Ministry of Higher Education and Scientific

Research

Scientific supervision and evaluation

institution

Department of Quality Assurance and

Academic Accreditation



Description of the academic program of the Power Mechanical Technology

Engineering Department for the academic year 2022-2023

University name: Al-Furat Al-Awsat Technical University College/Institute: Technical College - Musayyib

Scientific Department: Department of Power Mechanical Technology Engineering

Name of the academic or professional program: Bachelor's degree

Name of final degree: Bachelor of Mechanical Power Technology Engineering

Academic system: annual

**Description preparation date:** 

Date of filling the file: 2/25/2024

the signature

:the signature

Name of scientific assistant Dean:

Prof. Dr. Nabil Hamid Abdel

Majeed

أ. د نبيل حميد عبد المجيد معاون العميد للننوون العلمية والدراسات العليا معد العلمية

Name of Department Head:

Assist. Prof. Dr. Malik Nama Hawass

Date: /22/4/2024



Check the file by

Division of Quality Assurance and University Performance

Name of the Director of the Quality Assurance and University Performance Division: Dr. Haider Rahman Daoud

Date:  $2^2/4$  /2024 the signature

Authentication of the Dean



#### 1-Program vision

Keeping pace with modern scientific developments in the education program for undergraduate and postgraduate levels in the future, directing and developing scientific research, and employing applicable research energies in the fields of .power and energy production.

#### 1. Program message

Within the framework of the mission of Al-Musayyib Technical College, the department is committed to preparing technical engineers and researchers capable of contributing to the development of the power sector and the fields of energy production in its various forms.

#### 1. Program objectives

1- Preparing engineering technical staff who hold qualifications in power mechanical engineering technology

2- Preparing scientific staff capable of keeping pace with scientific development in mechanical engineering/power mechanical technology engineering

- 3- Learn how to maintain turbine machines, generating and cooling devices
- 4- Design of equipment and machines
- 5- Learn practical applications through laboratory experiments
- 6- Gaining practical experience through field observation to enhance the theoretical aspect.

# 1. Programmatic accreditation

Does the program have program accreditation? no

## 1. Other external influences

Is there a sponsor for the program? no

1. Program structure										
* comments	percentage	Study unit	Number of	Program structure						
			courses							
		195	43	Institution requirements						
		185	38	College requirements						
		185	38	Department						
				requirements						
For the		2 months		Work placement						
second and				(summer training)						
third stages										
				others						

1.	1. Program description									
Credit h	ours	Name of the course	course code	Year/level						
-	60	Engineering Materials Tech.	PMTE111	The first						
180	-	Engineering Drawing	PMTE112							
-	120	Engineering Mechanics	PMTE113							
-	90	Mathematics1	PMTE114							
60	30	Electrical technology	PMTE115							
240	-	Workshops	PMTE116							
60	30	Computer Applications 1	PMTE117							
-	60	Human Rights and Democracy	PMTE118							
-	30	English 1	PMTE119							
60	60	Strength of materials	PMTE211	The						
60	60	Fluid mechanics	PMTE212	second						
60	60	Thermodynamics	<b>PMTE213</b>							
60	60	Metallurgy	PMTE214							

r			_	
-	90	Mathematics2	PMTE215	
180	-	Mechanical Drawing	PMTE216	
60	30	Computer Applications 2	<b>PMTE217</b>	
-	-	Training	<b>PMTE218</b>	
-	30	English 2	PMTE219	
60	60	Electric motors	PMTE220	
			-	
60	60	Pumps Technology	PMTE311	The third
60	60	Hydraulics	<b>PMTE312</b>	
60	60	Gas dynamics	PMTE313	
90	-	Turbo machinery Operation & Maintenance (1)	PMTE314	
60	60	Internal combustion engines	PMTE315	
60	60	Heat transfer	PMTE316	
60	60	Theory of Machines	<b>PMTE317</b>	
-	90	Engineering &Numerical Analysis	PMTE318	
60	30	Computer Applications 3	PMTE319	
-	-	Training	<b>PMTE320</b>	
-	30	English 3	PMTE321	
60	60	Power plants	PMTE411	The
-	90	Machine design	<b>PMTE412</b>	fourth
60	60	Theory of Vibration	PMTE413	
60	60	Manufacturing Processes	PMTE415	
60	60	Refrigeration and air conditioning	PMTE416	
90	-	Project	PMTE417	
60	60	Measurement & Control processes	PMTE418	
-	60	Industrial Engineering	PMTE419	
60	30	Computer Applications 3	PMTE420	
-	30	English 4	PMTE421	

1. Expected learning outcomes of the program						
Knowledge						
The student's awareness of the importance of power .mechanical engineering techniques in practical life	1 - Preparing qualified technical engineering personnel to design, inspect, install, operate and maintain various types of turbine machines and their accessories.					

	<ul> <li>2- Teaching students what is meant by mechanical engineering and creating a generation of engineers in the specialty of power mechanics.</li> <li>-3Spreading knowledge awareness related to mechanical engineering/power mechanical engineering techniques.</li> </ul>
Skills	
General skills and qualifying the student to maintain and rehabilitate power stations	<ul> <li>1- He has the ability to work in electrical power production units and refrigeration and air conditioning systems.</li> <li>-2 Proficiency in working in the public and private sectors in the specialty of mechanical engineering/power mechanical technology engineering.</li> </ul>
Value	
Acquiring skills and experience in the field of mechanical engineering in general and the energy sector in particular.	<ul> <li>1- Observation, perception, analysis and interpretation</li> <li>2- The ability to use the acquired knowledge in designing machines, turbine machines, and cooling devices</li> <li>3Conclusion and evaluation in solving engineering problems and how to develop engineering devices and equipment</li> <li>4The ability to evaluate numerical data and apply analytical methods for the purposes of mechanical design, manufacturing methods, and product control.</li> </ul>

1–Teaching and learning strategies
1- The lecture
2- Laboratory
3- Seminars and summer training
4- Scientific trips and seminars
5- Scientific books
6- Graduation projects
1. Evaluation methods
Conducting tests (daily, quarterly, final(
Annual Evaluation
Homeworks
Quizzes.

# 2. The teaching staff

Faculty members

Number c	f the teaching staff	Special requirements/skills (if any(		field	Academic position
lecturer	Permanent		specialization	General	
	staff			specialization	
			Power/ thermal engineering	Mechanical Engineering	Prof
			Applied mechanics	Mechanical Engineering	Prof.
			Design and manufacture	Mechanical Engineering	Assist. Prof.
			Applied mechanics	Mechanical Engineering	Assist. Prof.
			Power/ thermal engineering	Mechanical Engineering	Assist. Prof.
			Power/ thermal engineering	Mechanical Engineering	Assist. Prof.
			Applied mechanics	Mechanical Engineering	lecturer
			Applied mechanics	Mechanical Engineering	lecturer
			Power/ thermal engineering	in MSc Mechanical Engineering	lecturer
			Power/ thermal engineering	MSc in Mechanical Engineering	Assist. lecturer

## Professional development

#### Orienting new faculty members

They are defined as members who are newly hired by the university and are within their first year of academic service. A faculty member in his second year is eligible to participate if he is nominated by the deanship.

Professional development for faculty members

The ability of teachers is developed by involving them in teaching methods courses held at the Faculty Development Center, as well as by holding seminars at the department level, where each teacher is assigned to prepare a seminar on one of the scientific topics, and it is delivered in the presence of the teaching staff in the department. The topic is discussed and notes are recorded. Necessary, as this is useful in refining the teacher's personality and helping him in managing discussion, defense, and expressing opinion, which would help raise the academic level of the teacher and develop his capabilities. Also, in recent years, many of the department's teachers have participated in courses inside and outside the country that have had a positive impact in increasing knowledge and developing skills. Most of the department's teachers also participate annually in many scientific conferences held by Iraqi universities as researchers or as participants.

#### 3. Acceptance criterion

Inputs:-

1. Graduates of preparatory school, scientific branch.

2. The top five students are graduates of vocational training/mechanics branch.

3. The top ten students who are graduates of technical institutes and distinguished state employees are graduates of the Technical Education Authority for the following specializations:

• Machinery and Equipment Department - Pump Operation Branch.

• Machinery and Equipment Department - Automotive Branch.

• Mechanics Department - Production Branch.

- Mechanics Department - Power or Capacity

4. The top ten distinguished employees of state departments are graduates of the Petroleum Training Institute for the following specializations:

• Mechanics Department - Pumps and Turbine Branch.

• Mechanics Department - Automotive and Heavy Equipment Branch.

Admission system:-

Students are accepted through central admission at the Ministry of Higher Education and Scientific Research in two stages, as follows:

1. The first grade includes graduates of preparatory school in the scientific stream, as well as the top graduates of vocational education in the specializations that can be accepted into the specialization.

2. The second grade is accepted:

I The top ten graduates of the technical institutes specified in the specialization entries.

Distinguished people in the field of work in the specializations specified in the entries.

I The top ten graduates of the institute for the specializations specified in the specialization entries, including the Department of Power/Power Mechanics

3. The most important sources of information about the program

# The official website of the college www.tcm.edu.iq Musayyib Technical College/Babylon

## 3. Program development plan

The Mechanical Technology Engineering Department works to develop the student's practical skills and increase his confidence in his scientific capabilities. The curricula are updated by 20% annually by the subject teacher, and periodic updating follows the Deans' Committee.

	Program skills ch										lls ch	art			
	Le	earning	g outcom	ies req	uired	l from	the p	rogra	amme						
			Value				Skills			Know	ledge	Essential or	Course Name	Course Code	Year/level
4C	3C	2C	1C	<b>4</b> B	<b>3B</b>	2B	<b>1B</b>	<b>4</b> A	3A	A	1A	?optional			
		*								*		specialization	Engineerin g Materials Tech.	PMTE111	The first
	*	*	*							*		Assistance	Engineering Mechanics	PMTE113	
			*							*		specialization	Strength of materials	PMTE211	The second
*	*	*	*				*	*		*		specialization	Metallurgy	<b>PMTE214</b>	
*	*	*	*		*	*	*	*	*	*	*	specialization	Pumping Technology	PMTE311	The third
*	*	*	*		*	*	*	*	*	*	*	specialization	Heat transfer	PMTE316	
*	*	*	*		*	*	*	*		*	*	specialization	Power plants	PMTE411	The fourth

*	*	*	*	*	*	*	*	*	*	*	specialization	Project	PMTE417	
*	*	*	*	*	*	*	*	*	*	*	specialization <sup>1</sup>	Machine	PMTE412	
												design		

# **Course description form**

1. Name of the course

Pumps technology

1. 1. Course code

#### **PMTE311**

2. Semester/year

annual

2. The date this description was prepared

2024/2/25

2. Available forms of attendance

Theoretical and practical lectures and scientific trips

2. Number of study hours (total)/number of units (total)

4 hours

2. Name of the course administrator (if more than one name is mentioned)

Name: M.M. Doaa Fadel Karim

Email: Doaa.fadhli.tcm@atu.edu.iq

2. Course objectives

Introducing the student to hydraulic calculations for pumps and their types
 Classifying them and identifying the internal parts, the function of each part

- Classifying them and ide
   and their relationship
- With the rest of the parts for turbine engines.
- •Studying the theory of centrifugation, on which the operation of pumps
- depends, and studying the properties of pumps
- Performance curves and their relationships.
- • Choose the type and specifications of pumps required for any situation. Identify
- the types of valves and their parts

The interior and function of each valve and its uses.

## 2. Teaching and learning strategies

The strategy

**Objectives of the** 

study subject

3. Cours	e structure				
Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	the week
Daily and	Theoretical	Power shaft		8	2-1

monthly exams and lectures and filmshydraulic calculationslease calculationsDaily and monthly and practicalTypes of pumps and ways to classify and matched166-33monthly exams and reportslectures and scientific filmsthem tectures166-33monthly and practicaland ways to classify and practical1166-31monthly and practicalinternal centrifugal pump2011-71monthly and practicalcentrifugal pump centrifugal pump16-12monthly and practicalCentrifugal pumps/theory and application16-12monthly and practicalcentrifugal pump pumps/theory and application16-12monthly and practicalrelationships and properties of scientific films112-16monthly and practicalrelationships and properties of scientific112-16monthly and practicalrelationships and centrifugal pumps12-16monthly and practicalcentrifugal pumps12-16monthly and practicalcurves/choosing tectures and centrifugal pumps12-16monthly and practicalConnect the pumps22-19paily and reportsTheoreticalConnect the pumps22exams and lectures and partificcurves/choosing423monthly and practicalconnect the pumps-10-10paily and reportsTheoretical<					
exams and reportslectures and scientificcalculations calculationsand reportsDaily and monthly and practical and practical and practical and ways to classify166-3monthly exams and reportslectures and scientificthem them166-3Daily and reportslectures and scientificthem components of a centrifugal pump2011-7Daily and monthly and practicalcomponents of a centrifugal pump2011-7Daily and reportsTheoretical scientificCentrifugal pumps/theory and application16-12Daily and reportsTheoretical scientificCentrifugal pumps/theory and application16-12Daily and reportsTheoretical scientificcentrifugal pumps/theory and application12-16Daily and reportsrelationships and scientific12-1618Daily and reportsTheoretical scientificrelationships and centrifugal pumps12-16Daily and reportsTheoretical scientificCentrifugal pumps22-16Daily and reportsTheoretical scientificCentrifugal pumps22-16Daily and reportsTheoretical scientificCentrifugal pumps-22-22exams and lectures and scientificCentrifugal pumps-22-22baily and reportsTheoretical scientificConnect the pumps-23-24monthly and p			hydraulic	and practical	monthly
reportsscientific filmsTypes of pumps and practical and ways to classify and practical and ways to classify exams and lectures and films166-3monthly exams and reportsand practical scientific filmsInternal components of a centrifugal pump2011-7Daily and monthly and practical exams and lectures and lectures and centrifugal pump2011-7monthly and practical components of a centrifugal pump16-12monthly and practical propertsCentrifugal pumps/theory and application16-12monthly and practical pumps/theory and and practicalCentrifugal pumps/theory and application16-12monthly and practical reportsScientific films16-1216monthly and practical and practical properties of scientific filmsrelationships and centrifugal pumps12-16monthly and practical reportsScientific films12-1618Daily and reportsTheoretical scientific filmsPerformance point16-19Daily and reportsTheoretical scientific filmsConnect the pumps in series and parallel23-16Daily and reportsTheoretical scientific filmsConnect the pumps in series and parallel-16-19Daily and reportsTheoretical scientific filmsConnect the pumps in series and parallel-12-16Daily and reports			calculations	lectures and	exams and
Image: matrix and sector of the sector of				scientific	reports
Daily and monthly exams and lectures and lectures and scientificTypes of pumps and ways to classify and ways to classify herm166-3monthly reportsscientificherm111Daily and exams and lectures and lectures and centrifugal pump2011-7monthly and practicalcomponents of a centrifugal pump2011-7monthly and practicalcomponents of a centrifugal pump16-12Daily and monthly and practicalCentrifugal pumps/theory and application16-12Daily and reportsTheoretical scientific filmsCentrifugal pumps/theory and application11-16Daily and reportsTheoretical scientific filmsrelationships and properties of centrifugal pumps12-16Daily and reportsTheoretical scientific filmsrelationships and centrifugal pumps12-16Daily and reportsTheoretical scientific filmsPerformance properties of curves/choosing12-16Daily and reportsTheoretical scientific filmsConnect the pumps423monthly and practicalConnect the pumps423monthl				films	
monthly exams and lectures and scientificand ways to classify themImage: classify themreportsscientific11monthly and practicalInternal components of a centrifugal pump2011-7monthly and practicalcomponents of a centrifugal pump2011-7monthly and practicalcentrifugal pump16-12Daily and reportsTheoreticalCentrifugal pumps/theory and application16-12Daily and reportsTheoreticalCentrifugal pumps/theory and application16-12Daily and reportsScientific films12-1618Daily and reportsTheoreticalrelationships and properties of scientific1118Daily and reportsTheoreticalPerformance properties of centrifugal pumps16-19Daily and reportsTheoreticalPerformance point16-19Daily and reportsTheoreticalConnect the pumps22baily and reportsScientific scientificin series and parallel1423Daily and reportsTheoreticalConnect the pumps423Daily and reportsTheoreticalConnect the pumps423Daily and reportsTheoreticalConnect the pumps423Daily and reportsTheoreticalConnect the pumps423Daily and reportsTheoreticalConnect the pumps	6-3	16	Types of pumps	Theoretical	Daily and
exams and reportslectures and scientificthemlectures and filmsthemDaily andTheoreticalInternal components of a exams and lectures and films2011-7monthlyand practical filmscomponents of a centrifugal pump2011-7monthlyand practical filmscomponents of a centrifugal pump16-12monthlyand practical and practicalCentrifugal pumps/theory and application16-12monthlyand practical filmspumps/theory and application12-16monthlyand practical filmsrelationships and centrifugal pumps12-16monthlyand practical filmsproperties of centrifugal pumps12-16monthlyand practical filmscentrifugal pumps12-16monthlyand practical filmscentrifugal pumps12-16monthlyand practical filmscentrifugal pumps22-16monthlyand practical filmsCentres and centrifugal pumps12-16monthlyand practical filmsPerformance point16-19monthlyand practical filmsfilms1423monthlyand practical filmspoint in series and parallel1423monthlyand practical filmsin series and parallel1423monthlyand practical filmsfilms1423monthl			and ways to classify	and practical	monthly
reportsscientific filmsInternal components of a centrifugal pump2011-7Daily andTheoretical and practical filmsComponents of a centrifugal pump2011-7monthlyand practical filmscentrifugal pump16-12Daily and monthlyTheoretical and practical pumps/theory and lectures and scientificCentrifugal pumps/theory and application16-12Daily and reportsTheoretical scientific filmsCentrifugal pumps/theory and application12-16Daily and reportsTheoretical scientific filmsrelationships and centrifugal pumps12-16Daily and reportsTheoretical scientific filmsrelationships and centrifugal pumps12-16Daily and reportsTheoretical scientific filmsPerformance curves/choosing the best operating reports16-19Daily and monthly and practical filmsConnect the pumps423Daily and monthly and practicalConnect the pumps in series and parallel423Daily and reportsTheoretical scientific filmsPositive films8-24Daily and reportsTheoretical scientific filmsPositive films8-24Daily and reportsTheoretical scientific filmsPositive films8-24Daily and reportsTheoretical scientific filmsPositive films8-24 <t< td=""><td></td><td></td><td>them</td><td>lectures and</td><td>exams and</td></t<>			them	lectures and	exams and
Image: second				scientific	reports
Daily and monthlyTheoretical and practicalInternal components of a centrifugal pump2011-7monthly exams and reportslectures and scientificcentrifugal pumpIIDaily and monthlyTheoretical and practicalCentrifugal pumps/theory and application16-12monthly exams and lectures and reportsIteoretical scientific filmsCentrifugal pumps/theory and application16-12Daily and monthly and practical exams and lectures and reportsrelationships and centrifugal pumps12-16Daily and reportsTheoretical scientific filmsrelationships and centrifugal pumps12-16Daily and reportsTheoretical scientific filmsPerformance curves/choosing the best operating the best operating and practical16-19Daily and reportsTheoretical scientific filmsConnect the pumps423Daily and reportsTheoretical scientific filmsConnect the pumps423Daily and reportsTheoretical scientific filmsPositive displacement8-24Daily and reportsTheoretical scientific filmsPositive displacement8-24Monthly and practical filmsA2525Daily and reportsIteures and scientific filmspumps425Daily and reportsTheoretical filmsGisplacement displacement25<				films	
monthly exams and reportsand practical lectures and scientific filmscomponents of a centrifugal pumplet iDaily and monthly exams and reportsTheoretical pumps/theory and pumps/theory and application films16-12Daily and reportsTheoretical scientific filmsCentrifugal pumps/theory and application16-12Daily and reportsInteoretical scientific filmsrelationships and centrifugal pumps12-16Daily and reportsTheoretical scientific filmsproperties of centrifugal pumps12-16Daily and reportsTheoretical scientific filmsPerformance curves/choosing16-19Daily and reportsTheoretical scientific filmsPerformance point16-19Daily and reportsTheoretical scientific pointConnect the pumps in series and parallel423Daily and reportsTheoretical scientific filmsConnect the pumps in series and parallel423Daily and reportsTheoretical scientific filmsConnect the pumps in series and parallel423Daily and reportsTheoretical scientific filmsPositive displacement8-24Monthly and practicaldisplacement pumps2525Daily and reportsScientific filmsJuly displacement25Daily and reportsTheoretical scientific filmsScientific 	11-7	20	Internal	Theoretical	Daily and
exams and reportslectures and scientificcentrifugal pumpmorthyScientific11monthlyand practical and practicalCentrifugal pumps/theory and application16-12monthlyand practical lectures and filmspumps/theory and application16-12monthlyand practical filmspumps/theory and application16-12Daily andTheoretical filmsrelationships and properties of centrifugal pumps12-16monthlyand practical and practicalproperties of centrifugal pumps12-16monthlyand practical scientificcentrifugal pumps12-16monthlyand practical curves/choosing12-1618monthlyand practical scientificCentres and curves/choosing1222exams and lectures andlectures and the best operating reports2222monthlyand practical and practicalConnect the pumps423monthlyand practical and practicalin series and parallel423monthlyand practical filmsfilms423monthlyand practicalfilms55monthlyand practicalfilmsfilms5Daily andTheoretical filmsPositive8-24monthlyand practical filmsdisplacement25paily andTheoretical films <td></td> <td></td> <td>components of a</td> <td>and practical</td> <td>monthly</td>			components of a	and practical	monthly
reportsscientific filmsCentrifugal pumps/theory and application16-12Daily andTheoreticalCentrifugal pumps/theory and application16-12monthlyand practicalpumps/theory and application1615exams andlectures and applicationapplication1216reportsscientific filmsrelationships and properties of12-16monthlyand practical and practicalproperties of centrifugal pumps1818exams andlectures and filmscentrifugal pumps1216Daily andTheoretical filmsPerformance16-19Daily and monthlyand practical and practicalCurves/choosing point2222exams and lectures and the best operating reportsscientific scientific16-19Daily and reportsTheoretical scientificConnect the pumps423monthly and practicalin series and parallel423monthly and practicalGonnect the pumps423monthly and practicalfilms555Daily and reportsScientific films555Daily and reportsTheoretical scientificPositive displacement8-24monthly and practicaldisplacement pumps255paily and reportsScientific films555Daily			centrifugal pump	lectures and	exams and
Image: scientific				scientific	reports
Daily and monthlyTheoretical and practical pumps/theory and application16-12monthlyand practical filmspumps/theory and application15reportsscientific films1215Daily and monthlyTheoretical and practicalrelationships and properties of centrifugal pumps12-16monthlyand practical filmsproperties of centrifugal pumps12-16monthlyand practical filmscentrifugal pumps16-19reportsscientific filmscurves/choosing the best operating point16-19Daily and reportsScientific filmspoint16-19Daily and reportsTheoretical scientific filmsConnect the pumps423Daily and reportsTheoretical scientific filmsConnect the pumps423Daily and reportsScientific filmsin series and parallel films423Daily and reportsTheoretical scientific filmsPositive garallel8-24Daily and reportsTheoretical scientific filmsPositive garallel8-24Daily and reportsTheoretical scientific filmsPositive garallel8-24monthly and practical filmsGisplacement gumps161525parallel reportsScientific filmsGisplacement161616Theoretical filmsS				films	
monthly exams and lectures and scientific filmspumps/theory and application15meportsscientific films1216Daily and monthlyTheoretical and practicalrelationships and properties of centrifugal pumps12-16monthly exams and reportslectures and scientific filmscentrifugal pumps12-16Daily and reportsscientific films12-1618Daily and reportsscientific films12-16Daily and monthly and practicalPerformance curves/choosing16-19monthly and practicalcurves/choosing point2222exams and lectures and filmsconnect the pumps423monthly and practicalconnect the pumps423monthly and practicalin series and parallelpaily and reportsTheoretical scientificPositive displacement8-24monthly and practicaldisplacement pumps25paily and reportsscientific filmsDaily and reportsTheoretical scientificPositive films8-24-monthly and practicaldisplacement pumps25filmsfilmsfilms<	-12	16	Centrifugal	Theoretical	Daily and
exams and reportslectures and scientific filmsapplicationDaily and monthlyTheoretical and practical lectures and reportsrelationships and properties of centrifugal pumps12-16monthly exams and reportslectures and scientific filmscentrifugal pumps12-16Daily and reportsscientific filmsreationships and centrifugal pumps12-16Daily and monthly exams and lectures and lectures and reportsPerformance curves/choosing point16-19Daily and monthly and practical reportsCurves/choosing point2222baily and reportsScientific pointpoint22baily and reportsTheoretical scientific filmsConnect the pumps parallel423Daily and reportsTheoretical scientific filmsConnect the pumps parallel423Daily and reportsTheoretical scientific filmsPositive displacement8-24Monthly exams and lectures and pumpsPositive pumps8-24monthly and practical and practical filmsDoisplacement pumps55Daily and reportsTheoretical scientificPositive films8-24monthly exams and reportsScientific scientific555filmsfilmsfilmsfilms55filmsfilmsfilmsfilmsfilms<	15		pumps/theory and	and practical	monthly
reportsscientific films			application	lectures and	exams and
filmsrelationships and properties of exams and lectures and iscientific filmsrelationships and properties of centrifugal pumps12-16monthly and practical filmsproperties of centrifugal pumps1818Daily and monthly and practicalcentrifugal pumps1618Daily and reportsTheoretical filmsPerformance curves/choosing16-19monthly exams and lectures and reportscurves/choosing scientific point16-19Daily and reportsTheoretical scientific filmsConnect the pumps in series and parallel423Daily and reportsTheoretical scientific filmsConnect the pumps in series and parallel423Daily and reportsTheoretical scientific filmsPositive displacement8-24Monthly and practicaldisplacement pumps2525exams and lectures and pumpspumps films1615				scientific	reports
Daily and monthlyTheoretical and practical properties of centrifugal pumps12-16exams and reportslectures and scientific filmscentrifugal pumps18Daily and monthlyScientific films-1618Daily and monthlyTheoretical and practical curves/choosing the best operating reports16-19Paily and monthlyInteoretical and practical filmsPerformance curves/choosing16-19Paily and reportsIctures and scientific filmsthe best operating point2216Daily and monthlyTheoretical and practicalConnect the pumps in series and parallel423Daily and reportsTheoretical scientific filmsConnect the pumps423Daily and reportsTheoretical scientificPositive displacement8-24Daily and reportsInteoretical scientificPositive displacement8-24monthly and practicaldisplacement pumps2525exams and reportslectures and scientificpumps cures and pumps1616FilmsInteoretical displacementInteoretical cures1616FilmsInteoretical displacementInteoretical cures16Inteoretical curesFilmsInteoretical displacementInteoretical curesInteoretical curesInteoretical curesInteoretical curesFilmsInt				films	_
monthly exams and reportsand practical lectures and scientific filmsproperties of centrifugal pumps18reportsscientific filmscentrifugal pumps161Daily and monthlyTheoretical and practicalPerformance curves/choosing the best operating reports16-19monthlyand practical filmsCurves/choosing the best operating point16-19Daily and reportsscientific filmspoint1622Daily and reportsScientific filmspoint1623Daily and exams and lectures and lectures and lectures and filmsConnect the pumps parallel423Daily and reportsTheoretical scientific filmsConnect the pumps423Daily and reportsTheoretical scientificPositive displacement8-24Monthly exams and lectures and lectures and scientificPositive displacement8-24Monthly exams and lectures and lectures and scientificGilliplacement pumps55Paily and reportsIndepractical scientificGilliplacement pumps55exams and lectures and lectures and lectures and lectures and pumps66165exams and lectures and lect	-16	12	relationships and	Theoretical	Daily and
exams and reportslectures and scientific filmscentrifugal pumpsImage: Centrifugal pumpsDaily and monthlyTheoretical and practicalPerformance curves/choosing16-19monthly exams and lectures and terportsInterports2222exams and reportsInterportsScientific filmspoint16Daily and monthlyTheoretical filmsConnect the pumps423Daily and monthlyTheoretical and practical in series and lectures and parallel423Daily and reportsScientific filmsin series and parallel1616Daily and reportsTheoretical scientific filmsPositive displacement8-24Daily and reportsTheoretical scientific filmsPositive pumps8-24Daily and reportsScientific scientific161615Daily and reportsTheoretical scientificPositive pumps1625Exams and lectures and pumpspumps161616FilmsFilmsFilmsFilms1616FilmsFilmsFilmsFilms1616	18		properties of	and practical	monthly
reportsscientific filmsPerformance curves/choosing16-19Daily and monthlyTheoretical and practical lectures and filmsPerformance curves/choosing16-19exams and reportslectures and scientific filmsthe best operating point2222Daily and monthlyscientific filmspoint16-19Daily and exams and lectures and lectures and exams and lectures and filmsConnect the pumps in series and parallel423Daily and reportsTheoretical scientific filmsConnect the pumps in series and parallel423Daily and reportsTheoretical scientific filmsPositive displacement8-24Monthly and practical lectures and lectures and lectures and lectures and pumps2022Daily and reportsTheoretical scientific filmsPositive lectures8-24Monthly and practical lectures and reportsScientific scientific1616FilmsInterformance lectures and filmsInterformance lectures1616FilmsFilmsInterformance lectures161616FilmsFilmsInterformance lectures16Interformance lectures16FilmsFilmsFilmsFilmsFilms1616FilmsFilmsFilmsFilmsFilms1616FilmsFilmsF			centrifugal pumps	lectures and	exams and
Image: non-state state sta				scientific	reports
Daily and monthlyTheoretical and practicalPerformance curves/choosing the best operating point16-19exams and reportslectures and scientificthe best operating point22Daily and monthlyScientific filmspoint4Daily and reportsTheoretical scientific filmsConnect the pumps in series and parallel4Daily and reportsIn series and scientific films94Daily and reportsScientific films94Daily and reportsTheoretical scientific filmsPositive displacement8-24Monthly exams and lectures and practicalPositive displacement8-24Monthly exams and reportsscientific films9425				films	•
monthly exams and reportsand practical lectures and scientificcurves/choosing the best operating point22Teportsscientific filmspoint1Daily and monthlyTheoretical and practicalConnect the pumps in series and parallel423Monthly reportsand practical scientificConnect the pumps in series and parallel423Daily and reportslectures and scientificparallel11Daily and reportsTheoretical scientificPositive displacement8-24Monthly exams and lectures and lectures and scientificPositive displacement8-24Monthly exams and reportsscientific scientific111Daily and reportsTheoretical scientificpumps11Monthly exams and reportsscientific scientific111Monthly reportsscientific scientific111Monthly reportsscientific scientific111Monthly reportsscientific scientific111Monthly reportsscientific scientific111Monthly reportsscientific scientific111Monthly reportsscientific scientific111Monthly reportsscientific scientific111Monthly reportsscientific <br< td=""><td>-19</td><td>16</td><td>Performance</td><td>Theoretical</td><td>Daily and</td></br<>	-19	16	Performance	Theoretical	Daily and
exams and reportslectures and scientificthe best operating pointImage: constraint of the set operating pointDaily and monthlyTheoreticalConnect the pumps423Monthly exams and reportsIn series and scientific11Daily and reportsScientific films11Daily and reportsScientific films11Daily and reportsTheoretical filmsPositive displacement8-24Daily and reportsTheoretical scientificDisplacement films2525exams and reportsScientific films111	22		curves/choosing	and practical	monthly
reportsscientificpointfilmsfilms1Daily andTheoreticalConnect the pumps4monthlyand practicalin series and4exams andlectures andparallel4reportsscientific44TheoreticalPositive44Daily andTheoreticalPositive4Daily andInfecreticalPositive44Daily andInfecreticalPositive44Daily andInfecreticalPositive44monthlyand practicaldisplacement44exams andlectures andpumps44reportsscientific444films4444films4444films4444films4444films4444films4444films4444films4444films4444films4444films4444films4444films4444films4444films4444films444			the best operating	lectures and	exams and
IfilmsIIDaily and monthlyTheoretical and practicalConnect the pumps in series and parallel423exams and reportslectures and scientificparallel423monthly reportsscientificI11Daily and monthlyTheoreticalPositive displacement8-24monthly exams and reportslectures and scientificpumps25exams and reportsscientific filmsII			point	scientific	reports
Daily and monthlyTheoretical and practicalConnect the pumps in series and parallel423exams and reportslectures and scientificparallel423monthly reportsscientificparallel423Daily and monthlyTheoreticalPositive displacement8-24monthly exams and reportslectures and scientificpumps8-24filmsfilms0000filmsfilms0000				films	
monthly exams and reportsand practical lectures and scientific filmsin series and parallelIn series and parallelTheoretical monthlyScientific filmsNoNoDaily and monthlyTheoretical and practical lectures and scientificPositive displacement pumps8-24 monthlyItectures and scientific25exams and reportsscientific filmsItectures and filmsItectures pumps	23	4	Connect the pumps	Theoretical	Daily and
exams and reportslectures and scientificparallelTeportsscientific			in series and	and practical	monthly
reportsscientific filmsreportsDaily andTheoreticalPositive8Daily and practicaldisplacement25exams andlectures andpumps1reportsscientific11films111			parallel	lectures and	exams and
filmsfilmsDaily andTheoreticalPositive8monthlyand practicaldisplacement25exams andlectures andpumps4reportsscientific44films666			1	scientific	reports
Daily and monthlyTheoretical practicalPositive displacement8-24monthly exams and reportsand practical because and scientificdisplacement pumps25reportsscientific filmsbecause and because and <br< td=""><td></td><td></td><td></td><td>films</td><td>•</td></br<>				films	•
monthlyand practicaldisplacement25exams andlectures andpumps25reportsscientific1000000000000000000000000000000000000	-24	8	Positive	Theoretical	Daily and
exams and lectures and pumps reports scientific films	25		displacement	and practical	monthly
reports scientific films			pumps	lectures and	exams and
films				scientific	reports
				films	
Daily and Theoretical Valves 12 -26	-26	12	Valves	Theoretical	Daily and
monthly and practical 28	28			and practical	monthly
exams and lectures and				lectures and	exams and
reports scientific				scientific	reports

	films							
Daily and	Theoretical	Cavitation in pumps		4	29			
monthly	and practical							
exams and	lectures and							
reports	scientific							
	films							
Daily and	Theoretical	Methods for		4	30			
monthly	and practical	choosing the						
exams and	lectures and	appropriate pump						
reports	scientific							
	films							
3. Cours	3. Course evaluation							

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.

The	Final exam		Annual	year works		Second course			First course			Subject	
grade				quest									
	Sum	Pra	Th		Report	Total	Sum	Pra	Th	Sum	Pra	Th	
100	50	10	40	50	5	5	20	10	10	20	10	10	Theory
													and
													practical

3. Learning and teaching resources	
	(Required textbooks (methodology, if any
Bhattacharya S.C., Hydraulic machines, shri B.V. Gupta, Delhi, 1975.	(Main references (sources
1. John A. Roberson, Hydraulic	Recommended supporting books and
Engineering, John Wily& Sons, USA, 1998. 2. Jain V.K., Pumps Theory and	references (scientific journals, reports)
Practice, Galgotia Booksource,	

New Delhi, 1987.

