



ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ
ವಿಟೆಯು ಅಧಿನಿಯಮ ೧೯೯೪ ರ ಅಡಿಯಲ್ಲಿ ಕರ್ನಾಟಕ ಸರ್ಕಾರದಿಂದ ಸ್ಥಾಪಿತವಾದ ರಾಜ್ಯ ವಿಶ್ವವಿದ್ಯಾಲಯ

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

State University of Government of Karnataka Established as per the VTU Act, 1994 "Jnana Sangama"

Belagavi-590018, Karnataka, India



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REGISTRAR

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REF: VTU/BGM/CIR/005/2026/ 4133

DATE: 22 OCT 2026

CIRCULAR

Subject: Correction in the Syllabus of 1st Semester M.Tech. in Machine Design (2026 Scheme) – reg.

Reference: Email from Chairperson, BoS, PGME. Dated: 22/10/2026

This is to bring to the notice of all concerned stakeholders that a typographical error was identified in the syllabus uploaded on the VTU website for the 1st Semester M.Tech. in Machine Design (2026 Scheme).

Previously, the syllabus contents for the following two courses were erroneously displayed as identical:

- 1MME102 - Advanced Materials and Processing
- 1MME105A - Advanced Structural Dynamics and Vibration Control

Please be informed that the syllabus for 1MME105A - Advanced Structural Dynamics and Vibration Control has now been corrected. The revised and corrected syllabus file has been successfully uploaded on the official VTU website for your reference and the same has been made available at <https://vtu.ac.in/en/pg-scheme-syllabus/>.

The Principals of all constituent/affiliated engineering colleges and Chairpersons/Heads of the Mechanical Engineering departments are hereby requested to bring this correction to the immediate notice of the concerned faculty members and students.

Encl: List of updated Syllabus for the subjects 1MME102 - Advanced Materials and Processing and 1MME105A - Advanced Structural Dynamics and Vibration Control.

Paul/22/10/26
REGISTRAR

To,

1. The Principals of all Engineering Colleges affiliated with VTU offering the M.Tech Machine Design program.
2. The Chairpersons / Heads of the Department of Mechanical Engineering.

Copy:

1. The Hon'ble Vice-Chancellor, through the Secretary to VC, VTU, Belagavi, for information.
2. The Registrar (Evaluation), VTU, Belagavi.
3. The Special Officer, QPDS Section, VTU, Belagavi (Copy to Mr. P. Manjunath).
4. Office Copy

ADVANCED MATERIALS AND PROCESSING			
Course Code	1MME102	Scheme	2026
Type of Course	PCC/PEC/OEC (Theory)	Semester	01
Teaching Hours/Week (L:T:P)	: :	CIE Marks	50
Total Hours of Pedagogy per semester L /T/P/SL&TW:	: : : :	SEE Marks	50
Credits	3	Total Marks	100
Examination type (SEE)	Theory	Exam Hours	03
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to:			
1. Explain the structure, properties, and classification of advanced materials.			
2. Analyze processing techniques for metals, ceramics, polymers, and composites.			
3. Evaluate the role of nanomaterials and smart materials in engineering applications.			
4. Apply material selection principles for industrial design and manufacturing.			
5. Assess sustainability and emerging trends in advanced material processing.			
Module-1			
Structure and Properties of Advanced Materials: Crystal structures, defects, and microstructures, Mechanical, thermal, electrical, and optical properties. Advanced alloys (superalloys, shape memory alloys). Case studies: aerospace and biomedical applications. Number of Hours: 08			
Module-2			
Processing of Metals and Alloys: Solidification and casting processes, Powder metallurgy and additive manufacturing, Thermomechanical treatments (forging, rolling, extrusion), Heat treatment and surface engineering. Number of Hours:08			
Module-3			
Ceramics and Polymers: Structure and properties of ceramics and glasses, Ceramic processing: sintering, hot pressing, sol-gel. Polymers: thermoplastics, thermosets, elastomers, Processing methods: injection molding, extrusion, 3D printing. Number of Hours: 08			
Module-4			
Composite and Hybrid Materials: Classification: fiber-reinforced, particle-reinforced, laminated composites. Processing techniques: lay-up, pultrusion, resin transfer molding. Hybrid materials and functionally graded materials, Applications in automotive, aerospace, and construction. Number of Hours: 09			
Module-5			
Emerging Materials and Sustainability: Nanomaterials: synthesis, characterization, applications. Smart materials: piezoelectric, magnetostrictive, shape-memory polymers. Bio-materials and eco-friendly materials. Sustainability in material processing: recycling, green manufacturing. Number of Hours: 09			
Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):			
Text books:			
1. Callister, W.D., <i>Materials Science and Engineering: An Introduction</i> , Wiley, 2018, 10th Edition, ISBN 9781119405498.			
2. Ashby, M.F., <i>Materials Selection in Mechanical Design</i> , Butterworth-Heinemann, 2017, 5th Edition, ISBN 9780081005996.			

Reference books / Manuals:

1. Shackelford, J.F., Introduction to Materials Science for Engineers, Pearson, 2015, 8th Edition, ISBN 9780133826659
2. Chawla, K.K., Composite Materials: Science and Engineering, Springer, 2012, 3rd Edition, ISBN 9780387743646

Web links and Video Lectures (e-Resources):

NPTEL courses on Advanced Materials.
MIT OpenCourseWare: Materials Science.
ASM International Digital Library.

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- 1 Flipped Classroom with pre-class video lectures.
- 2 Case-Based Teaching (industrial applications).
- 3 Simulation and Virtual Labs for material processing.
- 4 Industry expert lectures and visits.

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
- To pass the **SEE**, a student must score at least **35% of 50 marks**, i.e., **18 marks**.
- Notwithstanding the above, a student is considered to have **passed the course**, provided the combined total of **CIE and SEE** is at least **40 out of 100 marks**.

Continuous Comprehensive Assessments (CCA)+ Internal Assessment Test (IA) = Continuous Internal Evaluation CIE [25+25=50 marks]

A minimum of **two Internal Assessment Tests(IA)** shall be conducted, carrying a total of **25 marks**.

In addition, **Continuous Comprehensive Assessment (CCA)** shall be conducted for a total of **25 marks**.

It is recommended to include a **maximum of two learning activities** as part of the CCA to foster the **holistic development of students**. These activities shall be:

Sl. No.	Name of the Learning activity	Maximum Marks
1.		
2.		

Rubrics for Learning Activity (Based on the nature of learning activity, design the rubrics for each activity):

	Superior	Good	Fair	Needs Improvement	Unacceptable
Performance Indicator- 1 (CO/PO Mapping)					
Performance Indicator-2 (CO/PO Mapping)					
...					
Performance Indicator-n (CO/PO Mapping)					

Suggested Learning Activities may include (but are not limited to):

- Course Project
- Case Study Presentation
- Programming Assignment
- Tool/Software Exploration
- Literature Review
- Open Book Test (preferably at RBL4 and RBL5 levels)
- GATE-based Aptitude Test
- Assignment (at RBL3, RBL4, or RBL5 levels)
- Any other relevant and innovative academic activity
- Use of MOOCs and Online Platforms

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
- ICT-Enabled Teaching
- Role Play

**Term Work (TW) and Self Learning (SL) components in
Number of Hours per semester**

Term work (includes assignments, seminars, micro projects, industrial visits, any other student activities etc.)

Sl. No.	Term Work (TW) Activity	Number of Hours / Semester
1.		
2.		
3.		

4.	(Add rows if required)	
SL: Self Learning, MOOCs, spoken tutorials, online educational resources etc.		
Sl. No.	Self-Learning (SL) Activity	Number of Hours / Semester
1.		
2.		
3.		
4.	(Add rows if required)	

Continuous Internal Evaluation (CIE)

1. The CIE marks shall be decided based on internal tests and other outcome-based activities. The continuous internal evaluation shall be carried out by the teacher handling the course.
2. Out of 50 marks earmarked for CIE, 25 marks shall be assigned for internal tests. The first test shall be conducted after completing two modules of the syllabus and the second one after completing the remaining three modules.
3. The remaining 25 marks shall be assigned for Continuous Course Assessment (CCA), conducted as per the rubrics listed in the assessment section of the respective syllabus.
4. A student shall obtain a minimum of 40% marks or 20 out of 50 marks allotted to CIE to become eligible to appear for the SEE.

Passing requirement in SEE

1. For a pass in the Semester End Examination (SEE), a student shall secure a minimum of 35 marks out of 100.
2. For the declaration of a pass grade, the sum of the Continuous Internal Evaluation (CIE) marks (out of 50) marks and the SEE marks scaled down to 50 shall be greater than or equal to 40 marks.
3. If the total (CIE + SEE) is less than 40 marks, the student shall be awarded the grade 'F' (Fail).

ADVANCED STRUCTURAL DYNAMICS AND VIBRATION CONTROL			
Course Code	1MME105A	Scheme	2026
Type of Course	PEC(Theory)	Semester	01
Teaching Hours/Week (L:T:P)	: :	CIE Marks	50
Total Hours of Pedagogy per semester L /T/P/SL&TW:	: : : :	SEE Marks	50
Credits	3	Total Marks	100
Examination type (SEE)	Theory	Exam Hours	03
Course outcome (Course Skill Set)			
At the end of the course, the student will be able to:			
1. Apply principles of structural dynamics to analyze vibration behavior of engineering systems. 2. Model single and multi-degree-of-freedom systems under dynamic loading. 3. Evaluate damping mechanisms and vibration control strategies. 4. Use computational tools for dynamic analysis and vibration suppression. 5. Integrate vibration control methods in aerospace, automotive, and civil engineering applications.			
Module-1			
Fundamentals of Structural Dynamics: Free and forced vibration of single-degree-of-freedom systems. Damping models and resonance phenomena. Applications in mechanical and civil structures.			
Number of Hours:08			
Module-2			
Multi-Degree-of-Freedom Systems: Equations of motion for MDOF systems. Modal analysis and orthogonality of modes. Numerical methods for dynamic response.			
Number of Hours:08			
Module-3			
Continuous Systems: Vibration of beams, plates, and shells. Wave propagation in structures. Approximate methods: Rayleigh–Ritz, Galerkin.			
Number of Hours:08			
Module-4			
Vibration Control Techniques: Passive control: tuned mass dampers, viscoelastic dampers. Active control: sensors, actuators, feedback systems. Semi-active and hybrid control strategies.			
Number of Hours:08			
Module-5			
Advanced Applications and Case Studies: Vibration control in aerospace, automotive, and civil engineering. Smart materials and adaptive structures. Case studies: earthquake-resistant design, noise reduction.			
Number of Hours:10			
Suggested Learning Resources: (Text Book/ Reference Book/ Manuals):			
Text books:			
1. Chopra, A.K., <i>Dynamics of Structures: Theory and Applications to Earthquake Engineering</i>, Pearson, 2017, 5th Edition. 2. Meirovitch, L., <i>Elements of Vibration Analysis</i>, McGraw-Hill, 1986, 2nd Edition.			
Reference books / Manuals:			
1. Rao, S.S., <i>Mechanical Vibrations</i>, Pearson, 2017, 6th Edition. 2. Den Hartog, J.P., <i>Mechanical Vibrations</i>, Dover Publications, 1985. 3. Preumont, A., <i>Vibration Control of Active Structures: An Introduction</i>, Springer, 2018, 4th Edition			
Web links and Video Lectures (e-Resources):			
NPTEL – Structural Dynamics NPTEL – Mechanical Vibrations MIT OpenCourseWare – Dynamics and Vibration			

IEEE Xplore – Vibration Control Papers

Teaching-Learning Process (Innovative Delivery Methods):

The following are sample strategies that educators may adopt to enhance the effectiveness of the teaching-learning process and facilitate the achievement of course outcomes.

- 1 Flipped Classroom with pre-class readings.
- 2 Problem-Based Learning (PBL) with vibration case studies.
- 3 Simulation and Virtual Labs (MATLAB, ANSYS).
- 4 Industry expert lectures and industrial visits.

Assessment Structure:

The assessment in each course is divided equally between Continuous Internal Evaluation (CIE) and the Semester End Examination (SEE), with each carrying 50% weightage.

- To qualify and become eligible to appear for SEE, in the **CIE**, a student must score at least **40% of 50 marks**, i.e., **20 marks**.
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Performance Indicator- 1 (CO/PO Mapping)					
Performance Indicator-2 (CO/PO Mapping)					
...					
Performance Indicator-n (CO/PO Mapping)					

Suggested Learning Activities may include (but are not limited to):

- Course Project (material selection/design).
- Case Study (industrial application).
- Literature Review (emerging materials).
- Open Book Test (RBL4/RBL5).
- GATE-based Aptitude Test.

Suggested Innovative Delivery Methods may include (but are not limited to):

- Flipped Classroom
- Problem-Based Learning (PBL)
- Case-Based Teaching
- Simulation and Virtual Labs
- Partial Delivery of course by Industry expert/ industrial visits
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