



**ACECR**

Academic Center for Education, Culture and Research

**Science, Innovation, Products and Services**

2021





## ACECR at a Glance

The Academic Center for Education, Culture and Research (ACECR) is an Iranian public non-governmental institution, established in 1980, with the mission of presenting a native model for development of knowledge and technology.

This mission is achieved by means of directing innovative research and development projects in different fields of science and technology and pursuing the utilization of the results. In this respect development and compilation of technology; commercialization of research results; knowledge propagation by means of publications, professional trainings and academic educations are overtaken by ACECR .

### Field of Activities:

- Research and Technology
- Education
- Cultural
- Entrepreneurship

### Human resources

Professional activities are fulfilled by ACECR's 700 full time research and academic staff and 1700 full time research assistants.

A variant number of industry experts, university staff and post graduate research students have part time cooperation in some projects.

The main activities are supported by 2100 services and administrative staff.

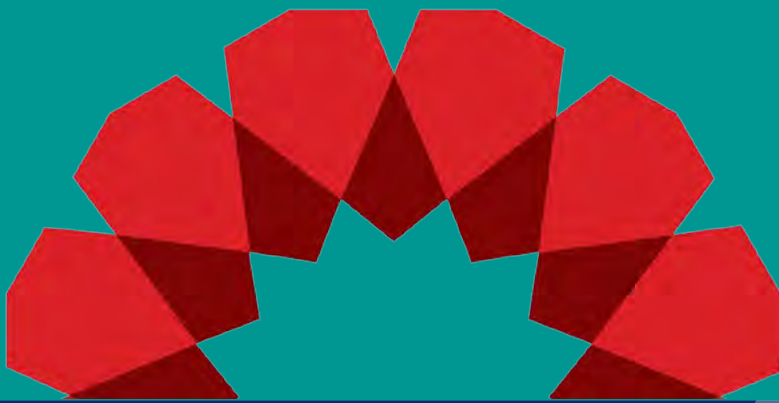
### Financial resources

More than 80% of ACECR annual revenues are supplied by contract research and selling technological products and services to the private and public sectors. Less than 20% is covered by government funds.

### ACECR Range of Services and Partnership

The multidisciplinary nature and the organizational flexibility of ACECR enables us to offer a wide range of services in many fields of science and technology. Depending on the customer's field of interest, one or some of the services are provided.

ACECR also enters partnership with financial, industrial and research organizations in the forms of consortium, joint venture and cooperation agreements.



**ACECR**

**Engineering  
and  
Basic Science**

## Land Drilling Rigs

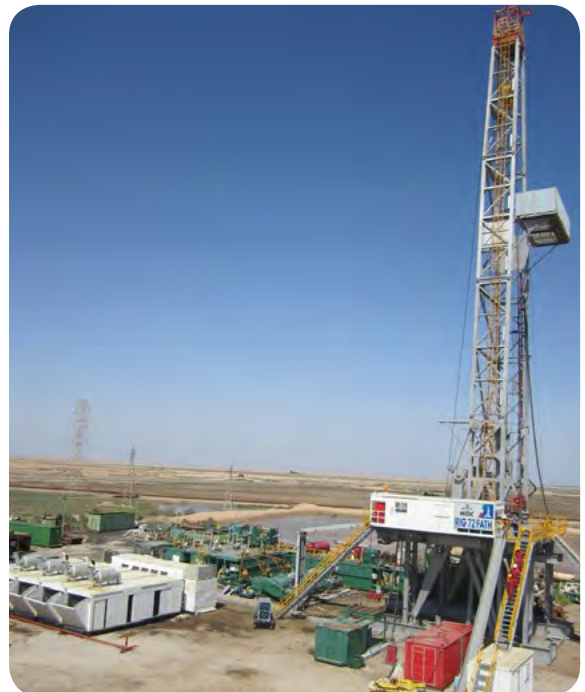
### Technical Specifications:

- Cantilever Mast as Per API 4F
- Swing Up Substructure as Per API 4F
- Draw works Rated Input: 2000hp
- Drilling Depth: UP to 20000 Ft
- Mast Height Above Floor: 152Ft
- Drill Pipe Stand: 3 Joints
- Substructure Floor Height: 36Ft
- Static Hook Land on 12 Lines:  
1,000,000 Lbs or above
- 500 Ton AC Top Drive
- Rotary Table 37 1/2"
- Mud Pumps: 3 sets reciprocating triplex single acting 1600 hp each unit driven by 2 nos.
- DC motors (2×1100 hp)

### Environmental applications

- Temperature: -20 C \_ +50 C
- Humidity: Less or Equal 90 %
- Wind speed: less than 110 km/h
- Height above sea level: less or equal 1500 m





## Electrical Systems for Drilling Rigs (SCR & MCC System)

### Technical Specifications

- Rig type: electrical drive drilling rig
- Draw works driver: 2 \* 1100 hp
- Mud pumps driver: 3 \* (2 \* 1100 hp)
- Rotary table driver: 1 \* 1333 hp
- Diesel generator: 4 \* 1900 KVA (1330 kW), CAT 3512
- Emergency diesel generator: CAT 3406 400 kW
- SCR units: 5 \* 750 VDC / 1800 A
- Generator units: 4 \* drivers for 600 VAC / 60 Hz, 1200 PRM, 1900 KVA
- Diesel-generator
- MCC: draw out type with 54 feeders up to 75 hp and top driver feeder
- Power transformers: 1 \* 1250 KVA, 1 \* 180 KVA
- Air conditions: 2 \* 10 tons
- Power house dim: 12.72\*3.15\*3.7 (L\*W\*H) m
- PLC: siemens S7-300

### Major Client and Projects

#### National Iranian Drilling Company (NIDC)

- Electrical System for Rigs No.: 43 - 71 - 78 - 79 - 80 - 81 and 87 Fath - Since 2001 (Delivered)
- Electrical System for Rigs No.: 72 and 73 Fath (Under construction)



## Coiled Tubing Unit

No.	Item	Specification
1	Transport Base	3-Axle Main Trailer + 2-Axle Accessory Trailer
2	Maximum Injector Pulling Capacity	80,000 lbs
3	Maximum Wellhead Pressure	10,000 psi
4	Tube OD	1 ¼" – 2 ½" (Typically 1 ½")
5	Maximum Tube Length (for 1 ½" Tube)	6,000 m
6	Total CTU Weight	54,000 Kg
7	Hydraulic Power Pack Engine	450 hp
8	Working Capability	On-Shore / Off-Shore (Skid Mount)
9	Control Cabin	Electric/Hydraulic
10	Hose Reel Length	42 m (140 ft)





## Tricone Tooth Bit

### Technical Specifications:

- Bit Size: 17 ½ in
- Tooth Type: face harden Steel Tooth by Tungsten Carbide
- Bit Connection Type: 7 5/8" API Regular Pin
- Weight on Bit: 15000 to 60000 lb
- Rotary Speed: 50 to 350 (RPM)

### Application:

Drilling oil well





## Marine Loading Arm

size: 12"

Balancing type: DRCMA

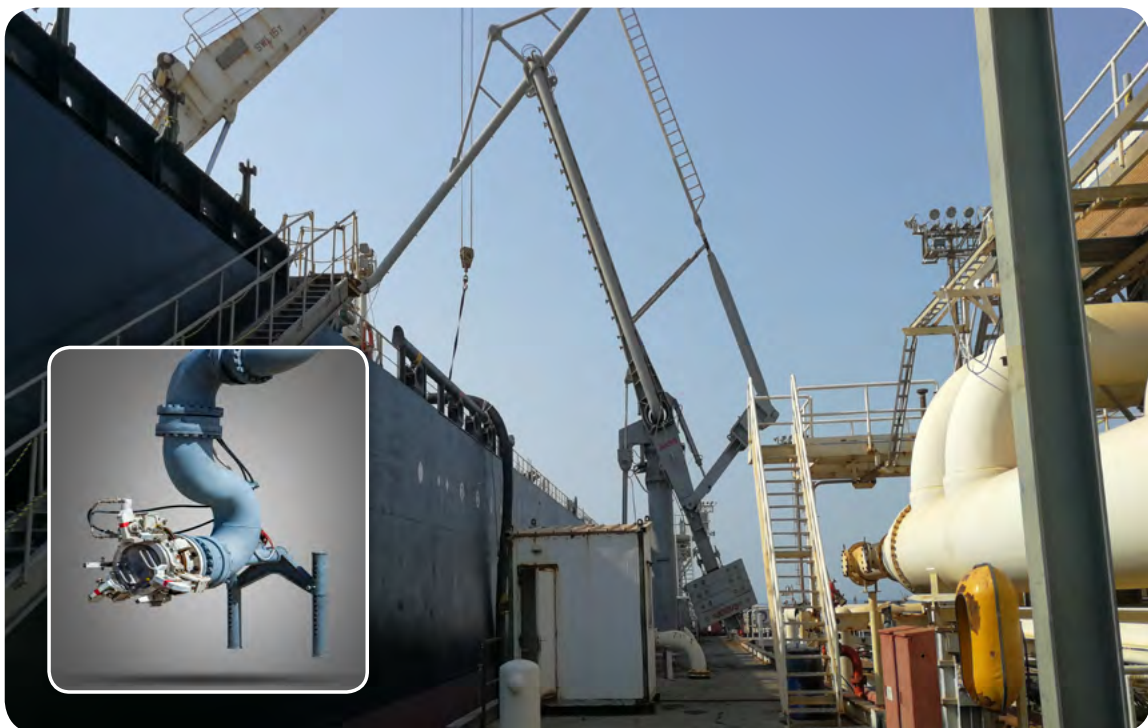
(Double Rotating Counterweight Marine Arm)

Medium: Crude/Bunker/Diesel

Riser length: 6500 mm

Inboard length: 10850 mm

Outboard length: 9300 mm



## Submerged Rotary Jet (SRJ)

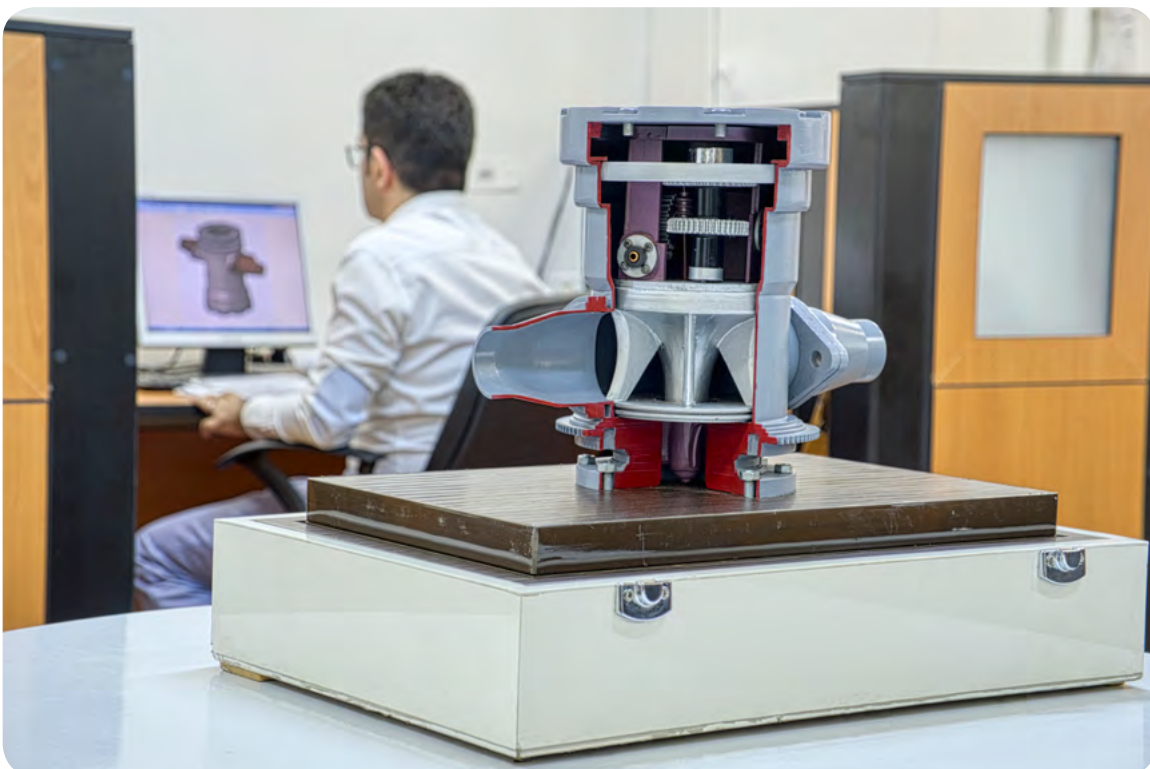
This device is replaced by the mixers. Experiments show that less than 30 hours is required in petroleum sludge using SRJ fully be suspended and be removed from the tank floor. One of the main advantages of this system is the saving in electricity.

### Benefits and features:

- measure the correct quantity of oil storage
- excellent and perfect drainage of oil from the reservoir tank during evacuation
- Elimination of unnecessary operations on oil
- lower cost of installation and maintenance
- simple structure with excellent durability

### Technical Specifications:

- Inlet momentum of the designed SRJ system: 1 N.m
- Output momentum: 5 KN.m
- Gearbox input cycle: 400 rpm
- Nozzle diffusion length for a tank with a diameter of 109
- Casing material: Alloy UNS C95500 – Brinell hardness of 200





## **Industrial Air Pollution Control Equipment:**

### **Electrostatic Precipitators (ESPs):**

A device which separates particles from a gas stream by passing the carrier gas between electrodes across which a unidirectional, high-voltage potential is placed. The particles are charged before passing through the field and migrate to an oppositely charged electrode. These devices are very efficient collectors of small particles.

### **Application:**

Cleaning of air pollutants by a variety of industrial sources such as cement, copper, aluminum, refineries

Installed ESPs in more than 60 industrial plants.



## Fabric Filter Collectors, Baghouses

**Fabric filter collectors**, or **Baghouses**, separate particulate from gas stream by causing the particulate to pass through a filtering media. The gasborne particulate is intercepted by the fibers of the filtering media, by the particulate already present on the media surface, or both. To prevent excessive pressure drop as the particulate accumulates, these devices use various mechanisms to disengage the particulate from the media.

### Typical applications and uses:

**There are three basic fabric filter dust collector applications.**

- 1) “Nuisance” venting of conveyors, transfer points, packing stations and so on — this dust is often sent to waste.
- 2) “product collection” venting of classifiers, crushers, storage bins, air (pneumatic) conveying systems, mills, and flash dryers. This dust is often recovered because it has value.
- 3) “process gas filtration” venting of spray dryers, kilns, power boilers, reactors and so on. The collected solids may or may not be returned to the process. This dust may or may not be worth recovering but must be controlled for environmental or workplace health reasons.

Fabric filter collectors are also currently used for gas absorption applications wherein the fabric filter collector is preceded by a spray dryer, dry Venturi, ductwork injection system, or the bags are pre-coated with an adsorbent or absorbent. Sodium bicarbonate precoat, for example, has been used to remove gaseous SO<sub>2</sub> from power boiler exhaust gases.

## Cooling Towers

Gas conditioning towers (GCT), also named “Cooling tower” mainly are used in cement plant for cooling hot exhaust gas of cement kiln entering to electrostatic precipitator (ESP) by spraying water droplets into hot gas stream for optimizing dust collection.

### Example of Projects:



**Darab Cement**



**Tehran Cement**



**Shahrekord Cement**

## MW / AM Radio Transmitters

More than 100 transmitter units with output powers from 1 to 1000 kilowatts are installed in Iran and some neighboring countries.

### Technical specifications and Innovations:

Use of long-life solid-state

Switching technology with efficiency greater than 90%

MOSFETs instead of vacuum tubes

PWM modulation technology

Fully modular design

In-module error control using programmable ICs.

Reliability and ease of installation, repair and maintenance

Combination of serial and parallel power combining in 1000KW transmitter.

fluctuations compensation of the mains power.

Manufacturing of 20KV/260V power transformer in a special design for 2.4MVA power

Design and manufacture of 2.4MW rectifier with a special inductance filter for 6000A current

Design and implementation of control and monitoring system through PC

### Mobile MW Radio Transmitters:

One of the other products in this category is the mobile MW transmitter that is suitable for using in critical conditions and disasters. It can be installed and becomes operatable in less than 48 hours.

### Specifications:

100KW output power in the whole of MW band

All requirements of a radio broadcasting site with fast installation capability

Ability of installation and operation everywhere.





## FM Radio Transmitters

### Technical Specifications:

- Nominal output power :10000 watts can be increased upto 10% (20000watts)
- Output connector(female) : 7.16 inch
- Deviation of nominal frequency : +/- 75 KHz
- The power efficiency : 60%(DC to RF)
- Pre-emphasis 50 and 75 micro seconds(switchable)
- Protection systems for current, voltage, temperature and back
- Isolation between two Stereo bands: greater than 40 dB
- Harmonic attenuation to the main carrier, higher than 65dB
- THD at nominal frequency deviation better than 55 dB
- Remote control transmitter through the serial port
- Attenuation 19 kHz after noise filtering, higher than 45 dB
- Adjustable frequency step 10 kHz or 100 kHz (PLL circuit)
- Frequency band from 87.5 to 108 MHZ(no need to set if frequency changes)
- Weighted signal to noise greater than 65 dB(Mono)at 75 kHz frequency deviation
- Unweighted signal to noise greater than 70 dB(Mono-at 75 kHz frequency deviation)

### Special Features:

- Protection VSWR(as Recycle)
- Central monitoring and control of the transmitter (MCU)
- Switching power supply with high efficiency and active PFC
- IP-Based remote control system( Optional )
- Automatic power control of RF power modules (APC)
- Stereo modulator and also possible to get MPX input
- Basic parameters monitoring system and registry errors
- System for recording the current status of transmitter (Rack Memory)
- Ability to broadcasting digital data with RDS protocol (Optional)
- Voice input range from -10mdB to +10mdB(adjustable)
- Dual excitation system with manual switch and automatic in emergency
- All-transistor power amplifiers(MOSFET technology is used)
- The transmitter can continue working without interruption in case of outages and damage to a power module



## Access Control System

This award winning product from our Speed Gate range is the latest for today's security requirements.

New concepts, new materials, personalization with a selection of operating systems, and features. Proven technology, for fast, reliable operation. "Normally Closed" presents obvious security.

### References List:

- Government
- Banking
- Transport
- Petrochemical
- Pharmaceutical
- Airports
- Telecommunications
- Information Technology

### Technical Specification:

Power supply	190 – 240VAC / 50-60Hz
Logic voltage	24 VDC
Operating temperature	-25 to +55 C
Flow rate (per minute)	Min. 20 in reader mode Max. 40 in sensor mode



**Function:** Passage in both directions, electronically controllable.

**Power failure:** In the event of a power failure the wings will drive to the open position. (UPS is required.)

## Connected Vehicle Technology :

### Application

- Safety: awaring about surrounding situations by making alerts such as emergency brake warning, emergency vehicle arrival warning, accident occurrence warning, sidetrack-to-main-road vehicle arrival warning, informing vehicles about road traffic status of the out-of-sight regions, and etc.;
- Traffic: electronic toll collection, emergency vehicle prioritization, proposing optimal route and estimating travel time, intelligent park system, and etc.;
- Environment: optimizing the scheduling of traffic signals to decrease fuel consumption, transmitting some recommendations compatible with environment to the drivers, and etc.;
- Other applications: on-time informing the driver by sending the alerts to change or repair the defective components, electronic toll collection according to crossed distance, distance-based insurance

### ACECR Experiences

- CVT Pilot in two areas:  
Road area: Tehran-Rasht freeway (338 Km)  
Urban area: Qazvin city located in the middle way of Tehran-Rasht freeway
- Producing and integration of hardware and software components of the product
- Production and development of basic software and basic processing
- Developing real-time software for communication between RSE and vehicles (V2I)
- Developing real-time software for vehicle-to-vehicle communication (V2V) based on safety
- RSU installation in the freeway and the urban area
- OBU installation on buses, passenger vehicles, road maintenance vehicles, emergency vehicles, and private cars



## Propulsion System of Subway Train

We have used the most updated traction system of AC type in designing propulsion system of subway train.

It has been used the IGBT technology in engine motor auxiliary converters and inverters along with the control boards based of the most powerful digital processing ( FPGA, DSP).

These systems are able to make connection to high level control systems and also other train subsystems through each Standard communication protocol, (CAN, MVB...)

In designing control boards, advanced and complicated diagnostic and troubleshooting facilities are provided.



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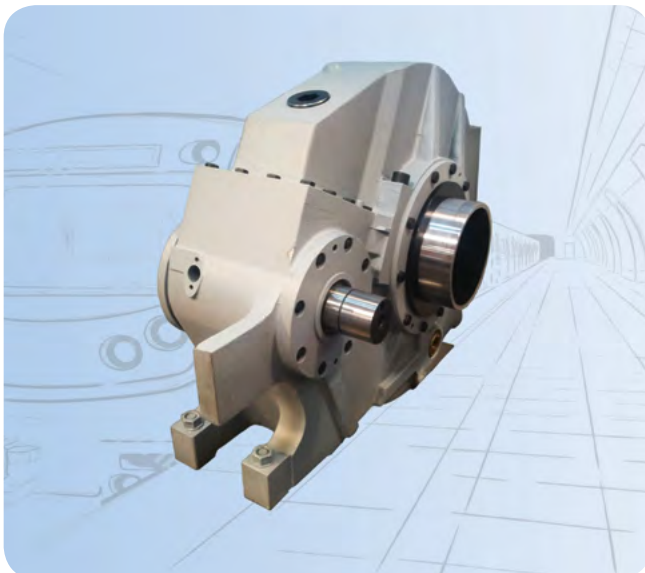
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These equipments are designed for installing under the train.

It's been utilized the dynamic brake resistor for absorbing energy in braking posture.

**Propulsion system equipment is as follow:**

- Traction engines with gearbox
- Engine drive converter with braking resistance
- Auxiliary converter(Static)
- Train control and monitoring system (TCMS)



## Rectifiers for Subway Traction Substations

### Technical Specifications:

- Type of rectifier: silicon diode
- Configuration: 2 × parallel three phase

bridge (12 pulses)

- Type of installation: indoor
- Enclosure degree: IP 20
- Method of cooling: AN
- output voltage: 750 V DC / 1500 V DC
- Rate power: up to 4500 KW
- Rate current: up to 4000 A DC
- Standard: IEC 146 class IV
- Max. ambient temperature: 40





## Industrial AC / DC UPS System

### Specifications:

- Industrial Online UPS & Converter System (single/three phase)
- Single, Double, Parallel, Hot Standby & Load Share UPS
- High Power (Up to 250 kVA for single phase and 500 kVA for three phase systems)
- High Efficiency & Reliability
- High Power Quality
- Low Output Distortion
- Fast Step Load Response Time
- Compatible with IEC, IPS, NEMA Standards

### Reference List:

- Isfahan, Bandar-e-abbas, Abadan and Shazand Refineries
- Ilam Gas Refinery
- Phases 6, 7, 8, 9, 10, 12, 17 and 18 South Pars gas field
- Development of Salman, Siri, Lavan and ... Platforms
- Tabriz, Kermanshah, Khark, Morvarid, Kavian and Pars Petrochemicals
- Tana Power Plant of Kenya
- Sangtuda Power Plant of Tajikistan



## Standard UPS

### Technical Specifications:

- True online double conversion technology
- Latest technology floating point (DSP) / multi Microprocessor Controllers
- IGBT PWM rectifier & inverter technology
- Low input current THD (< %3)
- High input power factor (> 0.99)
- Output harmonic distortion (Linear load <%2 & Nonlinear load <%3)
- High efficiency (Normal mode up to %94 & Economy mode %98)
- Advanced battery test and management
- Short circuit and overload protection
- Static & manual bypass operation
- Easy and free power upgrade
- Advanced communication capabilities (RS 232 / 485, MODBUS, SNMP)
- Perfect generator compatibility
- Cold start function
- Emergency power off
- Back feed protection
- Parallelable up to 8 units (N+1 redundant parallel)
- Auto restart function





## High Current Transformer – Rectifier

This product has been designed and produced in order to reach to demand parameters in Rectifiers such as efficiency, ripple and losses ...

It is included some different kinds of combination of Transformer and semi-conductors, it is able to make required change in Voltage and Current output by auto transformer or thyristor methods(sometime with Thyristor +tap changer)

Application:

- Non-ferrous metals production (aluminum, zinc, copper and steel)
- Anodizing of aluminum
- CL production

Technical specifications:

- Duty cycle: continues
- Cooling: Oil and water/air
- Type of control: manual, semi automatic and automatic by PLC
- Input voltage: 380 / 20000 V
- Output current: up to 40 KA
- Output voltage: up to 140 KV DC
- Number of pulse: 6, 12, 24 and 48 pulses





## Electroplating DC Power Supplies

### Application:

Creating additive metallic surface on the metals for increasing their period of life, protection aims and improving physical and chemical characteristics

### Technical Specification:

- Input voltage: up to 20 kV/ 50 Hz/ 1 or 3 Ph
- Output current: up to 40 kA DC
- Output voltage: up to 500 V DC
- Cooling: AN, AF, ONAN, ONAF, WFAF
- Auto/manual control of output voltage & current
- Electronic control by microprocessors
- Standard port for connection to computer
- Suitable for industrial and laboratorial environments

## Variable Frequency Drive (VFD)

- Output power: up to 2 MW of power
- Output voltage: up to 6.6 Kv
- High efficiency Over 97%

### Application:

- Replacement suitable for Gas Turbines
- Optimization of energy consumption
- Optimization of maintenance costs





## High Voltage DC Power Transmission

### HVDC-Light System - 1 MVA

#### Industrial Type:

- Rectifier: 12 pulse electro optic thyristor based
- Inverter: 3 phase VSI electro optic series IGBT based
- Type: mono / directional
- Output Power: 1 MVA
- Input Voltage: 3 phase 20 KV AC
- Output Voltage: 3 phase 400 V AC
- DC voltage: 20 KV ( $\pm$  10 KV DC)

#### Application:

- supply power/ Electrification to marine platforms
- supply power/ Electrification to islands
- supply power/ Electrification to impassible regions
- Selling electricity to other countries





## High Voltage Laboratory Equipment

### High Energy Impulse Generator 1800 KV/180 KJ

#### Technical Specifications:

- Generating and measuring of lightning and switching impulses according to IEC60060-1 (2010)
- Voltage: 1800 kv
- Energy: 180 kJ
- Possibility to upgrade up to 2600 kV / 260 kJ
- Impulse Analyzer system
- Automatic controller

### High Voltage laboratory Training Kit

#### Technical specifications:

Input voltage: 380 / 20000 V  
 Output voltage: up to 140 KV DC  
 Cooling: Oil and water

Output current: up to 20 KA  
 Duty cycle: continues  
 Type of control: manual, semi automatic and automatic by PLC





## Short Circuit Test Equipment (Synthetic Method)

### Technical Specification:

- Carrying out the short circuit tests on MV circuit breaker up to 36KV/31.5 KA
- Making and breaking test on MN circuit breaker
- Capacity to do T10, T30, T60, T100 s tests
- According to IEC62271-100,

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### Technical Specifications:

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- Making and breaking test on MV circuit breaker
- Capability to do T10, T30, T60, T100 s tests
- According to IEC62271-100, IEC62271-100
- Equipped with Automatic controller

### Reference List:

Tavanir Co.

niroo research institute of Iran (NRI)

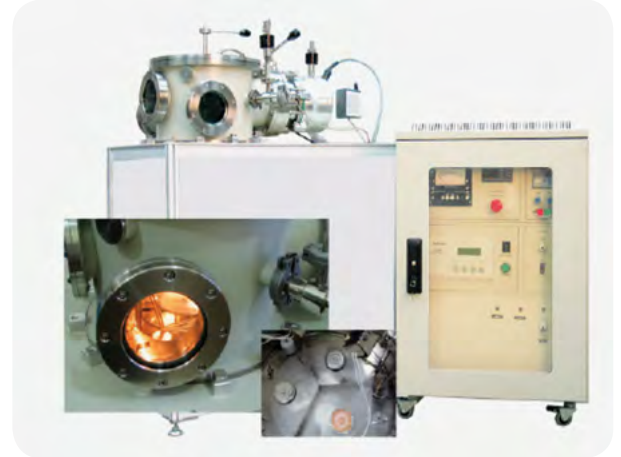
**Manufacturer:** JDEVS (High Voltage Center)



## Thin Film Coating

### Thin Film Coating of Metals and Dielectrics by :

- DC Magnetron Sputtering
- Electron Gun Beam Thermal Evaporation
- Resistive Thermal Evaporation
- Reactive Sputtering



#### • Conductive and Metal coating of :

Ag, Au, Al, Cr, Cu, Fe, Ge, In, Ni, Pt, Zn, Ti, AZO, ITO, Co

#### • Dielectric Thin Film coating of :

Al<sub>2</sub>O<sub>3</sub>, Cr<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, MgF<sub>2</sub>, ZnO, WO<sub>3</sub>, TiO<sub>2</sub>, CuO, SiO<sub>2</sub>

### Applications:

- Precision Mirror
- Sensors
- Anti-Reflection Layers
- Optical Filters
- Dielectric, Resistive and Conductive Thin Film Layers
- Hard Coating Thin Film Layers
- Protective Thin Films Layers



**Thickness:** 5 Nanometer to 5 Microns

**Tolerance:** 10% to 20%





## Metal Foam

### Features:

- Ability to dire heat homologously in all directions
- Resistance to corrosion
- None – flammable
- High surface to volume ratio for catalytic applications
- High filtration capacity
- Resistance to sudden thermal shocks
- High porosity range
- High Elastic modality
- High Energy absorption
- High strength to weight ratio
- Recyclability

### Applications:

- Heat exchangers
- Catalysts
- Fuel Cell
- Strengthen the driving force of solid fuel

### Our Capabilities:

- Production of open cell metal Foam from various metals such as aluminum, copper, Nickel, titanium, etc.
- Production of open cell metal foams of different shapes and sizes.
- Provision of consulting services regarding the open cell metal foams.

### Some performed Projects and Researches:

- Open cell metal foam production knowledge development and optimization of production process
- Receiving product order foam Iranian consumers

### Potential industrial clients:

- Aerospace
- Automotives
- Optics and Electronics
- Chemicals

## Chemical Surfactants

- Sorbitan Esters 20,60,80
- Sulfosaccinate
- Lauramide and Superamide
- Coco Amido Propyl Betaine

## Chemicals for Petroleum and Industries

- Spherical Activated Alumina
  - Tri Calcium Phosphate
  - FC and HS Grade Stabilizers(for Polystyrene plants)
  - Glycerol Mono Stearate(GMS)
  - Fluid Loss Control for Oil Well Cementing
  - Leveling Agents
  - Pharmaceutical Grade Selenium Sulfide
  - Drag Reduce Agent
  - Hydro Desulfurization Catalyst(HDS)
  - Water Resistant Spherical Silica Alumina
  - Water Resistant Spherical Silica Alumina
- Carbendazium, fungicide
  - Bentazone, weeds herbicide
  - phytochemistry



## Fine Chemicals

- Azodi Carbon Amid
- Hexa Meta Phosphate
- Thio Phthalimide
- Sodium Fluorophosphate
- Sulfobenzamide
- Sulfur oxychloride
- Sulfathiazole
- Gelpol products
- Non-toxic Antifouling Components
- Demulsifier
- Selenium Sulfide
- Drag Reduce Agent
- Nano-photocatalytic Synthesis and Their Application in Industry.

Diocetyl Sodium Sulfosuccinate (DSS)

Crystalline Urea

Wetting & Dispersing Agents

Sulfur Polymer Cement

Process Engineering

Selenium Sulfide

Drag Reduce Agent

Organic Products Analysis

- Cyclohexylthio Phthalimide(CTP)



## Demulsifier

The most common classes of water-in-oil demulsifier can be summarized in the following list:

- Polyalkoxylate block copolymers and ester derivatives
- Alkylphenol-aldehyde resin alkoxyates
- Polyalkoxylates of polyols or glycidyl ethers
- Polyamine polyalkoxylates and related cationic polymers (mainly for oil-in-water resolution)
- Polyurethanes (carbarnates) and polyalkoxylate derivatives
- Hyperbranched polymers
- Vinyl polymers
- Polysilicones



## Aquaculture Nets

### Typical Applications:

Used in Aquaculture Cage Systems to Allow Free Flow of Water into and out of the Cage and Protect Fish against Dangerous Hunters;

Providing Appropriate Strength And Structure To Prevent Fish Out Of The Cage;

Complete Antifouling to Reduce the Cost and Time to Clean Periodic of Net;



## Variety of Monolithic Materials

### Technical Specifications:

- Different types of Chamotte refractories (Service temperature 1400, 1540 and 1550 °C)
- Different types of Alumina-silica and high alumina refractories (Service temperature 1650, 1750 and 1820 °C)
- The high alumina castables up to 90% are made from high grade raw materials.

### Application:

Unshaped (monolithic) refractory materials used in various industries such as: lining furnace and insulation, steel, cast iron and non-ferrous metals and alloys, glass industry, cement industry, oil and gas and petrochemical.

### Pre-shaped products

#### Tap spouts

#### Technical Specifications:

- Composition: 98%  $Al_2O_3$
- Bulk density: 3.2 g/cm<sup>3</sup>
- Dimensions tolerances: + - 1mm
- Service temperature: 1700 °C

#### Application:

Use in launders of purified molten non-ferrous metals



## Variety of Monolithic Materials

### Ladle Nozzles

#### Technical Specifications:

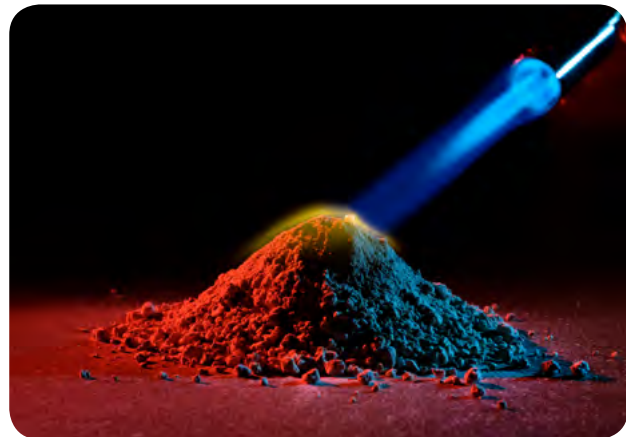
- Composition: Fused alumina, Silica
- Resistance to chemical corrosion : Excellent
- Bulk Density: 2.9-3g/cm<sup>3</sup>



### Alumina Stopper

#### Technical Specifications:

- Density :2.8-2.9 g/cm<sup>3</sup>
- Open porosity: 19-21%
- Resistance to chemical corrosion: Excellent



### Refractory Burner Blocks

#### Technical Specifications:

- High density
- thermal shock resistance: excellent
- Erosion resistant
- High hot strength

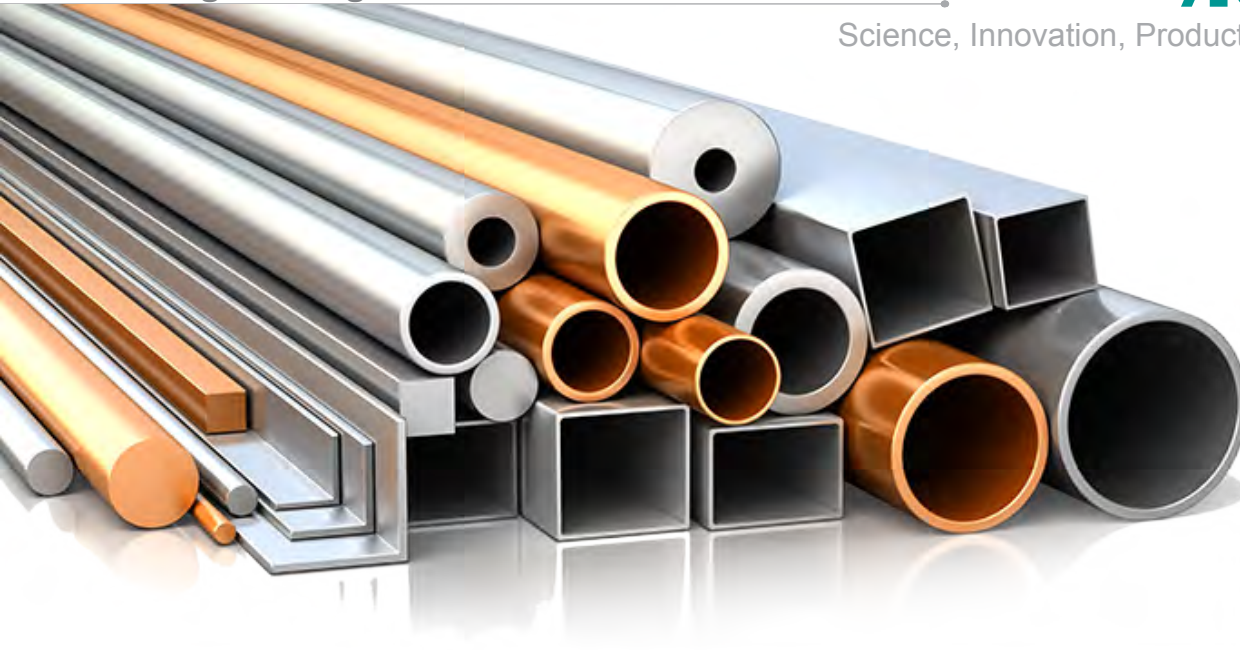


## Pure Metals

Pure copper %99.99 in electrical industry and heat transfer mould is used thanks to its characteristics of high electrical and thermal conductivity . This kind of pure copper produce in ACECR with purity of 99.99 for famous metal producing factory . Different shapes of pure is produced like thick and slim plates round bar can be produced in this company.

- 1- Electrical - energy, power and transportation systems, electrical stampings and pressings, magnet windings, commutators and many other applications.
- 2- Electronics - vacuum tubes for radio and TV transmitters, vacuum capacitors, vacuum interrupters, magnetrons, heat sinks, bases for semiconductors and substrates as well as targets and backing plates in sputtering devices.
- 3- Telecom
- 4- Heat transfer - energy and heat transfer systems, solar thermal panels.
- 5- Superconductors





### **Ferrous and Non-Ferrous Alloys**

#### **Magnetic alloys:**

- Ni-Mo-Fe (Super alloy), soft magnet
- Fe-Ni, soft magnet
- Fe-Al, soft magnet
- Fe-Si, soft magnet
- W-Cr, hard magnet
- W-Cr-Co, hard magnet

#### **Heat Resistant alloys:**

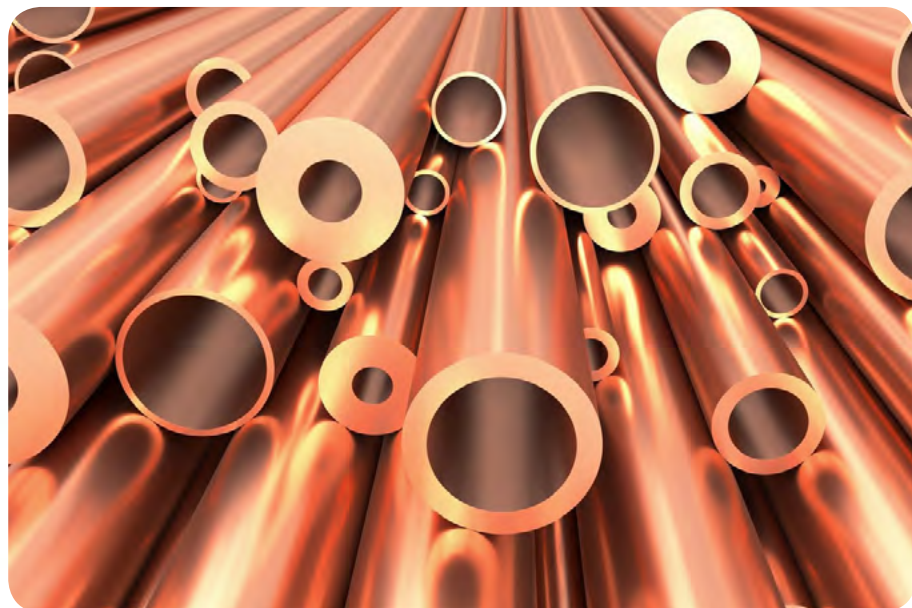
Fe-Cr-Al, for heat resistant and catalytic exchangers Inconel, for turbine blades and down hole completion

#### **Steel alloys:**

- 4340 stainless steel

#### **Copper alloys:**

- Cu-Cr, for resistance welding
- Cu-Cr-Ni-Ti, for aerospace industries
- Cu-Cr-Ni-Si, for Hazelett continuous casting moulds





## Extraction of Precious Metals (gold, silver, tin, copper and lead metals) and Lateral Products from Secondary Sources

Center of precious metals production from secondary sources has been established for the development of environmentally friendly flowsheets.

The most important innovative hydrometallurgical processes in this center are as follows:

- Recovery of tin & lead balk / copper cathode / gold & silver balk from waste printed circuit boards
- Recycling of platinum / palladium / rhodium balk from spent automotive catalysts
- Extraction of nickel / cobalt / molybdenum / aluminum metals from spent catalysts used in petroleum refineries





## Bioremediation of Drilling Oil-Based Mud Wastes

### Applications:

- Remediation of liquid and solid oil contaminated wastes, by using oil-degrading bacteria.
- Isolation and molecular identification of indigenous oil-degrading bacteria

### Characteristics of oil degrading bacteria:

- Degrading the hydrocarbon compounds
- Utilizing hydrocarbons as a source of carbon and energy
- Producing carbon dioxide gas and the cell biomass during biodegradation processes
- Having environmentally safe products
- Using as biological fertilizers to improve soil.

### Actual Results:

#### These bacteria are used in three phases:

- Liquid waste treatment
- Solid waste treatment
- Phytoremediation phase using resistant plants suitable for planting in the amended soil.

#### Overall achievements in one project were:

- Recovering 727 barrels of pure oil by physical method
- Clean-up of 894 barrels of oil contaminated liquid waste and 9451 cubic meters of polluted sludge and solid wastes by biological method, - Planting of 188 tree seedlings in soil obtained from bioremediation.

#### Major project:

Bioremediation of oil polluted liquid and solid wastes of oil-based-mud plant (performed in National Iranian South Oil Company, NISOC)

### The First Industrial Scale Clean up of Oil Polluted Solid Wastes Using Environmentally Safe Oil Degrading Bacteria, in Iran

**Major client:** National Iranian South Oil Company (Oil-Based-Mud Plant -National Iranian South Oil Company)

## Iranian Biological Resources Center

### Vision:

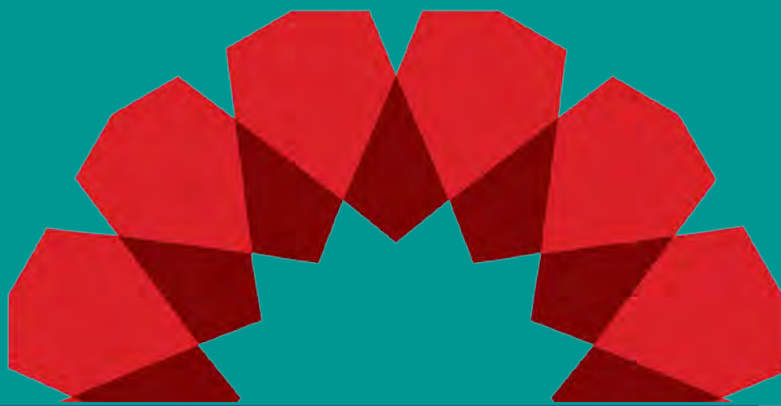
Attaining a pioneer center for “collection, identification, quality control, classification, registration, preservation, propagation and distribution of types of microorganisms and propagable cells like bacteria, fungi, viruses, types of plant and animal cells and genomic DNA and artificial nucleic acid products” to achieve the development of life science and technology, enhancement of life quality and hygiene, preservation of natural resources and globalization of researches and collaborations.



**Mission:**

- 1- Identification, preparation, and collection of microorganisms, human and animal cells, plant cells and seeds from native and foreign resources.
- 2- Preparation of DNA bank from native and foreign resources.
- 3- Preparation, control and collection of DNA Vectors and their hosts for Biotechnological usage.
- 4- Supporting of BioBanks in other research centers and universities, Also quality control, identification and preservation of their samples (Backing up) for future uses.
- 5- Registration of newly identified Microorganisms, plant & animal cells and DNA molecules as an act of Intellectual Property.
- 6- Developing relevant regulations, guidelines to be authorized by proper references for preservation of native biological resources.
- 7- Classification and registration of scientific information and data exists in research centers and universities of the country and development of data bank and network for microorganisms, cells, plant species and DNA molecules to provide research centers, universities and industrial centers.
- 8- Establishment of scientific collaboration with national and international researchers, research centers and banks to improve the scientific situation of the center nationally, regionally and internationally.





Science, Innovation, Products and Services

**ACECR**

**Medicine  
and  
Medical Science**



## Celltech Pharmed

Celltech Pharmed-Stem Cell Company was established in February 2013. In 2016, it succeeded in obtaining the ISO 9001: 2015 standard certificate and the ISO 10015 standard certificate. In September 2017, Celltech factory was put into operation. The Renudermcell product was unveiled in February 2017 by this company and following that GMP certificate (BIO-96-71) was obtained. The factory was officially opened in May 2016. In December 2016, the product of Mesestrocell was unveiled, and the license for phase 4 of Recolorcell product was obtained. In May 2009, Celltech Pharmed-Stem Cell received the GMP certificate (BIO-98-113), and in June 2009, it was able to renew the ISO 9001: 2015 standard certificate.

### Products:

#### Autologous

Renudermcell- Cell therapy for skin damage- wrinkles

Recolorcell – Vitiligo cell therapy

Mesestrocell: Cell therapy for osteoarthritis

Monucell- Heart failure in cell therapy

#### Allogeneic

Wartocell: Transplantation of allogeneic cell for the treatment of cerebral palsy



## Regenerative Medicine

### Advanced Therapy Medicinal Products (ATMPs) Cell and Stem Cell Therapy

Stem cells are cells that can be defined based on two characteristics. First, stem cells can divide themselves to produce many other cells that are fundamentally similar to the same primary cell and have the same basic properties. This feature helps in maintaining the body's stem cell reservoir. Secondly, stem cells can mature and change into other cells that are responsible for performing specific functions, such as heart muscle cells, nerves and skin. This feature happens due to the need to replace worn or dead cells with young cells which have special functions.



## Cell Therapy

Performing more than 30 clinical trial in treating of various diseases:

1. Vitiligo (skin disease)
2. Brain Injuries
3. Chronic renal failure
4. Liver diseases
5. Nk cell therapy in cancer
6. Chronic wound
7. Infertility
8. Heart diseases
9. Covid-19



## Human Cultured Fibroblast Product

Fibroblasts are located in dermis, they synthesize the extra cells and collagen and they play a critical role in wound healing. We use these kinds of cells to remove wrinkles in the face, so we inject cultured fibroblast cells.

It is taken from post auricular biopsy, after that it is cultured in a special culture medium, and with 3 weeks interval  $20 \times 10^6$  is injected in depth of dermal scar in 3 steps.

### Application :

Treatment of wrinkle (e.g. in face)

Treatment of Acne scar (or scar of kitchen pox)

## Vitiligo Treatment

Vitiligo is a condition in which your skin loses melanin, the pigment that determines the color of your skin, hair and eyes. Vitiligo occurs when the cells that produce melanin die or no longer form melanin, causing slowly enlarging white patches of irregular shapes to appear on your skin.

Vitiligo affects all races, but may be more noticeable and disfiguring in people with darker skin.

Vitiligo usually starts as small areas of pigment loss that spread with time. These changes in your skin can result in stress and worries about your appearance.

There is no cure for vitiligo. The goal of treatment is to stop or slow the progression of pigment loss and, if you desire, attempt to return some color to your skin.

The goal of therapy in vitiligo is to regenerate the damaged colour producing cells of the skin (melanocytes) and to correct the aberrant immune system. Normally, in vitiligo, the body's own immune system attacks and damages the color producing cells of skin, hence it is considered as an autoimmune disease.

### The Way of Treatment

- Autologous melanocytes, the Royan Cell Therapy Center product, is derived from the patient's normal skin.
- Biopsies from the buttock of patients are the source of melanocytes which are isolated and used for the correction of vitiligo.
- Prior to final packaging cell visibility is assessed to be at least 100%.
- Melanocyte suspension cells manufactured with sterile components under aseptic conditions within the final package.
- These cells implanted via a fine gauge needle (gauge No 30).





## Diagnosis and Treatment of Breast Cancer

### Public awareness

- Education

Public education (meeting, educational class,...)

Special education ( biannual congress,...)

- Statistics & Field research

- Screening

Research in the fields of:

- Diagnosis
- Treatment
- Rehabilitation
- Quality of life

- Writing prognostic & treatment protocol

- Publication

Iranian Journal of Breast Disease

Education at Booklets

- Surgery

Modified radical mastectomy

Breast conserving surgery

Sentinel LN biopsy

- Chemotherapy

- Radiotherapy

- Hormone therapy

- Follow-up of patients

- Rehabilitation:

Lymphedema clinic

Psychiatry and consultation clinic

- Genetic consultation

- Gynecology clinic

### Clinical services:

- Diagnosis and treatment of breast disease

- Diagnosis and treatment of breast cancer

Diagnostic mammography

Diagnostic sonography

- Interventional imaging

Stereotactic biopsy

Sonoguided biopsy

Wire localization

Sonoguided localization

-Biopsy

Core needle “, excisional ,...



## Fertility, Infertility

### Infertility Clinic

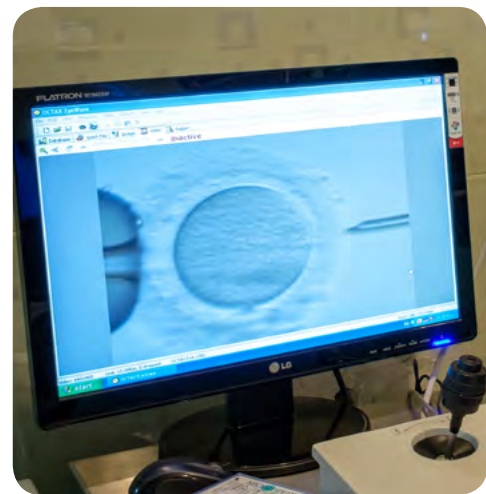
The rate of infertility between Iranian couples is estimated to be 10-15%. Royan Infertility Clinic is the second clinic which was established in Iran and the first one in Tehran in 1991. After 30-years experience in this field; although there are more than 80 infertility clinics throughout Iran, but due to high success rates( more than 40%) in Royan infertility clinic, many patients prefer to have their treatments in this clinic. Most of our patients are referred by other physicians and clinics (Annually 17,000 cycles treatment). Each year we have numerous foreign patients who come to Iran for infertility treatment. Different services include: diagnostic and operative laparoscopy, hysteroscopy, cystoscopy, IUI, ovulation induction, IVF, ICSI, PGT, PESA/TESE, microscopic TESA, vasovasostomy, vasoepididymostomy, TURD, gamete and embryo cryopreservation, assisted hatching, karyotyping, molecular genetic tests such as Factor V Leiden, Factor II and MTHFR gene, as well as others routinely offered to patients.





**Royan Infertility Clinic includes different sections for the assessment of different aspects of infertility and developing the best treatment methods:**

- Endocrinology Section: Diagnosis and treatment of different endocrinologic disorders such as PCOS, thyroid dysfunctions and hyperprolactinemia. This section also consists of a diet clinic for effective treatment of infertility.
- Endoscopy Section: Consists of laparoscopy and hysteroscopy for the diagnosis and treatment of certain reproductive tract disorders such as cysts and adhesions.
- Endometriosis Clinic
- Recurrent Abortion Clinic: For evaluation and treatment of different types of recurrent miscarriages
- Prenatology Clinic: For monitoring the mother's health during pregnancy, diagnosis and treatment for fetal abnormalities, performing P.W.D
- IVF Failure Clinic: Increasing the pregnancy rate and decreasing failures.
- Male Infertility Clinic
- Psycho-Social Support and Counseling Clinic
- Genetic Counseling Clinic
- Reproductive Imaging modalities such as rectal and vaginal ultrasonography



**Biotechnology**

- Animal cloning
- COVITECH, COVID-19 Multiplex qPCR kit
- Monoclonal antibody products

## Chronic Wounds



Chronic wounds is considered as one of the challenges of health systems. By changing life style, increasing prevalence of metabolic diseases, aging and accidents, prevalence of chronic wounds have increased significantly so that could lead to some serious complications and consequences namely limb amputation, early death in patients. Given the underlying causes in chronic wounds, treatment could be expensive and ineffective



Yara Institute for Wound and Tissue Repair Technologies along with clinical, basic-science and engineering groups have attempted to meet medical and equipment these patients in order to solve their problem and boost their life quality as following services:

1- Providing multidisciplinary diagnostic and therapeutic services for chronic wounds/ulcers, including diabetic ulcers, venous leg ulcer, arterial ulcers and pressure ulcers, in addition having vascular laboratory, decompression surgeries, neuropathic and stem cell/cell therapy clinics

2- Providing training courses to physicians and nurses in the form of training skill courses, fellowship and internship courses at the highest national and international training standard and also holding international wound congress annually (WTRC)

Carrying fundamental and practical out researches towards accelerating healing wounds and introducing biologic ways including

- Advanced therapy medicinal products (ATMP) such as:
  - Amniotic Membrane Dressing
  - Dressing containing stem cells
  - Cell products and cell therapy in treating chronic wounds
- Biological Modality such as Maggot Debridement Therapy (MDT)
- Biomaterial Wound Dressing:
  - Foam-based dressing
  - Alginate dressing
  - Carboxymethyl cellulose-based dressing



## COVID19 Multiplex qPCR Kit

The assay utilises a unique two target strategy for an effective detection of all known SARS-CoV-2

strains. E-gene (FAM), S-gene (ROX) & RNaseP (HEX)

Quick Guide COVITECH kit has been designed and manufactured based on the most up-to-date and reliable sequence information. The kit protocol is based on WHO (World Health Organization) recommended approaches using the best technologies at hand. This kit targets two regions of the virus, namely E (FAM) and S (ROX). RNaseP is also included in the same tube as an endogenous control in a3-way Multiplex RT-qPCR reaction. The positive control template supplied with the kit is packaged at a known copy number to generate a standard curve. The template can be used in single dilution where quantitative analysis of the samples is not required. The efficiency, precision and sensitivity of the kit has been investigated using numerous panels from the actual samples obtained from Iranian patients, and the kit has been optimized based upon the attained results.





**The efficiency of this kit has been evaluated and confirmed by QuantStudio™ 5, Rotor Gene and Applied Biosystems™ 7500 devices.**

#### **Kit Utilization Strategy:**

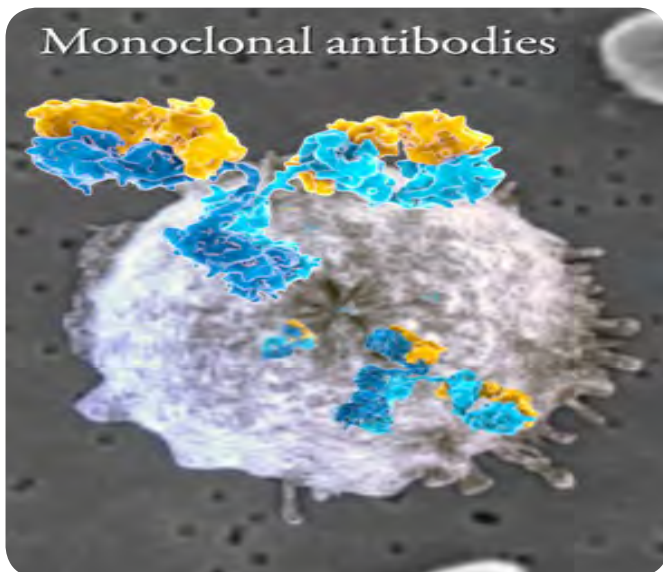
According to the results obtained from the Iranian samples, WHO protocols, and the advised and endorsed instructions of the Quick Response Team of the Iranian Pasteur Institute, it is advised that for the purpose of preliminary screening and diagnostics, the E gene is given preference as the basis for diagnosis, and in the case of a positive result, the S gene is interpreted as the confirmation test of the SARS-Cov-2. To determine the efficiency of the amplification process and / or to quantify the virus in the sample, you can use the positive control included in the kit. The positive control is packaged at 200000 copies per microliter. A serial dilution to generate a 6-point standard curve ranging from 1million to 10 copies is recommended for quantitative analysis. Use 5ul of the positive control template in the qPCR reaction. Note: The DNA positive control template should be handled with extreme care to avoid cross over contamination. In all of the tests, make sure to use two RNA samples extracted from healthy people as the negative control of the healthy person and also as the negative control for the No Template Control ( NTC). Investigation of the kit on Iranian samples has revealed that the Ct of the E gene generally ranges between 14 to 36. Ct value of the S gene is expected to be 1 Ct higher than E gene. Positive test result is valid and acceptable if the negative controls remain negative without any amplification signal from the endogenous control (RNase P) Negative test results should be confirmed with a reliable endogenous control (RNaseP) signal.



## Animal Cloning:

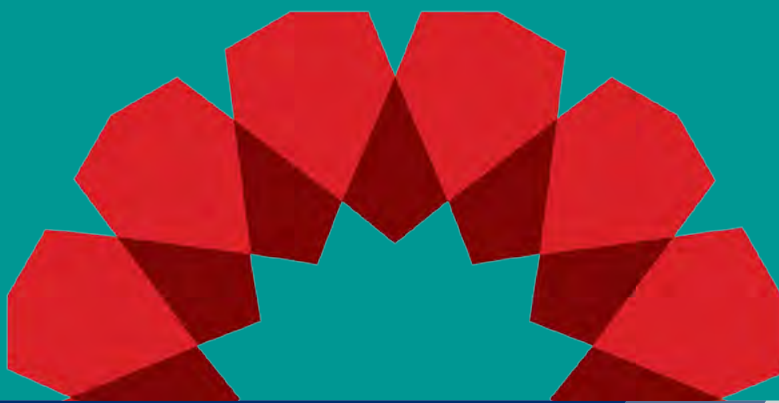
Increasing the number of elite animals is an important economical issue in the field of dairy industry. One of the procedures for this purpose is animal cloning. In this regard many companies have cloned animal elite animals for sperm or milk production. Therefore, considering numerous animals in different species, so far cloned in the Royan institute, this institute has the ability to clone animal for commercial and non commercial purposes (Pet and for bio-conservation).





## Monoclonal Antibody Products

- 1- mab Anti Ferritin
- 2- mab Anti Prostate Specific Antigen (PSA)
- 3- mab Anti Sperm Surface Antigen (ASA) 3D3-D6, 1C3-C11, 2B2-B10
- 4- mab Anti Prolactin



Science, Innovation, Products and Services

**ACECR**

**Agriculture,  
Medicinal Plants  
and  
Food Industry**

## Herbal Medicine

### Melitropic:

Preventing and controlling Alzheimer and also decreasing distemping and irritating signs in Alzheimer's patients

### Niglapsin:

Treatment of indigestion and digestive problems  
Treatment of Gastroesophageal reflux disease

### Liversil:

Treatment of inflammatory liver diseases and fatty liver  
Lowering cholesterol and Triglyceride  
Lowering sugar blood especially in type-2 diabetes

### Detoxin:

Chemical drug in lowering pain in addicted patients



## Pharmaceutical Grade Tea Bags:



### Antomina

#### Containing:

Coriander seeds, dill seeds, dried lime  
Treatment of Cholesterol  
Adjusting sugar blood  
Helping to decrease digest and tympanites and bloat

### Anti-diabetic

Containing: Fenugreek seeds, nettles leaf, dried lime  
Lowering sugar blood for non-insulin diabetics, therefore using this along with diet in the first stage of this disease would be effective.

Influencing on cholesterol and Triglyceride so that it could be a proper supplementary in preventing of cholesterol and atherosclerosis in diabetics.

**Diuretic:** containing: celery seeds, yellow sweet clover, horsetail,  
Disinfectant of the urinary tract and renal ducts  
Remedy for bladder and renal colic  
Removing gout  
Eliminating signs related to uric acid  
Blood purifier

## Producing High Genetic Ability Livestock with Using Somatic Cell Nuclear Transfer Techniques



### Saanen

- The Saanen is widely recognized as the world's best-developed and highest milk producing breed. They have been bred for polledness. The ears are erect and of medium length and they point forward. The face is straight. The average expected body weight of adult males is 90 kg and that of females 65 kg. The average height at withers is 90 cm for adult males and 80 cm for females. The Saanen breed has been most widely exported around the world and has become established as French Saanen, Weisse Deutsche Edelziege (German Improved White), British Saanen, Dutch White Goat, Polish Improved White, Bulgarian White, Banat White, Improved North Russian White, and so on. Annual milk production ranges from 300 to 2000 kg in 150–300 days of lactation, depending on the country, averaging 1285 kg with 3.5% fat and 3.4% protein in 301 days in France for dams in the year 2000 and above 975 kg in other leading countries.
- The Alpine is a medium to large sized breed of domestic goat known for its very good milking ability. The breed originated in the French Alps. Mature does weigh around 61 kg (135 lbs), and are about 76 cm (30 in) tall at the shoulder. Alpine goats are heavy milkers. Their hair is short to medium in length, and they come in all colours and combinations of colours. They have erect ears and a straight profile, and are described as being "alertly graceful" with the ability to adapt to any climate thanks to their hardy nature. Alpine goats are extremely popular in the dairy industry for their docile temperament, high quality milk output and long lactation. Alpine milk has relatively low fat content, with an average fat percent of 3.4%. It is higher in sugars than cows' milk but balances itself in terms of the amount of protein. Alpine goats' milk has 2.3 g of protein per 250 ml while cow's milk has 3.4. A higher protein count is not always good, since it packs more calories with an increased fat content.



- The Murciano-Granadina is a Spanish breed of dairy goat. It was created in 1975 when two existing breeds, the mahogany-coloured Murciana of Murcia and the black Granadina of Granada, began to be hybridised as a result of the official recognition of a single herdbook including both breeds. It is the most important dairy goat breed of Spain, with more than 500,000 milking females. They were bred for two main traits, milk production and its ability to continue this production in dry and nutrient poor regions. These goats are medium size for goats, around 30 to 50 kg for females and 50–60 kg for males. These goats are very good milk producers, with a lactation period of around 210 days, often producing 500 liters of milk annually, with some individuals producing as much as twice that. Their milk has 5.6% fat, and 3.6% protein, which is better than most other goat breeds in Mediterranean Europe.) These goats reproduce quickly, since they do not have a particular season for breeding, and the females can come into heat at any time of the year. Usually two kids are born per breeding, and they become sexually mature around 7 to 8 months of age.



## **In Vitro Production of the Embryo from the Superior Cow Breeds with the Aim of Reducing Production Costs**

### **EXECUTIVE SUMMARY**

After about 10 years of activity in the field of reproductive biotechnology in farm animals, Avicenna Research Institute of ACECR has targeted to replicate the best and rare breeds of cows in recent years, focusing on the functionalization of technical knowledge of “in vitro production of embryos using the oocytes collected from live cows by ultrasonographic technique (ovum pick up: OPU)”. The significant features of this technology has led to economic growth and has been as a turning point in the livestock industry of the developed countries in the world through accelerating the genetic improvement and reducing 20% -30% of production costs.





**THE MAIN GOALS OF THE PROJECT**

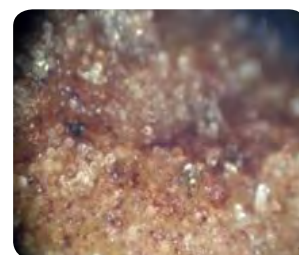
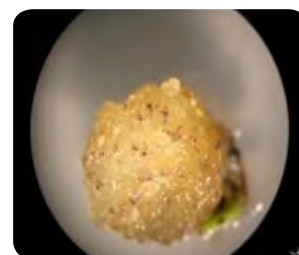
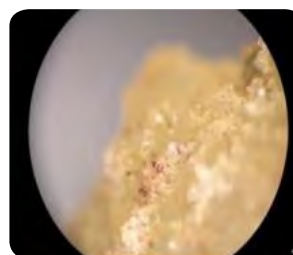
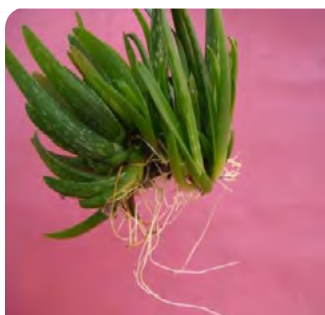
1. Helping to increase food security
2. Reducing “meat” and “butter” imports by creation of pure herds of superior beef and dairy cattle breeds (respectively) for the first time in Iran
3. Reduction of production costs by 20-30% through proliferating of premium herd animals
4. Utilization of targeted pregnancy technology
5. Replacing herd animals with more favorable performance indicators such as: disease resistance, functional longevity, better fertility, higher milk and meat production, resistance to environmental stress, and so on.

## Cultivation and Development of Medicinal Plants

- Gathering native medicinal species of IRAN for establishing **Gene Bank of Iranian medicinal plants** in order to domesticating, improving and reaching access to valuable medicinal plants.
- Production of bio-herbicide, bio-pesticide and bio-fungicide.
- Settling of production and presentation of seed and sapling the medicinal plants in Iran.
- Studying the effects of environmental factors on quality and quantity of medicinal plants.
- Documenting technology and knowledge in the form of a books or articles.

### Professional services:

- Collection, identification, and evaluation of different species and populations of endemic medicinal plants of Iran.
- Study of Agronomical agents and components on quality and quantity of medicinal metabolites and agronomical characters of medicinal plants.
- Optimization of cultivation and production of medicinal plants with the aim of improvement in quality, quantity, and economy of medicinal plants.
- Floristic study of protected and unprotected areas (including collection of herbarium specimens, photography in fields, Identification and preparation of distribution map for plants and provide of plant seeds).
- Ethno-botanical investigation and documentation of medicinal plants usages in traditional medicine of different regions of country.
- Identification of different plant species and offer of valid Herbarium code number.
- Identification of different plant seeds and offer of valid seed bank code number.
- Preparation, deposition, and offering of credible Herbarium specimens of medicinal plants.
- Preparation, deposition and offering of credible seeds of medicinal plants.
- Domestication of wild plant species from natural habitats of country.



## Commercial Protocol for Micropropagation of *Lippia Citriodora* (Lemon verbena)

### Introduction

Lemon verbena is a perennial shrub or subshrub growing to 2–3 m high and native to western South America. *Lippia citriodora* have various benefits including strengthening the nervous system, de-stressing, anti-spasmodic, expectorant, helps with digestion, easing colic, feverish cold, reducing fevers, relieving spasms of digestive track.

### Advantages of Micropropagation

Clonal propagation

Requires relatively small growing space

enhancing the rate of multiplication

Pathogen free plants

### Methodology

#### Establishment

Shoot apical meristem were separated from healthy plants which cultured on green house. Explants were sterilized and cultured on tissue cultured media and transferred to growth room.

#### Propagation

Shoots were culture on optimized media supplemented with suitable concentration of plant growth regulators.

#### Root induction and acclimatization

Propagated shoots were sucultur on optimized media and transferred to growth room. Afterwards, plantlet were cultured on adaptation condition and transferred to adaptation room.





## Propagated Plantlets through Tissue Culture

Availability knowledge about propagation of some important Micropropagation of cut flower plants like:

- Gerbera hybrida
- Anthurium andraeanum
- Alstreomeria spp
- Dianthus caryophyllus
- Liliium sp

Availability knowledge about micropropagation of pot plants such as:

- Begonia sp
- Saintpaulia ionantha
- Gloxinia speciosa
- Discocactus horstii
- Kalanchoe blossfeldiana
- Hippeastrum vittatum



Seed production in some ornamental plants such as Gerbera and Anthurium

Product specifications:

- Uniformity in propagated plantlets
- No fungus, bacterial or virus disease infection in produced plantlets
- Rapid propagation of individuals and produce many similar plants
- Propagation without environmental limits
- Continue production and propagation of plants during the year



## Hybrid seeds

Iran is the fifth largest producer of vegetables and summer vegetables in the world and has a genetic diversity and rich biological resources in the field of vegetables and summer crops. Considering water shortage resources in Iran, one of the necessities of developing greenhouse culturing is developing technology of Hybrid seed of vegetables and summer crops. This technology brings about self-sufficiency of importing hybrid seed and some other appropriate seeds to country climate condition and also increasing vegetables production amount, developing export and optimized consumption of water in agriculture industry.



### Some of achievements of this project would be as follows:

- Providing infrastructure and necessary greenhouse and laboratory equipment for producing hybrid seed of vegetables and summer crops.
- Producing unique lines and vegetables and summer crops hybrids
- Achieving to other technologies related to this field namely reverse modifying, Morphometric, molecular, phytochemical evaluation and banking of germplasm of resources

## Mushroom Products

Mushrooms are valuable and practical creatures in biotechnology research, medicine and agriculture and also mushroom industrial is one of the most important and beneficial industrials in international commerce in the field of food and drug so that has influenced on world economy. considering the importance of mushroom usage in different industries, researchers in biotechnology department of ACECR- Mashhad branch, during recent years succeeded to achieve not only pharmaceutical mushroom production know how but also some considerable special breeds of mushrooms in the field of Antimicrobial, antiviral, anticancer, antifungal...





## Mushroom

Over the last two decades, edible mushrooms have been considered one of the most prominent functional foods. They have earned this reputation based on a body of information demonstrating that edible mushrooms are excellent sources of fiber, essential oils, protein (including all the essential amino acids), vitamins, minerals, lectins, and bioactive compounds. In addition, edible mushrooms possess bioactive compounds that confer various biological activities, including antioxidant, anticancer, antibacterial, antiviral, immunomodulatory, immunosuppressive, anti-allergic, anti-inflammatory, and anti-cholesterol activities. Over recent decades, mushroom technology has significantly advanced in Iran and has found a commendable place in the market. However, what is currently more known about mushrooms is their protein content, whilst their other significant medicinal or nutritional properties are largely overlooked. Therefore, there is apparently a low public awareness on specific medical properties of mushrooms.

Industrial Fungi Biotechnology Research Department has launched semi-pilot scale production of various edible and medicinal mushrooms. In addition it produces other related products, including commercial spawn, maternal spawn and mycelial mother cultures.

number	Product	Target market	Quality and characteristics	Applications
1	Commercial spawn (the white button and oyster mushrooms)	Mushroom farms	Produced from free, high yielding maternal spawn	Ready to inoculate compost
2	Maternal pure spawn	Spawn makers, mushroom farms	Produced from pure, first generation hybrids, contaminated free	Ready to inoculate
3	Mother cultures	Spawn makers, research institutes	Contaminated free, pure mycelium culture, first generation hybrid	for further multiplication, inoculation of maternal spawn
4	Medicinal mushroom <i>Pleurotus eryngii</i>	Fresh market	Organic mushroom, has natural antioxidants, an excellent energy booster, has low calorie, sugar, and fat, has an effect on controlling insulin, a fibrous food, improving blood levels	Ready to eat



## Natural Edible Colors

### Products

- Curcumin
- Bixin
- Norbixin
- Crocin
- Anthocyanin
- Capsulated Curcumin
- Capsulated Crocin
- Capsulated Anthocyanin



### Applications

Different food and drug industries include:

- Snacks and extruded products
- Pasta products
- Confectionary
- Dairy products
- Pharmacy
- Health & beauty products

Medicinal properties

- Anti-oxidant
- Anti- cancer
- Anti-inflammatory
- Cardiovascular disease reducer
- Liver and kidney protection
- Anti- microbe



## Semi Industrial Food Extrusion Pilot

Due to high consumption of Extruded Snack foods and their nutritional concerns and consumer behaviors, Production of healthy Snack Foods has been a challengeable topic in recent years. This subject regards to target community which mostly comprised of children & students has been emphasized.

Development of Functional Food market, suitability of extrusion for food processing besides high-yield production, wide variety of different types of products, low cost production and low amount of sewerage are the most advantages of this kind of Production method.

Food sciences and technologies institute- ACECR Khorasan Razavi, in order to integrate and industrialize its research activities, has established semi industrial food extrusion pilot for the first time in Iran.

Extruded snack containing legume seeds and their sprouts

Extruded snack containing cereal seeds

Sesame extruded snack

Extruded snack containing bakery by products

Fiber-enriched extruded snack

Functional fiber supplements

Extruded wheat bran

Functional textured vegetable protein

Instant beverage based on extruded flour

Functional feed containing flax seed (omega 3)

Functional, low fat flavoring coatings





Education, Entrepreneurship and job creation

**ACECR**

**Education**

## Learning / Development/ Innovation

ACECR educational activities for developing human resources with diverse training capacities throughout the country.

### Fields of Activity:

- Higher Education (55,000 students)
- Short Term General and Professional Courses (1,1000,000 students)
- International Educational Cooperation

### Higher Education

ACECR higher education activities focus on developing postgraduate courses based on its research capabilities in the following institutes:

- The University of Science and Culture (USC)
- The University of Science and Art(Yazd)
- ACECR Khusestan Province Higher Education Institute
- ACECR Isfahan Province Higher Education Institute
- ACECR Yazd Province Higher Education Institute
- ACECR Kermanshah Higher Education Institute
- 47 Applied Science and Technology Higher Educational Institutes
- More than 140 educational centers affiliated to ACECR Branches and Research Institutes for short term courses

The main campus of the university at Tehran and four branches at Esfahan, Rasht, Hamedan and Kashmar

20 undergraduate (BSc., BA, BE) and 6 graduate (MSc. ,ME) programs

70 full-time faculty members, approximately 300 part-time faculty members and a capacity of about 10,000 students

### Applied Science and Technology Higher Educational Institutes

40 branches, capacity of 40,000 students, 71 fields of applied science

### Short courses

Training of more than two million people in a decade

Designing of 61 syllabus of training programs

Developing over 600 short courses for

- General Training
- Professional Training
- Government employees Training

More than 100 training centers in the fields of Health, computer, agriculture, language, Engineering and science, Humanities, Art



## University of Science and Culture (USC)

Founded: 1992

The main campus of the university at Tehran, branch campuses at Isfahan, Rasht, Hamedan and Kashmar

These majors in different degrees are taught as following table:

Tourism	Engineering	Art and Architecture	Human Science	Basic Science
<b>PhD</b> Tourism Management	<b>PhD</b> Civil Structural Engineering	<b>PHD</b> ---	<b>PhD</b> • Private Law • Clinical Psychology	<b>PhD</b> Animal biology with genetic propensity
<b>Master</b> • Geography- Tourism planning • Tourism Planning • Religious Tourism • Tourism Management • Marketing and Tourism • Ecotourism	<b>Master</b> • Software Engineering • Civil Engineering- Soil Mechanics and Foundation • Civil- Earthquake Engineering • Civil Structural Engineering • Financial Engineering • Industrial Engineering • Industry - Logistics Supply Chain	<b>Master</b> • Textile Design • Art Research • Drawing • Graphic	<b>Master</b> • MBA • Psychology and Family Therapy • Criminal Law and Criminology • Private law • Sports Media Manager • Management and Planning in Higher Education • Social Sciences and Cultural Studies	<b>Master</b> • Mathematics in Finance • Statistics in Mathematics • Molecular and cellular Biology • Animal Biology- Cell and Developmental
<b>Bachelor</b> Tourism Management	<b>Bachelor</b> • Civil Engineering • Industrial Engineering • Software Engineering • Electronic Engineering	<b>Bachelor</b> • Graphic • Interior Design • Architecture • Textile Design	<b>Bachelor</b> • Psychology • Industrial Management & Law • Cultural Management • Accounting	<b>Bachelor</b> Statistics



## University of Science and Art

**Founded:** 1996

The main campuses of the University Of Science and Art are Situated in Yazd, Aradakan and Ashkezar .

The faculties and programs that are presented as following table:

Human Science	Engineering and Science	Art and Architecture
<b>Master</b> <ul style="list-style-type: none"> <li>• Business Management</li> <li>• Industrial Management</li> <li>• Truism Management</li> </ul>	<b>Master</b> <ul style="list-style-type: none"> <li>• Civil Engineering</li> <li>• Electrical Engineering</li> <li>• Industrial Engineering</li> <li>• Computer Engineering</li> <li>• Mechanic Engineering</li> <li>• Biology</li> </ul>	<b>Master</b> Architecture
<b>Bachelor</b> <ul style="list-style-type: none"> <li>• Finance Management</li> <li>• Accounting</li> <li>• Psychology</li> <li>• English Language</li> </ul>	<b>Bachelor</b> <ul style="list-style-type: none"> <li>• Civil Engineering</li> <li>• Electrical Engineering</li> <li>• Industrial Engineering</li> <li>• Computer Engineering</li> <li>• Mechanic Engineering</li> <li>• Biology</li> <li>• Information Technology</li> <li>• Food Industry</li> </ul>	<b>Bachelor</b> Handicraft



## Applied Science and Technology Institute

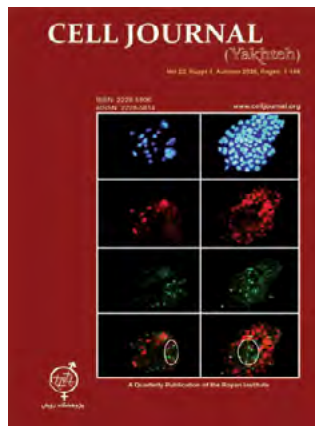
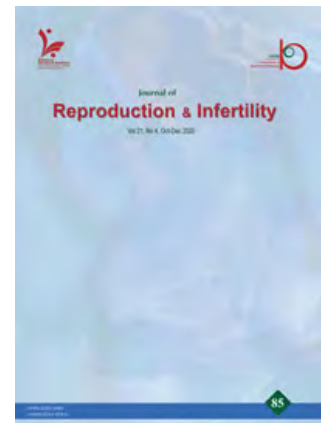
- The biggest non-governmental academic institute in Iran with 2 universities and 6 higher education institutes and 1 autonomous faculty
- One of the biggest Applied Science and Technology institute in Iran with more than 41 Applied Science and technology centers
- Superior Organization in developing and Technology institute expertise-oriented, skill-based, job-oriented, product-oriented
- Possibility for communication with advanced higher and specialized international education centers along with issuing joint certificate
- Having postgraduate in both research-based and course-based
- Close to 3 decades of presence in higher education system of country
- Having more than 1065 training course
- More than 210,000 graduates from initiating till now

## Short-course Specialized Training Realm

- An effective educational institute in national and international area
- 171 short-course specialized centers all over the country with the capacity of more than 1 million students trained a year
- Prominent and innovative and enjoying the ability of designing, developing and implementing training courses in order to meeting society needs
- Continuous market monitoring, educational need assessment with concentration on breeding professional for future careers
- Designing, developing and enacting more than 1000 course in 9 specialized training group
- Performer of training course for managers and employees of executive organizations and also in charge of holding training course of pre-recruitment in country
- Ability of preparing standard identification of career training in specialized organizations and other executive organizations in country
- Capable of developing, compiling books, producing references, software and specialized educational courses.
- Top organization in providing educational services and enabling of governmental and non-governmental employees in order to make and increase career skills
- Permitted organization in holding periodical and recruitment exams in country
- Performer of evaluation of professional managers' qualifications in executive organizations
- Capable to rank and enable the teachers and instructors
- Proving enabling and educational services to more than 3 million people of executive organizations employees and managers and also approximately 11 million graduates in short-courses from the initiating of our activities till no
- Providing specialized educational service to Middle East and Islamic countries

## Scientific Journals

- International Journal of Fertility & Sterility
- Iranian Journal of Chemistry & Chemical Engineering
- Yakhteh (in Cell Technology)
- Iranian Journal of Electrical and Computer Engineering
- Payesh (in Health Sciences)
- Reproduction & Infertility
- Iranian Journal of Mathematical Sciences and Informations
- Iranian Journal of Breast Cancer
- Iranian Journal of Geology
- Journal of Medicinal Plants
- Laser in Medicine
- Journal of Information Systems and Telecommunication



## Employment and Entrepreneurship

- Developmental institute in the field of employment and small businesses
- Pioneer in implementing employment pattern projects and entrepreneurship for graduates
- Designing and providing varied job services based on notification systems such as “Jobiran”
- Superior organization in providing educational services to students and graduates in the field of employment and entrepreneurship
- Training of Entrepreneurship and commerce skills with cooperation of some international organizations like” UNIDO”, “JICA”, UNESCO” “ILO”
- Studying the employments and entrepreneurship opportunities in home businesses and developing 150 innovative jobs titles in this filed
- Designing and formulating new pattern of developing home businesses with concentration on developing sale market and stabilizing that in order to implement throughout the country
- Implementing the project of new pattern in developing home business for 20,000 people in 9 provinces in the country
- Performing the national project of home business for more than 54,300 people in 31 provinces throughout the country
- Implementing the project of enabling breadwinners women for more than 6,200 people in 24 provinces
- Performing the project of comprehensive career guidance system for students and graduates
- Performing recovering and enabling small businesses influenced of Corona (1600 businesses with cooperation of UNDP) in the country
- Formulating and publication applicable, educational and extendable resources and texts in the field of business skills and entrepreneurship
- Providing enabling services in the field of employment and entrepreneurship to more than 500,000 jobseekers
- Cooperating with executive institutes in performing projects of employment
- Development and entrepreneurship for graduates
- Extending entrepreneurship culture and helping to convert the youth ideas and graduates to new businesses with holding more than 300 entrepreneurship events
- Rapid reaction project to social- economic effect of Covid 19 in Tehran province, Mallard city

Vision: **One Graduate, one entrepreneur**



## Science and Technology Parks and Incubators

- Rooyesh Information & Communication Technology Incubator
- Kermanshah Province Technology Incubator
- Hormozgan Province Technology Incubator
- medicinal plants Technology Incubator
- North- Khorasan Province technology Incubator
- Avicenna health technology Incubator
- Royan biotechnology Incubator
- Lorestan Province technology Incubator
- Telecommunication Advanced units technology Incubator
- West eslamabad technology Incubator
- Urmieh agriculture technology Incubator
- Songhor and Qoliaei technology Incubator
- Kermanshah Information & Communication Technology Incubator
- Kangavar Technology Incubator
- Ravansar Technology Incubator
- Sarpol-e-zahab Technology Incubator
- Ilam Agriculture and medicinal plants Technology Incubator
- Ardebil medicinal plants Technology Incubator
- Mahalat and nimvar Technology Incubator



▲ Alborz Science and Technology Park



▲ National Park of Sciences, Soft Technologies, and Cultural Industries



▲ Kermanshah Science and Technology Park



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