LESSON PLAN: FLUID MECHANICS (4th Sem)

(SUMMER SEMESTER 2024)

Discipline: **Mechanical Engineering**	Semester: **Summer 2024**	Name of the teaching faculty: **Susanta Kumar Bag**
Subject: **FM**	No of days/per week class allotted: **04**	Semester From Date:**16/01/2024** To Date: **26/04/2024** No of weeks: **15**
Week:	**Class day:**	**Theory/practical topics:**
1st	**1st**	Define fluid
	2nd	Description of fluid properties like Density, Specific weight, specific gravity, specific volume and solve simple problems
	3rd	DO
	4th	DO
2nd	**1st**	Definitions and Units of Dynamic viscosity, kinematic viscosity, surface tension Capillary phenomenon
	2nd	DO
	3rd	DO
	4th	DO
3rd	**1st**	Definitions and units of fluid pressure, pressure intensity and pressure head.
	2nd	DO
	3rd	Statement of Pascal's Law
	4th	Concept of atmospheric pressure, gauge pressure, vacuum pressure and absolute pressure
4th	**1st**	DO
	2nd	Pressure measuring instruments Manometers (Simple and Differential)
	3rd	Bourdon tube pressure gauge(Simple Numerical)
	4th	Solve simple problems on Manometer
5th	**1st**	Definition of hydrostatic pressure
	2nd	Total pressure and centre of pressure on immersed bodies(Horizontal and Vertical Bodies)
	3rd	DO
	4th	Solve Simple problems.
	1st	Archimedes 'principle, concept of buoyancy, meta center and meta centric height (Definition only)
	2nd	DO

6th	3rd	DO
	4th	Concept of floatation
7th	1st	Types of fluid flow
	2nd	DO
	3rd	Continuity equation(Statement and proof for one dimensional flow)
	4th	DO
8th	1st	Bernoulli's theorem(Statement and proof) Applications and limitations of Bernoulli's theorem (Venturimeter, pitot tube)
	2nd	DO
	3rd	Solve simple problems
	4th	DO
9th	1st	Define orifice
	2nd	Flow through orifice
	3rd	Orifices coefficient & the relation between the orifice coefficients
	4th	DO
10th	1st	Classifications of notches & weirs
	2nd	Discharge over a rectangular notch or weir
	3rd	Discharge over a triangular notch or weir
	4th	Simple problems on above
11th	1st	Definition of pipe.
	2nd	Loss of energy in pipes
	3rd	Head loss due to friction: Darcy's and Chezy's formula (Expression only)
	4th	DO
12th	1st	DO
	2nd	Solve Problems using Darcy's and Chezy's formula
	3rd	DO
	4th	DO
	1st	Hydraulic gradient and total gradient line
	2nd	DO

13th	3rd	Impact of jet on fixed and moving vertical flat plates
	4th	DO
14th	1st	DO
	2nd	Derivation of work done on series of vanes and condition for maximum efficiency
	3rd	DO
	4th	DO
15th	1st	Impact of jet on moving curved vanes, illustration using velocity triangles, derivation of work done, efficiency.
	2nd	DO
	3rd	DO
	4th	DO

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LESSON PLAN: THERMAL ENGG. -II

SUMMER SEMESTER 2024 (4th Sem)

Discipline: **Mechanical Engineering**	Semester: **SUMMER 2024**	Name of the teaching faculty: **SUBRAT PRADHAN**
Subject: **TE-II**	No of days/per week class allotted: **04**	Semester From Date:**16/01/2024** To Date: **26/04/2024** No of weeks:**15**
Week:	Class day:	**Theory/practical topics:**
1ST	1ST	Define mechanical efficiency, Indicated thermal efficiency, Relative Efficiency, brake thermal efficiency overall efficiency
	2ND	DO
	3RD	Mean effective pressure &specific fuel consumption.
	4TH	DO
2ND	1ST	Define air-fuel ratio & calorific value of fuel.
	2ND	DO
	3RD	Work out problems to determine efficiencies & specific fuel consumption.
	4TH	DO
3RD	1ST	Explain functions of compressor & industrial use of compressor air
	2ND	DO
	3RD	Classify air compressor & principle of operation.
	4TH	DO
4TH	1ST	Describe the parts and working principle of reciprocating Air compressor.
	2ND	DO
	3RD	Explain the terminology of reciprocating compressor such as bore, stroke, pressure ratio free air delivered &Volumetric efficiency.
	4TH	DO
5TH	1ST	Derive the work done of single stage & two stage compressor with and without clearance.
	2ND	DO
	3RD	Solve simple problems (without clearance only)
	4TH	DO

6TH	1ST	Difference between gas & vapours.
	2ND	Formation of steam.
	3RD	Representation on P-V, T-S, H-S, & T-H diagram.
	4TH	DO
7TH	1ST	Definition & Properties of Steam.
	2ND	Use of steam table & mollier chart for finding unknown properties.
	3RD	DO
	4TH	Non flow & flow process of vapour.
8TH	1ST	DO
	2ND	P-V, T-S & H-S, diagram.
	3RD	Determine the changes in properties & solve simple numerical.
	4TH	DO
9TH	1ST	Classification & types of Boiler.
	2ND	DO
	3RD	Important terms for Boiler
	4TH	DO
10TH	1ST	Comparison between fire tube & Water tube Boiler.
	2ND	DO
	3RD	Description & working of common boilers (Cochran, Lancashire, Babcock & Wilcox Boiler)
	4TH	DO
11TH	1ST	Boiler Draught (Forced, induced & balanced)
	2ND	DO
	3RD	Boiler mountings & accessories.
	4TH	DO
12TH	1ST	Carnot cycle with vapour.
	2ND	Derive work & efficiency of the cycle.
	3RD	Rankine cycle.
	4TH	Representation in P-V, T-S & h-s diagram.
13TH	1ST	Derive Work & Efficiency.

	2ND	Effect of Various end conditions in Rankine cycle.
	3RD	Reheat cycle & regenerative Cycle.
	4TH	Solve simple numerical on Carnot vapour Cycle & Rankine Cycle.
14TH	1ST	Modes of Heat Transfer (Conduction, Convection, Radiation).
	2ND	Fourier law of heat conduction and thermal conductivity (k).
	3RD	Newton's laws of cooling.
	4TH	Radiation heat transfer (Stefan, Boltzmann & Kirchhoff's law) only statement, no derivation & no numerical problem
15TH	1ST	DO
	2ND	DO
	3RD	Black body Radiation, Definition of Emissivity, absorptivity, & transmissibility
	4TH	DO

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LESSON PLAN: AE & HV SUMMER (6TH SEMESTER)2024

Discipline: **Mechanical Engineering**	Semester: **Summer 2024**	Name of the teaching faculty:**SAROJ KUMAR MALLIK**
Subject: **AE & HV**	No of days/per week class allotted: **04**	Semester From Date:**16/01/2024** To Date: 26/**04/2024** No of weeks:**15**
Week:	Class day:	**Theory/practical topics:**
1ST	1ST	Automobiles: Definition, need and classification
	2ND	Automobiles: Definition, need and classification
	3RD	Layout of automobile chassis with major components (Linediagram)
	4TH	Layout of automobile chassis with major components (Line diagram)
2ND	1ST	Manufacturer's specification of auto engines of motorcycle, scooter, car & bus one from each.
	2ND	State the classification of engines basing on working principle, fuel used, position of cylinder,
	3RD	arrangement of cylinder.
	4TH	Clutch System: Need, Types (Single & Multiple) and Working principle with sketch
3RD	1ST	Clutch System: Need, Types (Single & Multiple) and Working principle with sketch
	2ND	Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box, Concept of automatic gear changing mechanisms
	3RD	Gear Box: Purpose of gear box, Construction and working of a 4 speed gear box, Concept of automatic gear changing mechanisms
	4TH	Propeller shaft: Constructional features
4TH	1ST	Differential: Need, Types and Working principle
	2ND	Braking systems in automobiles: Need and types.
	3RD	Braking systems in automobiles: Need and types.
	4TH	Mechanical Brake
5TH	1ST	Mechanical Brake
	2ND	Hydraulic brake
	3RD	Air brake
	4TH	Air brake

6TH	1ST	Air assisted hydraulic brake
	2ND	Air assisted hydraulic brake
	3RD	Vacuum Brake
	4TH	Vacuum Brake
7TH	1ST	Revision
	2ND	Wiring diagram of Horn circuit, Lighting circuit, Cut-out circuit,
	3RD	Voltage current regulator circuit and Flasher circuit (Sketch and description)
	4TH	State the common ignition troubles and its remedies.
8TH	1ST	Spark plugs: Purpose, construction and specifications
	2ND	Description of the conventional suspension system for Rear and Front axle.
	3RD	Description of the conventional suspension system for Rear and Front axle.
	4TH	Description of independent suspension system used in cars (coil spring and tension bars)
9TH	1ST	Description of independent suspension system used in cars (coil spring and tension bars)
	2ND	Constructional features and working of a telescopic shock absorber
	3RD	Constructional features and working of a telescopic shock absorber
	4TH	State tyre specifications.
10TH	1ST	Explain the causes and remedies of tyre wear.
	2ND	Describe necessity of engine cooling.
	3RD	Describe defects of cooling and their remedial measures
	4TH	Describe defects of cooling and their remedial measures.
11TH	1ST	Describe the Function of lubrication.
	2ND	Describe the Function of lubrication.
	3RD	Describe the lubrication System of I.C. engine.
	4TH	Describe the lubrication System of I.C. engine.
12TH	1ST	Fuel and Ignition system: For petrol Engine
	2ND	Revision
	3RD	Describe carburetion and Air fuel ratio.
	4TH	Describe carburetion and Air fuel ratio.

13TH	1ST	Describe the Battery ignition and Magnet ignition system.
	2ND	Describe the Battery ignition and Magnet ignition system.
	3RD	Revision
	4TH	Describe Multipoint fuel injection system
14TH	1ST	Describe Multipoint fuel injection system For Diesel engine:
	2ND	Describe Multipoint fuel injection system For Diesel engine:
	3RD	Describe the working principle of Fuel feed pump
	4TH	Describe the working principle of Fuel feed pump
15TH	1ST	Injector and Fuel filter
	2ND	Describe the working principle of fuel injection system for multi cylinder engine.
	3RD	Describe the working principle of fuel injection system for multi cylinder engine.
	4TH	Revision

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LESSON PLAN: EM&ST WINTER SEMESTER 2023

Discipline: **Mechanical Engineering**	Semester: **Winter 2023**	Name of the teaching faculty:- **ASHISH KUMAR PRADHAN**
Subject: **EM&ST**	No of days/per week class allotted: **04**	Semester From Date:**01/08/2023** To Date: **30/11/2023** No of weeks:**15**
Week:	Class day:	**Theory/practical topics:**
1ST	1ST	CHAPTER-1:Concept /Meaning of Entrepreneurship , Need of Entrepreneurship
	2ND	Characteristics, Qualities and Types of entrepreneur
	3RD	**Function of entrepreneur**
	4TH	Barriers in entrepreneurship, Entrepreneurs vrs. Manager
2ND	1ST	Forms of Business Ownership: Sole proprietorship, partnership forms and others
	2ND	Types of Industries, Concept of Start-ups
	3RD	Types of Industries, Concept of Start-ups
	4TH	Entrepreneurial support agencies at National, State, District Level(Sources): DIC,NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
3RD	1ST	Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
	2ND	Technology Business Incubators (TBI) and Science and Technology EntrepreneurParks
	3RD	CHAPTER-2:Business Planning
	4TH	SSI, Ancillary Units, Tiny Units, Service sector Units
4TH	1ST	Time schedule Plan, Agencies to be contacted for Project Implementation
	2ND	Time schedule Plan, Agencies to be contacted for Project Implementation
	3RD	Assessment of Demand and supply and Potential areas of Growth
	4TH	Assessment of Demand and supply and Potential areas of Growth
5TH	1ST	Identifying Business Opportunity
	2ND	Final Product selection
	3RD	CHAPTER-3: Project report Preparation:Preliminary project report
	4TH	Detailed project report, Techno economic Feasibility
6TH	1ST	Detailed project report, Techno economic Feasibility
	2ND	Project Viability
	3RD	CHAPTER-4:Management Principles: of management , Principles of management

	4TH	Functions of management (planning, organising, staffing, directing and controlling
7TH	1ST	Functions of management (planning, organising, staffing, directing and controlling
	2ND	Level of Management in an Organisation
	3RD	Level of Management in an Organisation
	4TH	CHAPTER-5: Functional Areas of Management:Production management - Functions, Activities • Productivity
8TH	1ST	Quality control • Production Planning and control
	2ND	Inventory Management - Need for Inventory management
	3RD	Models/Techniques of Inventory management
	4TH	Financial Management -Functions of Financial management • Management ofWorking capital • Costing (only concept)
9TH	1ST	Break even Analysis • Brief idea about Accounting Terminologies: Book Keeping,Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)
	2ND	Marketing Management - Concept of Marketing and Marketing Management
	3RD	Marketing Techniques (only concepts) • Concept of 4P s (Price, Place, Product,Promotion)
	4TH	Human Resource Management -Functions of Personnel Management
10TH	1ST	Manpower Planning, Recruitment, Sources of manpower, Selection process,Method of Testing, Methods of Training & Development, Payment of Wages
	2ND	CHAPTER-6:Leadership - Definition and Need/Importance , Qualities of leader
	3RD	Manager Vs Leader,function of leader
	4TH	Style of Leadership (Autocratic, Democratic, Participative)
11TH	1ST	Motivation - Definition and characteristics,Importance of motivation,Factors affectingmotivation
	2ND	Theories of motivation (Maslow),Methods of Improving Motivation
	3RD	Importance of Communication in Business,Types and Barriers of Communication
	4TH	CHAPTER-7: Human relationship and Performance in Organization
12TH	1ST	Relations with Peers, Superiors and Subordinates
	2ND	TQM concepts
	3RD	TQM concepts
	4TH	Accidents and Safety
13TH	1ST	CHAPTER-8: Legislation-Intellectual Property Rights(IPR), Patents, Trademarks,Copyrights
	2ND	Features of Factories Act 1948 with Amendment (only salient points)
	3RD	Features of Factories Act 1948 with Amendment (only salient points)

	4TH	Features of Payment of Wages Act 1936 (only salient points)
14TH	1ST	Features of Payment of Wages Act 1936 (only salient points)
	2ND	Features of Payment of Wages Act 1936 (only salient points)
	3RD	CHAPTER-9: Smart Technology: Concept of IOT, How IOT works
	4TH	Components of IOT, Characteristics of IOT, Categories of IOT
15TH	1ST	Components of IOT, Characteristics of IOT, Categories of IOT
	2ND	Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.
	3RD	Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.
	4TH	Applications of IOT- Smart Cities, Smart Transportation, Smart Home, SmartHealthcare, Smart Industry, Smart Agriculture, Smart Energy Management

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LESSON PLAN: DME WINTER SEMESTER 2023

Discipline: **Mechanical Engineering**	Semester: **Winter 2023**	Name of the teaching faculty:- Saroj kumar Mallik
Subject: **DME**	No of days/per week class allotted: **04**	Semester From Date:**01/08/2023** To Date: **30/11/2023** No of weeks:**15**
Week:	Class day:	**Theory/practical topics:**
1ST	1ST	INTRODUCTION TO MACHINE DESIGN AND ITS CLASSIFICATION
	2ND	DIFFERENT MECHANICAL ENGINEERING MATERIALS USEDIN DESIGN WITH THEIR USES
	3RD	PHYSICAL AND MECHANICAL PROPERTIES OFENGINEERING MATERIALS
	4TH	WORKING STRESS, YIELD STRESS, ULTIMATE STRESS &FACTOR OF SAFETY
2ND	1ST	NUMERICALS ON WORKING,YIELD AND ULTIMATE STRESS.
	2ND	STRESS –STRAIN CURVE FOR M.S & C.I AND SALIENT POINTS
	3RD	MODES OF FAILURE BY ELASTIC DEFLECTION AND
	4TH	MODES OF FAILURE BY GENERAL YIELDING
3RD	1ST	MODES OF FAILURE BY FRACTURE
	2ND	FAILURE OF MACHINE ELEMENTS DUE TO FATIGUE AND CREEP.
	3RD	FACTORS GOVERNING THE DESIGN OF MACHINE ELEMENTS.
	4TH	DESIGN PROCEDURE
4TH	1ST	JOINTS AND THEIR CLASSIFICATION & TYPES OF WELDED JOINTS .
	2ND	ADVANTAGES OF WELDED JOINTS OVER OTHER JOINTS
	3RD	DESIGN OF WELDED JOINTS FOR NORMAL LOADS.
	4TH	PERFORMANCE TEST.
5TH	1ST	DESIGN OF WELDED JOINTS FOR ECCENTRIC LOADS.
	2ND	NUMERICALS ON DESIGN OF WELDED JOINTS
	3RD	TYPES OF RIVETED JOINTS AND TYPES OF RIVETS.
	4TH	FAILURE OF RIVETED JOINTS
6TH	1ST	STRENGTH & EFFICIENCY OF RIVETED JOINTS.
	2ND	NUMERICALS ON DESIGN OF RIVETED JOINTS
	3RD	DESIGN OF RIVETED JOINTS FOR PRESSURE VESSEL.
	4TH	NUMERICALS ON DESIGN OF PRESSURE VESSEL

7TH	1ST	FUNCTION OF SHAFTS.
	2ND	MATERIALS OF SHAFTS
	3RD	DESIGN SOLID & HOLLOW SHAFTS TO TRANSMIT A GIVENPOWER AT GIVEN RPM BASED ON STRENGTH
	4TH	NUMERICALS ON DESIGN OF SOLID SHAFTS AND HOLLOW SHAFTS BASED ON STRENGTH
8TH	1ST	DESIGN SOLID & HOLLOW SHAFTS TO TRANSMIT A GIVENPOWER AT GIVEN RPM BASED ON RIGIDITY
	2ND	NUMERICALS ON DESIGN OF SOLID SHAFTS AND HOLLOW
	3RD	SHAFTS BASED ON RIGIDITY, STANDARD SIZE OF SHAFT AS PER I.S.
	4TH	FUNCTION OF KEYS, TYPES OF KEYS & MATERIAL OF KEY & FAILURE OF KEY, EFFECT OF KEY WAY
9TH	1ST	DESIGN OF RECTANGULAR SUNK KEY CONSIDERING ITS FAILURE AGAINST SHEAR & CRUSHING AND NUMERICALS
	2ND	DESIGN RECTANGULAR SUNK KEY BY USING EMPIRICAL RELATION FOR GIVEN DIAMETER OF SHAFT ANDNUMERICALS
	3RD	SPECIFICATION OF PARALLEL KEY, GIB-HEAD KEY, TAPER KEY AS PER I.S.
	4TH	DISCUSSION OF IMPORTANT QUESTIONS
10TH	1ST	CLASS TEST -1
	2ND	SHAFT COUPLING, DIFFERENCE BETWEEN CLUTCH ANDCOUPLING
	3RD	REQUIREMENTS OF A GOOD SHAFT COUPLING
	4TH	ADVANTAGES OF USING SHAFT COUPLINGS
11TH	1ST	TYPES OF COUPLING.
	2ND	DESIGN OF SLEEVE OR MUFF-COUPLING.
	3RD	NUMERICALS ON DESIGN OF SLEEVE COUPLING
	4TH	DESIGN OF CLAMP OR COMPRESSION COUPLING
12TH	1ST	NUMERICALS ON CLAMP COUPLING
	2ND	DISCUSSION OF IMPORTANT QUESTIONS
	3RD	DISCUSSION OF IMPORTANT QUESTIONS
	4TH	PREVIOUS SEMESTER QUESTION DISCUSSION
13TH	1ST	MATERIALS USED FOR HELICAL SPRING.
	2ND	STANDARD SIZE SPRING WIRE. (SWG).
	3RD	TERMS USED IN COMPRESSION SPRING
	4TH	STRESS IN HELICAL SPRING OF A CIRCULAR WIRE.

5th Sem

LESSON PLAN: DME WINTER SEMESTER 2023

Discipline: **Mechanical Engineering**	Semester: **Winter 2023**	Name of the teaching faculty:- Saroj kumar Mallik
Subject: **DME**	No of days/per week class allotted: **04**	Semester From Date:**01/08/2023** To Date: **30/11/2023** No of weeks:**15**
Week:	Class day:	**Theory/practical topics:**
1ST	1ST	INTRODUCTION TO MACHINE DESIGN AND ITS CLASSIFICATION
	2ND	DIFFERENT MECHANICAL ENGINEERING MATERIALS USEDIN DESIGN WITH THEIR USES
	3RD	PHYSICAL AND MECHANICAL PROPERTIES OFENGINEERING MATERIALS
	4TH	WORKING STRESS, YIELD STRESS, ULTIMATE STRESS &FACTOR OF SAFETY
2ND	1ST	NUMERICALS ON WORKING,YIELD AND ULTIMATE STRESS.
	2ND	STRESS –STRAIN CURVE FOR M.S & C.I AND SALIENT POINTS
	3RD	MODES OF FAILURE BY ELASTIC DEFLECTION AND
	4TH	MODES OF FAILURE BY GENERAL YIELDING
3RD	1ST	MODES OF FAILURE BY FRACTURE
	2ND	FAILURE OF MACHINE ELEMENTS DUE TO FATIGUE AND CREEP.
	3RD	FACTORS GOVERNING THE DESIGN OF MACHINE ELEMENTS.
	4TH	DESIGN PROCEDURE
4TH	1ST	JOINTS AND THEIR CLASSIFICATION & TYPES OF WELDED JOINTS .
	2ND	ADVANTAGES OF WELDED JOINTS OVER OTHER JOINTS
	3RD	DESIGN OF WELDED JOINTS FOR NORMAL LOADS.
	4TH	PERFORMANCE TEST.
5TH	1ST	DESIGN OF WELDED JOINTS FOR ECCENTRIC LOADS.
	2ND	NUMERICALS ON DESIGN OF WELDED JOINTS
	3RD	TYPES OF RIVETED JOINTS AND TYPES OF RIVETS.
	4TH	FAILURE OF RIVETED JOINTS
6TH	1ST	STRENGTH & EFFICIENCY OF RIVETED JOINTS.
	2ND	NUMERICALS ON DESIGN OF RIVETED JOINTS
	3RD	DESIGN OF RIVETED JOINTS FOR PRESSURE VESSEL.
	4TH	NUMERICALS ON DESIGN OF PRESSURE VESSEL

	2ND	Specification and control of stepper motors
	3RD	Servo Motors D.C & A.C
	4TH	Introduction to PLC
8TH	1ST	Advantages of PLC
	2ND	Selection and uses of PLC
	3RD	Architecture basic internal structures
	4TH	Input/output Processing and Programming
9TH	1ST	Mnemonics
	2ND	Master and Jump Controllers
	3RD	Introduction to Numerical Control of machines and CAD/CAM
	4TH	NC machines
10TH	1ST	CNC machines
	2ND	CAD/CAM
	3RD	CAD
	4TH	CAM
11TH	1ST	Software and hardware for CAD/CAM
	2ND	Functioning of CAD/CAM system
	3RD	Features and characteristics of CAD/CAM system
	4TH	Application areas for CAD/CAM
12TH	1ST	Elements of CNC machines
	2ND	Introduction
	3RD	Machine Structure
	4TH	Guide ways/Slide ways
13TH	1ST	Introduction and Types of Guide ways
	2ND	Factors of design of guide ways
	3RD	Drives
	4TH	Spindle drives
14TH	1ST	Feed drive
	2ND	Spindle and Spindle Bearings
	3RD	ROBOTICS

	4TH	Definition, Function and laws of robotics
15TH	1ST	Types of industrial robots
	2ND	Robotic systems
	3RD	Advantages of robots
	4TH	Disadvantages of robots

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