree mark < 100/110
   - 11-21 points for a mark between 100/110 and 110/110 (a mark of 100/110 will receive 11 points, with one point for each additional hundredth of a point added to the final degree mark)
   - 30 points for a mark of 110/110 cum laude
   -
2. Up to a maximum of 70 points for an interview in Italian or English, whose aim is to evaluate the competencies, capacities and motivations of the candidate regarding the content and specific objectives of the Master's programme. Special recognition will be given for any work experience in the automotive sector – such as scientific publications related to the topic area of the Master's – and for knowledge of specific development software such as Matlab, Simulink, Adams, etc.

The interview will be considered successful with a mark of at least 42/70.

In case of a tie in the rankings, the younger candidate will be given preference.
If one or more candidates withdraw, their places will be assigned to the candidates next in line in the ranking, until all the available places are assigned.

ART. 8 - DEADLINE FOR ADMISSION APPLICATION
Candidates must submit their application form in the manner indicated in the admissions notice **FROM JUNE 18, 2019, TO SEPTEMBER 2, 2019.**

ART. 9 – ATTACHMENTS TO THE APPLICATION
Candidates must attach the following documents during the online enrolment procedure:
- **application for admission to the Master's programme (the form to be used is on page 7);**
- **a photocopy (front and back) of the personal identity document, to be included during the enrolment phase;**
- in the case of possession of a foreign degree:
    - ✓ a copy of the degree required for admission along with the exams taken and corresponding marks, translated into Italian
    - ✓ a copy of the "declaration of equivalence" issued by the Italian Embassy/Consulate in the country in which the degree was issued (only if already available)
- A transcript of records or self-certification of the exams passed at university in Italy, with the corresponding marks;
- **A reference letter**
- **A letter of Academic Purpose**
- **A curriculum vitae highlighting the professional experiences in areas associated with that of the Master's programme**

As Article 3 of the general admissions notice indicates, candidates with a foreign degree must, **by the final deadline of 10/01/2020**, submit to the Ufficio Master - Servizio Sanita' e Post Laurea (via Ferrata n. 5 Pavia) the following documents **in the original** notarized by the Italian Embassy or Consulate in the country from which the university degree was issued:
•   the academic degree required for admission, indicating the exams taken and corresponding marks, translated into Italian;
•   a declaration of equivalence.
THE REQUIREMENTS FOR ENROLMENT MUST BE IN THE POSSESSION OF THE CANDIDATE BY THE DEADLINE FOR THE SUBMISSION OF THE ADMISSIONS APPLICATION.

ART. 10 – FEES AND OTHER PAYMENTS

Enrolment:

Students enrolled in the Master's programme for the 2019/2020 academic year must pay a fee of €15,000 that includes:

€16 (stamp duty) and €142 (fees for secreteriat services).

This amount is to be paid in two instalments:

- an initial payment of €10,000 at the time of enrolment;
- a second payment of €5,000 to be paid by 10/01/2020

Final exam:

To be admitted to the final exam, candidates must submit the application form with a €16 stamp duty affixed along with a payment of **€100** (€16 of which as a stamp duty for the document, to be paid in virtual form) as a fee for the issuance of the document.

ART. 11 – WEB SITE AND ORGANIZATIONAL SECRETARIAT:

Any communication with the candidates will be published on the following **web sites**:

http://iii.unipv.it/index_en.php?pag=teaching/master.html

http://raceengineering.unipv.eu/

For information on the organization of the Master's programme contact the:

Organizational Secreteriat

Department of Industrial and Information Engineering

Prof. Carlo E. Rottenbacher, Ms. Laura Pecoraro

Tel. 0382/6992200

Fax 0382/6992228

E-mail: info.raceeng@unipv.it

Servizio Sanità e Post laurea

APPLICATION FORM

FOR THE LEVEL I MASTER IN "RACE ENGINEERING"

(the form, duly filled in, must be uploaded to the on-line procedure of admission to the Master's course as indicated in point 9 of the annex to the relevant call for admissions)

The undersigned   (NAME, SURNAME)_____

Date of birth _____City_____State_____

State of residence _____Permanent address _____

_____

_____E-mail _____

APPLIES

for admission to the aforementioned Master's degree

and **ATTACHES**

to the formal admission form the following papers **to be submitted mandatorily for the application evaluation**:

1.   photocopy of the personal ID document/passport uploaded during the on-line registration procedure;

2.   transcript of records/self-declaration of the exams passed at an Italian university and the corresponding marks;

3.   In addition, candidates with a degree earned at a foreign university must attach:

✓   a copy of the degree

✓   a copy of the "declaration of equivalence" issued by the Italian Embassy/Consulate in the country where the degree was awarded (only if already available)

4.   a reference letter;

5.   a letter of Academic Purpose;

6.   a CV listing professional experiences in areas pertaining to the above Master's degree.

Date _____   Signature_____