ANNEX EN-25-DISS-M1-563

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Art. 1 - Type

The University of Pavia is launching a first-level Post-Bachelor Vocational Program in **Car Testing and Race Engineering (MCTRE) - *Car Test Driving and Simulation for Vehicle Dynamics Development*** *course* at the **DEPARTMENT OF INDUSTRIAL AND INFORMATION ENGINEERING**, for the 2025/2026 academic year.

Edition: 4

Disciplinary area: SCIENTIFIC AND TECHNOLOGICAL AREA

Art. 2 - Training objectives, job opportunities and course appeal

This specific pathway of the Post BA Vocational Program aims to **train highly qualified professionals with a solid background in vehicle dynamics design**. T**hese professionals will be capable of operating in all phases of vehicle set-up and development,** from dynamic simulation to prototype testing and pre-series vehicle production. The students will gain special expertise in vehicle testing techniques, both virtually using CAE systems and through training on driving simulators, as well as experimentally on vehicles (on the track and on the road). **As a completely new feature**, the training course includes **test sessions on Quattroruote's ASC** (Automotive Safety Centre) **track**, in addition to lectures. During these sessions, participants will learn about the techniques and methods used in testing, checking and fine-tuning the vehicle's dynamic behaviour. All participants will undertake an advanced driving course specifically designed to prepare them for subsequent on-track testing.

The Vocational Program comprises **targeted training on the VI-Grade CarRealTime simulation software**, the **MSC Adams software and the CFD software**, as well as a **special training module on a static simulator and a work session on a dynamic simulator** at the VI-Grade centre in Tavagnacco (Udine) or at Danisi Engineering in Nichelino (Turin), which are partner companies in the programme.

A vehicle test engineer who has completed the specific Vocational Program can find employment in all industrial groups that operate in the design, development and production of vehicles, and more generally in the *Automotive* sector. Notably, **the expertise gained during the course is of fundamental importance in the design, testing and development phases of the dynamic behaviour of new vehicles**.

Training for design and test engineers is not available in the current academic education landscape, despite them being in high demand on the market. This training would be desirable in both mature markets, such as Italy, and emerging markets from the perspective of the *Automotive* industry. In addition, this Vocational Program's course is the world's first to **contribute to the training of a new professional profile**: the **"Certified" CAE Driving Simulator Engineer**. This role is reserved for students involved in apprenticeship activities specifically designed for further training and project development using the simulator.

The following companies are involved in the Vocational Program, related to one or both courses, in various capacities: ASC, VI-grade, McLaren, Pirelli, CD-Adapco/Siemens, Seat, Thyssen Presta, AudiSport, ZF-TRW, Ycom, Brembo, Lamborghini, Continental, Prema, Trident, ADM Motorsport, Team Lazarus, JAS Motorsport, Tatuus, Autotecnica Motori, Maserati, Alfa Romeo, Magneti Marelli, FCA, Abarth, Michigan Scientific, Michelin, Oreste Berta, PCB, Kistler, Danisi Engineering, Skydrive, Harp Racing, Corbetta Racing, PetriCorse, Imperiale Racing, Leomax, Porsche NTC. Aviorace and Koni.

The current changing context of the Automotive/Motorsport sector requires companies/teams to rely on highly trained human resources, not only in terms of theory and methodology, but also in the most innovative design and experimentation techniques currently available. These techniques are the main area of specialisation of the Vocational Program courses.

Art. 3 - Program's curriculum

The **one-year** Vocational Program comprises a total of 1,500 hours, broken down according to the table below.

The set of planned training activities is designed to enable course participants to acquire **60 university credits** (CFU).

The teaching modules are organized as follows and will be **taught in English**:

Module	SSD	Lenguage	L(h)	STD(h)	OL(h)	EX(h)	Tot(h)	CFU
DESIGN OF THE VEHICLE DYNAMICS								

1) Total Vehicle Design	ING-IND/13 | MECCANICA APPLICATA ALLE MACCHINE	English	60	90	0	0	**150**	**6**
	Contents: • International Scenario and methodology process • Total vehicle benchmark Analyses • Methodology processes for total vehicle Design • Aerodynamics for Dynamics performances improvement and fuel consumption control • Integration between Aerodynamics and Style.							
3) Virtual Dynamics Design and Simulation	ING-IND/13 | MECCANICA APPLICATA ALLE MACCHINE	English	8	60	0	32	**100**	**4**
	Contents: • Multibody analyses introduction • Adams Car. Real-time analyses • From real-time virtual Dynamics to Dynamic driving simulator.							
2) Fundamental Driving Dynamics	ING-IND/13 | MECCANICA APPLICATA ALLE MACCHINE	English	40	60	0	0	**100**	**4**
	Contents: • The role of K&C Rig Testing with CAE models • Chassis subsystem modeling for R&H • Full vehicle virtual prototypes for Handling and Ride-Comfort • Road loads data prediction • Multi-attribute balancing • Coordinating with Control system development • Advanced experimental body modal contribution techniques • Integrated Engineering development process • Advanced driver assistance systems and autonomous driving.							
MATERIALS, PROPULSION AND CONTROL								
4a) Materials	ING-IND/21 | METALLURGIA	English	20	30	0	0	**50**	**2**
	Contents: • Materials for the Automotive sector • Technologies, Processes • Features.							
4b) Structural resistance	ICAR/08 | SCIENZA DELLE COSTRUZIONI	English	20	30	0	0	**50**	**2**
	Contents: • Methods of topological optimization for verifying the body and components.							
5a) Propulsion: ICE.	ING-IND/08 | MACCHINE A FLUIDO	English	10	15	0	0	**25**	**1**
	Contents: • Internal combustion engines • Principal characteristics and features • Architecture • Consumption.							
5b) Propulsion: Hybrid, Electric (both courses)	ING-IND/32 | CONVERTITORI, MACCHINE E AZIONAMENTI ELETTRICI	English	10	15	0	0	**25**	**1**
	Contents: • Electric Motors • Generators • Accumulation Systems • Power supply • Recharging • Connection Systems • Wiring • Protocols • Diagnostics.							
6) Vehicle Dynamic Control (both courses)	ING-INF/04 | AUTOMATICA	English	10	15	0	0	**25**	**1**
	Contents: • Introduction to the main regulators • Braking control systems, stability, traction, and vector control • Classical problems • Vehicle dynamic control • Measurements, sensors and observers.							
VEHICLE TESTING AND PILOT/VEHICLE INTERACTION								

7) Total Vehicle Testing and Development	ING-IND/13 | MECCANICA APPLICATA ALLE MACCHINE	English	12	90	0	48	**150**	**6**
	Contents: • Total vehicle development process, experimental and CAE • Standardized subjective and objective experimental tests to develop and evaluate Dynamic and Ride Comfort behaviour • Driving course to learn Experimental Development Process: from test results to problem solving • Methodology to recognize problems and to approach problem solving • Failure Mode and Effect Analyses.							
8) Biomechanics: Human/ Vehicle interaction (both courses)	ING-IND/34 | BIOINGEGNERIA INDUSTRIALE	English	14	105	0	56	**175**	**7**
	Contents: • Methodology and tools for the evaluation of driver/vehicle interaction • Comfort and features • Integrated system of measurement and monitoring • Driver physiology • Psychophysical stress and physiological adaptation • Environmental factors.							
		PARTIAL	**204**	**510**	**0**	**136**	**850**	**34**
Internship/Stage		English					**600**	**24**
Final exam		English					**50**	**2**
						TOTAL	**1500**	**60**
L ***Lectures;*** **STD** ***Study;*** **OL** ***Online lessons;*** **EX** ***Exercises, practical activities.***								

Lectures and seminars will be held by researchers from the University of Pavia and other universities, including the University of Naples Federico II, the University of Pisa, the Politecnico di Milano, Sheffield Hallam University, the University of Padua, Stanford University, and **professional experts from companies** such as FCA, Abarth, VI-Grade, Pirelli, Seat, CSI, MegaRide, Brembo, Danisi Engineering, Alfa Romeo, Maserati, CSI, Kistler, PCB. **Technical visits will be arranged** at the following locations: the Balocco experimental centre (FCA), the Driving Simulator Centre of Danisi Engineering, the CSI centre, the Pirelli laboratories and the Pirelli track at Vizzola Ticino.

A number of very **innovative seminars and workshops** will be delivered to students, including, for example:

1. **Theoretical and practical seminar on ADAS systems** (*Advanced Driver Assistance Systems*) conducted by ASC technical staff. The two-day seminar will cover the main topics concerning the technical characteristics and evaluation of the efficiency and performance of ADAS currently used in road vehicles. The experimental seminar will be conducted with the exclusive "UFO" (UltraFlat Overunnable robot) instrumentation provided by the ASC centre.
2. **Experimental seminar on vehicle dynamics** designed in cooperation with FCA
3. **Seminar on experimental aerodynamics**
4. **Seminar on vehicle instrumentation** from a dynamic, *durability* and comfort perspective

Students of the Vocational Program **may attend, free of charge, any seminars, workshops or events on related topics**, organized by the Coordinator, within the relevant Department.

Students attendance of the various training activities is structured as follows:

- internship, practical and laboratory activities: compulsory attendance
- lectures: attendance is mandatory for the minimum of hours corresponding to the 75% of the total.

The training period cannot be suspended.

Transfers to similar Vocational Programs at other universities are not permitted.

Art. 4 - Progressive knowledge checks

Knowledge checks will be carried out during the course by the teachers delivering the lectures and practical exercises, conducting the seminars and practical tests and monitoring the students' work. Any progress tests and the final test will not result in a mark.

Art. 5 - Final degree examination and achievement of the qualification

The final examination involves **presenting and discussing a written thesis** on the candidate's training activities. No mark or merit grade will be awarded for this examination.

At the end of the Vocational Program, participants who have completed all the activities and fulfilled all the requirements will be awarded the will be awarded the **first-level Post-Bachelor** Vocational Program's Diploma in **'Car Test Driving and Simulation for Vehicle Dynamics Development (MCTRE)**'.

Art. 6 - Faculty

Teaching will be held by faculty from the University of Pavia, and from other universities e as well as by highly-qualified professional experts.

Art. 7 - Admission requirements

The Vocational Program is intended for students who have obtained a **Bachelor's Degree**, in accordance with the Ministerial Decree No. 270/04, **in one of the following classes:**

- (L-9) Industrial Engineering Degree Class

The Vocational Program is intended for students who have obtained a **Bachelor's Degree**, in accordance with the Ministerial Decree No. 509/99, **in one of the following classes:**

- (10) Industrial Engineering Degree Class

and **degrees in accordance with the previous regulations**.

The following qualifications will be given preference within the above classes:

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

Moreover, Master's Degrees (MD) obtained in accordance with Ministerial Decree No. 270/04 in one of the following classes will also be considered:

- Aerospace and Aeronautical engineering – 25/S, LM-20
- Automation engineering – 29/S, LM-25
- Electrical engineering – 31/S, LM-28
- Energy and nuclear engineering – 33/S, LM-30
- Mechanical engineering – 36/S, LM-33
- Material sciences and engineering – 61/S, LM-53.

Candidates holding a **degree obtained abroad deemed equivalent to the degree classes stated above** may also be admitted.

The maximum number of places available is **28**.

A minimum number of **10** participants is required to activate the Vocational Program; a minimum of **4** participants is rnecessary to activate the specific course.

The Academic Board may also consider whether it is possible to increase the number of places as mentioned above.

If the number of applicants exceeds the expected maximum, a selection committee comprising the Coordinator and two Faculty members will be formed to select applicants and create a merit list, expressed in **hundredths**. This list will be determined on the basis of the following evaluation criteria:

1) Up to a maximum of 30 points for the graduation mark, as follows:

- 10 points for a graduation mark < than 100/110
- between 11 and 21 points for a degree grade ranging from 100/110 to 110/110 (A grade of 100/110 will be awarded 11 points, with an additional point awarded for every subsequent hundredth of a point obtained)
- 30 points for a grade of 110/110 "cum laude".

2) Up to a maximum of 70 points for an interview in Italian or English, aimed at assessing the candidate's skills, abilities and motivation in relation to the contents and specific objectives of the Vocational Program. Special emphasis will be placed on any work experience gained in the Automotive sector - scientific publications relating to the topics of the master's degree, and knowledge of specialised development software such as Matlab, Simulink, Adams, etc. The interview will be considered successful if the candidate achieves a score of **at least 42 out of 70 points.**

In the event of a tie in the ranking list, the youngest candidate will prevail. If one or more candidates withdraw, the places they vacate will be offered again according to the merit list until they are filled.

AUDITORS

To be admitted, auditors will be required to meet the following criteria:

auditors, employees of the Vocational Program's partner companies or professionals, **must have proven experience in the *Automotive/ Motorsport* field and may attend a maximum of 5 modules**.

Below is a breakdown of the **cost of the modules**, including € 32.00 (two stamp duties) and € 200.00 (administrative fees):

- Module 1 (60 hours, classroom) - € 3.500
- Module 2 (40 hours, classroom) - € 2.500
- Module 3 (40 hours, classroom) - € 2.500
- Module 7 (60 hours: ASC driving course + ASC Vairano track activity) - € 7.174
- Module 8 (70 hours, classroom and experimental) - € 4.000.

The activities of module 7 take place exclusively at the ASC proving ground in Vairano.

Auditors will receive a **specific certificate of attendance** related to the modules attended, without any credits being awarded.

Art. 8 - Deadline for the online application process

Applicants must submit their application in accordance with the procedures,set out in the Call for Admission, from **18/06/2025** and by the deadline of **20/10/2025**. All the requirements set out in the Call for Admission and this Annex must be met within the application deadline.

Art. 9 - Annexes for the online application process

Applicants must upload, during the online application process, the scan of the following documentation:

1) **application form** (the form is at page 8)
2) (front-rear) **personal identification document** inserted during registration
3) **reference letter**
4) **motivational letter**
5) **CV** histing also professional experiences in working environments pertaining the above course, if any

ONLY FOR QUALIFICATIONS OBTAINED IN ITALY:
6) **self-certification of examinations** taken during the academic career (with marks)

ONLY FOR QUALIFICATIONS OBTAINED ABROAD:
6) **Academic qualification required for admission** issued in English/Spanish/French or officially translated in Italian
7) **Transcript of records issued in English/Spanish/French or officially translated in Italian**

Also, if already available:

- ***Declaration of Value (Do)** issued by the Italian embassy/consulate*
- *or **CIMEA Statement of Comparability***
- *or **Diploma Supplement** (if the qualification granting access to the Vocational Program has been issued by a european university)*
- *or **Statement of Correspondence** which can be downloaded from the Automatic Recognition Database (ARDI).*

The aforementioned documents must be uploaded within the period referred to in art. 8.

Please note that, as indicated in art. 3 of the Call for Admission to the Vocational Program, **applicants holding a qualification obtained abroad must, by the enrollment deadline or at least by 12/01/2026** according to the calendar published by the Organizational Secretary of the Vocational Program, **deliver the following documentation in original**:

1) **Academic qualification required for admission** issued in English/Spanish/French or officially translated in Italian

- **LEGALISED** by the Italian embassy/consulate in your country (legalisation is NOT required for Belgium, Denmark, the United Kingdom of Great Britain and Ireland, France, Ireland and Germany OR for documents with an electronic/digital means of ascertaining its authenticity as QR code/string code)
  PLEASE NOTE: legalisation must refer to the document not the translation
- or **APOSTILLED** (the apostille **is only available** for the signatory countries to the **Hague Convention**)
- or **ACCOMPANIED by CIMEA Statement of Verification**.

2) **Transcript of records** (list of and relevant marks) issued in English/Spanish/French or officially translated in Italian

3a) **IF your title HAS NOT been obtained** in one of the Countries that are signatories to the **Lisbon Recognition Convention**

- **Declaration of Value (DoV)** issued by the Italian embassy/consulate
- or **CIMEA Statement of Comparability**
- or **Diploma Supplement** (if the foreign qualification is issued by a european university).

3b) **IF your title HAS been obtained** in one of the Countries that are signatories to the **Lisbon Recognition Convention**

- **Statement of Correspondence** which can be downloaded from the **Automatic Recognition Database (ARDI)**.

Enrollment to the Vocational Program will be finalized ONLY upon delivery of this documentation.

Art. 10 - Tuition and fees

Enrollment

Students enrolling in the Vocational Program, for the 2025/2026 academic year, must pay the amount of **€ 15.000**, including: € 16.00 (stamp duty) and € 200.00 (administrative fees).

This amount must be paid in **2 instalments:**

- 1° instalment of € **10,000.00**, to be paid **upon enrollment**
- 2° instalment of € **5.000,00**, to be paid by **12 of January 2026**.

External national or international organisations or bodies may contribute to the conduct of the master's course by providing scholarships for enrolment/internship attendance. Should such agreements be finalised, they will be posted on the Vocational Program's website, along with the award criteria.

Final exam

In order to be admitted to the final examination, candidates must submit an application and pay a € 116.00 fee for the certificate. This amount includes two € 16.00 revenue stamps paid electronically, one being affixed to the certificate and the other to the application form. The cost of the certificate may be changed by resolution of the Board of Directors after the publication of this notice.

Art. 11 - Website and Organizational Secretary contacts

Any communication and important information regarding candidates and students will be posted on the following website:
http://vehicledynamics.unipv.it

For information regarding the course organization:

Organizational Secretary

The Organizational Secretary will be located at:

Dipartimento di Ingegneria Industriale e dell'Informazione
Via A. Ferrata, 5 - 27100 Pavia (PV)
E: info.vehicledyn@unipv.it
P: 0382.6992201

The contact persons are: Prof. Carlo E. Rottenbacher - Sig.ra Laura Pecoraro (ASC).

UNIVERSITÀ DI PAVIA

Servizio Medicina
e post laurea

APPLICATION FORM

to the I level POST-BACHELOR VOCATIONAL PROGRAM:

CAR TESTING AND RACE ENGINEERING (MCTRE)

(this form, duly filled in, must be uploaded in the on-line procedure of admission to the Post-Bachelor Vocational Program as per issue n°9 of the annex to the relevant call for admissions)

The undersigned (FORENAME, SURNAME) ……

Date of birth …… City …… State ……

State of residence …… Permanent address ……

E-mail ……

APPLIES

for admission to the aforementioned Post-Bachelor Vocational Program and in specific, to the following study path:

[ ] CAR TEST DRIVING AND SIMULATION FOR VEHICLE DYNAMICS DEVELOPMENT

[ ] RACE ENGINEERING

and **UPLOAD**

the scan of the following documents **to be submitted mandatorily for the application evaluation**:

1) front-rear of the **personal ID document/passport** uploaded during the on-line registration procedure

2) **reference letter**

3) **motivational letter**

4) **CV** listing also professional experiences in working environments pertaining the above course, if any

ONLY FOR APPLICANTS WITH AN ITALIAN ACADEMIC TITLE:

5) **self-declaration of the passed exams** during the academic career reading relevant marks

ONLY FOR APPLICANTS WITH A FOREIGN ACADEMIC TITLE:

5) **academic qualification required for admission** issued in English/Spanish/French or officially translated in Italian
   - **LEGALIZED** by the Italian embassy/consulate in your country (legalisation is not required for Belgium, Denmark, the United Kingdom of Great Britain and Ireland, France, Ireland and Germany OR for documents with an electronic/digital means of ascertaining its authenticity as QR code/string code)
     PLEASE NOTE: legalization must refer to the document's contents not to the translation
   - OR **APOSTILLED** (the apostille is only available for the signatory countries to the Hague Convention)
   - OR **ACCOMPANIED by CIMEA Statement of Verification**

PLEASE NOTE: it is not mandatory to have the Legalization/Apostille/Statement of Verificatio, if not available yet, during the online application, but it will be necessary to produce it in original and deliver it by the enrollment deadline.

6) **transcript of records** (list of and relevant marks) issued in English/Spanish/French or officially translated in Italian

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7) **IF your title HAS NOT been obtained** in one of the Countries that are signatories to the Lisbon Recognition Convention

- **Declaration of Value (DoV)** issued by the Italian embassy/consulate
- OR **CIMEA Statement of Comparability**
- OR **Diploma Supplement** (if the foreign qualification is issued by an european university).

IF your title HAS been obtained in one of the Countries that are signatories to the Lisbon Recognition Convention

- **Statement of Correspondence** which can be downloaded from the Automatic Recognition Database (ARDI)

PLEASE NOTE: it is not mandatory to have the DoV/Statement of Comparability/Diploma Supplement/Statement of Correspondance if not available yet, during the online application, but it will be necessary to produce it in original and deliver it by the enrollment deadline.

Date …… Signature ……