

Syllabus

ME-351: Automotive Science and Technology

L-T-P-CH-CR: 3-0-0-3-3

Pre-requisite: Nil

Historical development of automobile. Types of power plant for automotive vehicles, cooling system, camshaft, lubrication, MPFI, CRDI Engine. Layout of different kind of vehicles, need of gear box, types of gear box, clutches rear axle and final drive differential, front axle construction with constant velocity joint, steering system, suspension and chassis, brake, regenerative braking, development electric vehicle, automobile electronics control system for energy optimization and electrical appliances. Aerodynamics, design and pollution control.

Textbooks

- 1.Crouse, W.A. and Anglin, D.L. Automotive Mechanics (McGraw-Hill, New York, 2007)
- 2.Jain, K.K and Asthana, R.B. Automobile Engineering (Tata McGraw Hill, New Delhi, 2004)

References

- 1.Heitner, J. Automotive Mechanics (East-West Press, London, 1999)
- 2.Heisler, H. Advanced Vehicle Technology (Butterworth-Heinemann, Netherlands, 2002)
- 3.Limpert, R. Brake Design and Safety (SAE International, Pennsylvania, 1999)
- 4.Reimpell, J., Stoll, H., and Betzler, J.W. The Automotive Chassis (SAE International, Pennsylvania, 2010)
- 5.Ehsani, M., Gao Y and Emadi, A. Modern Electric, Hybrid Electric and Fuel Cell Vehicles (CRC, London, 2010).
- 6.Abe, M. Vehicle Dynamics Theory and Application (Butterworth-Heinemann, Netherlands, 2009)
- 7.Fuhs, A. Hybrid Vehicles and Future Personal Transportation (CRC, London, 2009)

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ME-492: Quality Science and Engineering

L-T-P-CH-CR: 3-0-0-3-3

Pre-requisite: Nil

Part-I

Principle and practices of Quality engineering: Basic definition of quality, new and old culture, dimensions of quality, Deming's philosophy. Quality of leadership: Leadership concept and characteristics, quality council, core value and concept, vision and mission statement, strategic planning. Customer satisfaction: Introduction, customer supplier chain, feedback, translating needs into requirements, customer retention. Involvement of employee: Maslow's Hierarchy of Needs, Herzberg's Two Factor Theory, Employee wants, Empowerment, characteristics of a successful team, recognition and reward, benefits from employee involvement. Continuous process improvement: Introduction, Input/ out process model, Juran Trilogy, Plan-Do-Study-Act (PDSA) cycle, Problem solving method. Supplier Partnership: Introduction, Supplier selection, principle of customer/supplier relations, supplier selection, rating and certification, Relationship development. Performance evaluation: Basic concepts, Quality cost, Cost categories, Optimum cost, Quality cost analysis, Reporting, Quality improvement strategy, Malcolm Baldrige National Quality Award.

Part-II

Statistical process control (SPC): Histogram, Pareto Analysis, Process flow diagram, Cause and effect diagram, check sheet, statistical fundamental, X and R chart, Chart for attributes, scatter diagram. ISO9000& 14000: Introduction, ISO 9000 series standards, elements of ISO/QS 9000, steps to implement quality systems, ISO 14000 series standards, concepts and requirement of ISO 14001, EMS benefits. Benchmarking: Definition, reasons for benchmarking, what to benchmark, planning, studying others, Pitfalls and Criticisms of benchmarking. Quality function deployment: Introduction, benefits of QFD, the voice of the customer, affinity diagram, Building of a house of quality, QFD process. Taguchi's quality engineering: Taguchi's loss function, step and quadratic function, signal- to- noise (S/N) ratio, Orthogonal Array. Liability of products: Introduction, product safety law, product liability law, proof and expert witness, financial loss, future of product liability. Failure mode and effect analysis (FMEA): Introduction, Reliability and its requirement, failure rate, intent of FMEA, FMEA documentation, Stages of FMEA, Design of FMEA document. Management tools: Introduction, forced field analysis, interrelationship digraph, Tree diagram, matrix

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diagram, Process Decision Program Chart (PDPC), activity network diagram. Total productive maintenance:

Introduction, Learning the new philosophy, improvement needs, Autonomous work group.

Textbooks

1. Krishnamoorthi, K.S. and Krishnamoorthi V.R. A First Course on Quality Engineering: Integrating Statistical and Management Methods of Quality (CRC press, Taylor and Francis, 2011).
2. Besterfield, D.H., Besterfield-Michna, C., Besterfield, G.H., Besterfield-Sacre, M., Urdhwareshe, H. and Urdhwareshe, R. Total Quality Management, 3/e (Pearson Education Asia, 2011).
3. Pham, H. Recent Advances in Reliability and Quality Engineering (World Scientific, 2001).

References

1. Pyzdek, T. and Berger, R.W. Quality Engineering Handbook (Tata McGraw Hill, 1996).
2. Khanna, O.P. and Sarup, A. Industrial Engineering and Management: With an Appendix Introducing ISO 9000 Quality systems (Dhanpat Rai Publications, New Delhi, 2011).

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ME 493 : ELEMENTS of PROJECT MANAGEMENT

L 3-T 0-P 0 - CH 3 – CR 3

Prerequisites of the course: None

Unit 1: Importance of Project management: About the Art and Science of Project Management, Project and process, Project and Project Management, Project Management-The Process Context, The Interpersonal and Behavioral Context, Project Management: The Organizational Context.

Types of Project.

Role of Project Manager -Skill Requirements, Responsibilities and Functional Competencies of the Project Manager, Common Challenges, the value of Introspection and Self-Awareness

Unit 2: Defining a Project - selection, definition, goal. Project Life-cycle model, Project team and stakeholders, Organizational influences, Project management processes and mapping, Project Process flow diagrams, Project idea generation and acceptance.

Project analysis and feasibility report.

Project Scope: definition and planning, Project Breakdown Structure (WBS).

Unit 3: Project Plan- Planning and Scheduling techniques, Resource Scheduling: Resource allocation method, splitting and multitasking, Multi-project resources scheduling, Critical chain scheduling. Project integration management, PERT/CPM and overview of other scheduling methods.

Performance measurement and control. Project monitoring and Control.

Unit 4: Project Time management, project activity- its definition, sequencing, resource and duration estimation, schedule development and control, Project cost estimation, budget and control. Project risk management.

Unit 5: Human resource management- Human aspects of Project Management, Human resource planning, acquire, develop and manage project team and stakeholders, performance reporting.

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Text Books:

- [1] Heerkens, G. R. Project Management, McGraw-Hill, 2nd edition, 2013.
- [2] Gray, C. F., Larson, E. W. and Desai G. V. Project Management -The Managerial Process. McGraw Hill Education Private Limited, New Delhi, 4th edition, 2010.

References:

- [1] Chandra, P. Project Preparation, Appraisal and Implementation. Tata McGraw Hill Publishing Company, New Delhi, 7th edition, 2009.
- [2] Burke, Rory. Project management - Planning and Control Techniques. John Wiley & Sons, Inc., 5th edition, 2013.
- [3] Lientz, B. P. and Rea, K. P. Project Management – for 21st Century, Academic Press, 4th edition, 1995.
- [4] Maylor, H. Project Management. Pearson Education Limited. New Delhi, 3rd edition, 2003.