4244 – QUALITY CONTROL AND INSPECTION

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
Lectures	Practical	Credits			Theory		Practical Ex.	Total
3	2	5	25	25	3Hrs	100	-	150

Pre-requisite	Source
4240	FAB

Semester	Theory	Test	Total	TW	PR	Gr Total
	75	25	100	25	–	125

Rationale:. A technician engaged in quality control and inspection department is required to have necessary cognitive abilities, skills and attitudes to perform his duties with professionalism and proficiency. This course is designed to develop those abilities and skills. The theoretical aspects covered in this course should be adequately supported and reinforced through discussions of case studies and properly structured laboratory experiences. A few of the practicals on testing, for which no laboratory facilities exists in the institute should be covered during industrial training or short visits to industry. The course also aims at developing the knowledge to execute the work to the required specifications.

COURSE CONTENTS	Hrs	Mks
1. BASIC CONCEPTS OF QUALITY CONTROL	6	8

Definition of quality as fitness for use, quality characteristic, parameters of fitness for use a) quality of design b) quality of conformance c) abilities i) Availability ii) Reliability iii) maintainability d) field service. Factors affecting quality of a product a) market b) men c) money d) materials f) machines and methods g) miscellaneous. Control: definition, regulatory process of control. Quality control: Definition, basic objectives, Advantages of quality control, role of technician in promoting quality mindedness among workers and operators. Broad areas of application of quality control, incoming material control, process control, product control, Approach to solution of quality problems (Briefly) Engineering, statistical Management.

2. ECONOMIC OF QUALITY 2 4

Quality value, quality cost, balance between quality cost and value, categories of quality cost, prevention, appraisal, internal failure, external failure

3. INSPECTION AND TESTING 8 16

Definition and meaning, difference between inspection and quality control, aims of inspection a) determining conformance to specifications b) planning c) procedure d) Training e) calibration f) records g) standardisation.

Classification of inspection based on work performance: a) Manuel inspection

b) Visual inspection c) test inspection d) Automatic inspection. Based on location a) process inspection b) final inspection c) receiving inspection d) tool and gauge inspection. Duties of inspector: a) Interpretation of specifications b) Measurement of product quality c) comparison with standards d) Disposition of the product e) recording data. Inspection planning a) necessity for planned inspection b) what to inspect c) what to inspect d) where to inspect e) when to inspect f) how much to inspect. Tools of Inspection a) specifications b) inspecting equipment's c) inspection records d) sampling inspection

4. NONDESTRUCTIVE TESTING 12 32

Visual Inspection, Acoustic test, Radiographic testing a) introduction b) principle c) X-rays and y – rays, d) x-ray radiography e) Y rays radiography f) penetrameters

g) Interpretation of radiographs, h) pitfalls in interpretations i) Advantages and disadvantages of x-ray radiography (j) fluoroscopy, k) advantages and disadvantage of Y radiography l) Safety precautions m) Applications.

Magnetic particle testing: a) Basic principle b) brief description of equipment c) Flaws detected d) scope and limitations e) sensitivity f) dry and wet methods g) sequence

of operations h) irrelevant indications i) common applications j) inspection of light weldment, Penetrant inspection: a) Principle of operation b) Types of penetrant inspection system c) test procedure d) inspection e) common application f) advantages g) fluorescent penetrant inspection.

Ultrasonic Inspection : a) introduction b) principle of operation c) Basic factors in ultrasonic testing d) Testing techniques e) Techniques selection f) evaluation g) Applications, advantages and limitations, Eddy current testing: a) Principle of operation b) Testing of Non magnetic materials c) Testing of magnetic materials d) Advantages and limitations e) Applications. Leakage testing : a) definition b) measurement of leakage c) Types of leaks d) types of tests i) visual tests ii) Testing under fluid pressure iii) leakage detecting by gas iv) water soluble paper with aluminium foil.

5. DESTRUCTIVE TESTING	6	16

Tensile Testing a) Preparation of specimen b) Test procedure c) Test report d) Longitudinal tensile test. Compression Test : a) Principle of compression test b) Information gained c) Practical reasons for test d) Test piece e) Practical aspects of test. Bend Test: a) Introduction b) Types of bend tests c) Free bend test d) Guided bend test e) Longitudinal bend test f) Side bend test. Impact testing a) Principle of test b) Types of tests i) Charpy V-notes Impact test ii) Izod V-notes Impact test c) Test procedure d) Reporting of result. The Etch Test : a) Introduction b) Concept and purpose c) Types of Tests i) Micro-etch test ii) Macro-etch test d) Preparation of test specimen. Nick break test: a) Purpose b) Preparation of specimen c) Test procedure. Hardness test: a) Purpose of test b) Types of tests c) Procedure of testing

6. INSPECTION OF PRESSURE VESSELS AND PIPES	5	8

Various codes: a) A.S.M.E. b) A.S.T.M. c) D.I.N. d) I.B.R. e) Loyds Register of Shiping f) G.S.T. Use of I.B.R. in brief.

7. SPECIFICATIONS	5	10

Definition, Purpose of specifications, Types: a) Contract specifications b) Manufactures specifications c) Standard specifications. General principles of writing specifications, Sources of information for specifications: a) Previous specifications b) Contract drawings c) Site investigations d) Employer's requirements e) I.S. codes/ I.B.R. code

8. ISO 9000 QUALITY SYSTEMS – CONCEPT	4	6

Introduction, Meaning and importance of ISO 9000, ISO 9000 references – ISO 8402, ISO 10011, ISO 10012., ISO 9000 series – ISO 9000, ISO 9001, ISO 9002, ISO 9003, ISO 9004. ISO 9001 – The mode for quality Assurance in Design / Development, production, Installation and servicing.

Introduction, scope field of application, References, Definitions.

TOTAL	48	100

TERM WORK

The term work shall consist of the following laboratory tests and maintenance of laboratory reports following:

Study of different defects in welded joints.
Dye penetrant test on welds.
Fluorescent penetrant test on welds.
Magnetic particle test.
Magnaflux testing of welds.
Tensile tests on welded specimens.
(Welded by MMAW, GMAW and Gas welding)