About NJES

Introduction:

Al-Nahrain Journal for Engineering Sciences is an open access specialized academic journal that evaluates and publish scientific papers in all engineering subject matters submitted by researchers. The editorial board consists of faculty members from Al-Nahrain University and other international universities, as well as an advisory board from Iraqi and foreign universities, specialized in engineering sciences. The members of these boards typically hold the Professor and Asst. Professor scientific titles.

The editorial board have monthly meetings to follow-up the progress of the submitted papers and the journal affairs, as well as the approval or rejection of concluded papers according to the reviews of the selected professional reviewers for each paper. These reviewers are selected according to the specialized subject matter of each paper.

The journal was founded in 1988 (previously titled; Nahrain University - College of Engineering Journal with the ISSN 1812-187X). It is a quarterly publication in English, issued in Baghdad under the authority of College of Engineering - Al-Nahrain University, with the registration number ISSN 2521-9154 and eISSN 2521-9162. Also, the journal has the DOI prefix 10.29194. NJES became a member of DOAJ since 2018.

Aims and Scope

NJES journal is committed to publish the scientific output of researchers in the full range of engineering fields of architectural, chemical, civil, computer, electrical, electronic, communications, information technology, laser and optoelectronics, mechanical and biomedical engineering as well as any directly related fields. The most significant criteria for accepting papers in this journal is scientific excellence and integrity .

The material of the paper must not violate any intellectual property rights of any person or entity, must not contain any subject matter that contravenes any Iraqi or international laws, and must adhere to the ethical standards applicable for all research disciplines. NJES accepts papers written in English only aside from the Arabic title and abstract for native Arabic speakers.

Publication Ethics

Al-Nahrain Journal for Engineering Sciences (NJES) aspires to publish scientifically excellent research articles while maintaining the integrity of scientific research by following the highest standards of ethical research practice and publication. Our journal is exceedingly serious about its responsibilities. We adhere to the national and international laws of intellectual property, thus all submitted papers shall be thoroughly checked for plagiarism and misconduct before further processing.

Any noted potential breach of our publication ethical standards shall be investigated. If such breaches are proven to be accurate, the journal shall attain the right to reject the submitted material immediately. If necessary, NJES shall attain the right to take legal steps and actions against the offending party.

Guidelines for Authors and Publication Requirements

General Information

Al-Nahrain Journal for Engineering Sciences (NJES), a refereed scientific engineering journal published under the authority of the College of Engineering, Al- Nahrain University four times per year. Our Journal is the winner of Al-Nahrain University prize for the Best Scientific Journal of 2017. The journal publishes the scientific output of researchers in the fields of architectural, chemical, civil, computer, electrical, electronic, communications, information technology, laser and optoelectronics, mechanical and biomedical engineering as well as any directly related fields. Papers are submitted in English only to the journal .

The material of the manuscripts submitted to our journal must not violate any intellectual property rights of any person or entity, must not contain any subject matter that contravenes any Iraqi or international laws, and must adhere to the ethical standards applicable for all research disciplines .

Fees

For the manuscript to be submitted for publications, 50.000.00 ID should be paid upon the submission of the manuscript to NJES office in Al-Nahrain University/ College of Engineering. This does not apply for International submissions .

Requirements

1. **All manuscripts** submitted for publication must not be published or considered for publication or accepted for publication elsewhere .
2. **The manuscript** submitted for publication must be submitted online as an MS Word copy only according to the standards of the journal's research template provided in our website. Please provide a physical copy of the Researcher's Obligation form with the required signatures and physical stamping in person if the researchers are from Iraq or a scanned copy if the researchers are abroad .
3. **The manuscript** must include a title and an abstract that ranges between 200-250 words for each of the English and Arabic versions (in case of native Arabic authors). The manuscript's pages must not exceed 15 printed pages .
4. **Full** name(s), qualification(s), affiliation(s), address(es) and e-mail addresses of all the authors must be arranged just below the title of the manuscript .
5. **Abbreviations** must not be used in the title of the manuscript and the abstract, except those of the measurement units .
6. **Only** standard international units (SI units) must be used .

7. **Tables and illustrations** such as figures, photographs and drawings must be clear, numbered, titled and referred to in the text consequently.
8. **Footnotes** can be used to clarify information, and, when used, footnotes must be numbered.
9. **Font description** for manuscripts written in English using the "Garamond" font and submitted in MS word only .
   - Title: 16pt (Bold) in the middle.
   - Authors Name/Names : 12pt (Bold) .
   - Affiliations: 10pt (Regular).
   - Headings: Capital initial letters size 12pt (Bold) and placed flush to the left-hand margin.
   - Sub-headings: Capital initial letters size 11pt (Bold) and placed flush to the left-hand margin.
   - The manuscript should be written in TWO columns except for the abstracts section.
   - Both the English and Arabic abstracts should be located at the beginning of the submitted manuscript .
   - The Arabic abstract should be in "Arabic Typesetting" font with single line spacing and the Arabic title 18pt (Bold)
   - Keywords: should be written after both abstracts. 10pt.
   - Text: 10pt. The first line should be flushed to the right by 5 mm .
   - Equations: Must be numbered in parentheses flush to the right-hand margin with dots leading the numbers; a single line blank space should be left before and after the equation. Equations are referenced within the text as follows :
     eq. (**x**), where **x** is the equation number.

10. **Figures and Tables:** Should be referenced in bold as follows: Fig.1, Table 1. Figure captions should [Figure ( ):] appear below the figure in small letters sized 10 and must be centered above the table [Table ( ):] in small letter size 10; a single line blank space should be left before and after the table heading.
11. **References:** References should be grouped together at the end of the manuscript, after the acknowledgment. They must be referred to as they appear in the text with square brackets [ ]. References should follow the **IEEE 2006** referencing style using "Garamond" 10pt .

Submission, Revision, and Final Decision Procedures

After submitting the manuscript to our journal, the author/s shall receive a confirmation email with their manuscript reference number within 24 hours If the author/s do not receive the confirmation email, please have the

corresponding author check their SPAM E-mail folder just in case the confirmation email got delivered there instead of the inbox .

All materials submitted to the Journal are checked for plagiarism using **Turnitin**, Plagiarism per source should be less than 5%. Total Plagiarism must not exceed 20%. (Bibliography and sources with less than "5 words" are excluded) .

Then after the material must be approved by the assigned reviewers and the Editorial Panel before being published in the Journal. The manuscripts are usually reviewed at least by two referees, selected by the Editorial Panel according to the paper's subject matter. Referees are required to conduct a review and provide an assessment report within three weeks of receiving the manuscript. If the two manuscript reviews contradicted each other, then a third reviewer shall be assigned and the majority opinion shall be conclusive .

The author/s shall receive the reviewers' reports and the required modifications, if available, then are requested to make these revisions within three weeks of receiving them, which shall be resubmitted to the referees for reassessment (if required). A letter detailing the requested revisions, addressed to the reviewers, should be submitted along with the revised manuscript to be sent to the reviewers with no reference whatsoever to the authors names in that letter .

The minimum period for submissions to be either accepted or declined is approximately two months. Declined submissions are returned to the corresponding author as soon as possible.

If the manuscript is accepted for publishing, the author/s are requested to provide a final electronic copy of the manuscript integrating the journal's typesetting requirements, and incorporating all the modifications requested and made during the assessment process .

When a manuscript is accepted for publication, it shall be sent for typesetting. One set of page proofs will be sent to the corresponding author to check thoroughly before publication. The marked proof must be returned to the Journal within seven days .

Review Papers

NJES accepts review papers exclusively from authors who have been publishing papers in an Engineering specialized field, or an Interdisciplinarity field with Engineering such as biomedical engineering, for at least five years prior to submitting their review manuscript to our journal .

NJES **requires 25 listed references minimum** per each manuscript submitted to our journal.

Useful Keywords

Architectural Engineering

Access	Flexibility	Plan
Acoustics	Formation	Pragmatic
Aesthetic		Public buildings
Alley	Glazing	
Antinational index	Ground Floor	Ramp
Arcade	Gutter	Rehabilitation
Arch		Reinforced renewal
Architect	Hanging	Restoration
Architecture	Hard Core	Residential buildings
Autonomous	Head room high-tech	Retaining wall
Axe	Housing	Roof
		Rough
Base	Image	
Basement	Indicator	Section
Bay	Industrial building	Semantic
Beam	Insulation	Semiotic
Block	Interpretation	Significance
Building		Silt
Bulky	Jack Arch	Site
		Skeleton
Cantilever	Maintenance	Smooth staircase
Ceiling	Masonry	Structuralism
Center	Material	Style of architecture
Characteristics	Meaning	Sustainable
Code	Mechanism	Symbolic
Color	Model	Syntax
Column	Modern	System
Conservation	Modernity	
Construction	Moumanility	Tower building
Constructivism	Mortar	Town planning
Context	Mullions	Tradition type
Core		Type
Court	Key Stone	Typology
Crack		
	Landscape	Urban
Decoration	Level	Urban Fabric
Defect		
Design	Order	Variability
Dimension		Ventilation
Dome	Partition	
	Pattern	Zoning
Elevation	Percepts	
Entrance	Phenomenology	

Chemical Engineering

Absorption	Economics	Laminar flow	Radiation
Activity coefficient	Equation of state	Liquid-liquid separation	Reaction engineering
Adsorption	Equilibrium properties		Reactors
Adsorbents			Reactive separation
Air pollution	Electrochemical	Mass transfer	Reboilers
Alkylation	Energy conservation	Material engineering	Refinery process
Azeotropes	Energy	Membrane separation	Refinery energy
	Environmental heat transfer	Membrane bioreactors	Reforming
Batch distillation			Refrigerants
Batch operation	Evaporation	Mixing	Reliability engineering
Batch reactor	Exergy	Modeling	Reverse osmosis
Biomass	Extraction	Modeling electrolyte	Rheology
Bioreactors	Extraction distillation	Molecular separation	
Biotechnology		Momentum transfer	Safety
Bio processing	Filtration	Multiphase flow	Serubbers
Bioengineering	Finned exchanges	Multi component systems	Sedimentation
Boiling	Fixed bed process		Separations
Boundary layer	Flotation		Simulation
Bubble column	Flow meters	Natural gas production	Simulation distillation
	Fluid flow		Size reduction
Catalysis	Fluidization	Natural products	Solid-liquid separation
Catalytic distillation	Food	Newtonian fluid	
Catalytic reactors	Fuels	Non-newtonian fluid	Transport phenomena
Centrifugation	Fugacity		Thermodynamic
Chemical reaction	Furnaces	Oil production	Thermal management
Chromatrography		Optimization	Thermal coupled distillation
Coating	Gas engineering	Osmotic distillation	
Combustion	Gas-liquid separation		Thickeners
Complex fluids		Packed towers	Turbulent flow
Computer simulation	Heat exchangers	Particle technology	Two phase flow
Composites	Heat transfer	Particle size	
Conduction	Heat transfer coefficient	Particulate removal	Unsteady-state flow
Control		Petrochemicals	
Convection	Heat pumps	Petroleum refinery	Viscosity
Cooling towers	High temperature corrosion	Phase equilibrium	Viscous fluids
Corrosion		Polymers	
Crude distillation		Process system engineering	Waste treatment
Crystallization	Interface		Water pollution
Cyclones	Ion exchange	Process design	Water treatment
	Interfacial phenomena	Process dynamics	
Dehumidification		Process synthesis	
Desorption	Isomerization	Process control	
Diffusion		Process simulation	
Distillation	Kinetics		
Distillation control			
Drying			

Civil Engineering

Aggregate	Durability	Mathematical models	Settlements
Airport	Dynamic	Military engineering	Seismic engineering
Alluvium		Mining & quarrying	Sewers
Asphalt	Earth pressure	Mudstone	Sewage treatment
	Earth works	Municipal engineering	Soil mechanics
Backfill	Economics		Shells
Beams	Elasticity	Noise	Silos
Bearing capacity	Embankments	Numerical methods	Silt
Bricks	Engineering geology		Site investigation
Bridges	Environment	Offshore engineering	Slabs
Building	Erosion	Organic materials	Slope stability
	Excavation	Overburden	Social impact
Cables			Soil-structure
Caissons	Failures	Pavements	interaction
California bearing	Fatigue	Permeability	Stability
ratio	Finite elements	Petroleum	Statistical analysis
Canals	Floods	Photogrammetry	Steel structures
Car parks	Foundation	Piles	Streets
Cavities	engineering	Pipes	Strength of materials
Cement	Frost action	Planning	Stress analysis
Clay		Plasticity	Structural frameworks
Coastal engineering	Geomaterials	Pollution	Subsidence
Codes & standards	Geophysics	Pore pressure	Surface water
Cofferdams	Geotechnique	Power station	Surveying
Columns	Geotextilos	Public health	
Compaction	Gravel		Thermal effects
Composite structures	Grouting	Quality control	Timbre structures
Concrete technology	Groundwater	Quarries	Town planning
Concrete structures			Traffic engineering
Conservation	Highways	Railroads	Transportation
Consolidation	Hydrology	Recreational facilities	engineering
Contracts		Recycling of materials	Triaxial tests
Corrosion	Infrastructure	Rehabilitation	Tunnels
Cranes	In-situ tests	Reclamation	
Cyclic loading	Ion exchange	Reservoirs	Underwater
	Irrigation	Resins	engineering
Dams		Risk	Urban design
Deformation	Joints	Retaining walls	
Demolition		River engineering	Vibration
Diaphragm walls	Laboratory tests	Rock mechanics	
Diffusion	Landfill		Waste management
Disaster engineering	Land reclamation	Safety	Water quality
Disposal		Sand	Water supply
Docks	Maintenance	Saturation	Waterways
Drainage	Management	Seepage	Weather
Dredging	Marketing		Wind engineering
Drilling	Material technology		

Computer Engineering

Algorithms
Analog computers
Artifical cybernetics
Artifical intelligence
Assembly language

Code development
Color vision
Complex systems
Computational linguistics
Computational methods
Computer network security
Computer security
Computer aided design
Computer applications
Computer architecture
Computer circuits
Computer data
Computer engineering
Computer graphics
Computer hardware
Computer interface
Computer methods
Computer modelling
Computer network
Computer operating system
Computer peripherals
Computer programming languages
Computer science
Computer simulation
Computer software
Computer storage
Computer system analysis
Computer systems
Computer theory
Computer vision
Computers,
Cryptanalysis
Cryptology

DASD
Digital computers
Distributed computing systems

Educational technology
Experiment design
Expert systems

Fault tolerance
Fault-tolerant computer networks

Games theory

High performance software

Image segmentation
Information systems
Information technology
Information engineering
Integrated hardware software systems

Local area networks
Logic and switching circuits
Logic design

Network communication

Object technology
Online learning
Optical computer technology

Parallel algorithms
Parallel processing systems
Parallel programming
Pattern recognition
Performability
Program verification

Realtime systems
Reverse code engineering,

Security analysis
Software engineering
Software-protection
Stochastic activity network
Stochastic Petri nets
Supercomputers
Switching theory

Texture analysis
Token ring

Virus-research

Electronic and Communication Engineering

Absorption	EIRP	Microstrip	Satellite
Access	Electromagnetic	Microwave	Scanning
Acquisition	Electronic	Mobile	Scattering
Algorithms	Electronic warfare	Mode	Shielding
Ambiguity	Enhancement	Modeling	Security
Amplifiers	ESM	Modulation	Semiconductor
Antennas		Monopulse	Sensor
Arrays	Fading	Multipath	Side lobes
Artificial intelligence	Feeder	Multiplex	Signals
Atmosphere	Ferrites		Signal processing
Attenuation	Ferromagnetic	Noise	Simulation
	Filter	Nonlinearity	SLAR
Band width	Field effect transistor	Numerical	Smoothing
Baseband	Format		Software
Beam forming	Free space	Omnidirectional	Solid state
Beam width	Frequency	Optical fiber	Sounders
Bit error rate		Optimization	Space
Broad band	Gain	Orbit	Spread spectrum
Broadcasting	Gates		Spectral analysis
Burst	GIS	Pager	Strip lines
	Ground waves	Parallel processing	Switching
Cable	GSM	Pattern recognition	Synchronization
CAD		Permittivity	Synthesizer
Cattier	Harmonics	Phase array	
Cellular	Homing	Photogrametry	Telemetry
Channel	Hopping	Polarization	Telephony
Circuit	Hardware	Power amplifier	Thermal noise
Code	Horizon	Power and machines	Tracking
Communications		Power electronics	Transducer
Compatibility	Identification	Prediction	Transform
Conductivity	Image processing	Probability	Transient analysis
Control	Industrial electronics	Propagation	Transistors
Correlation	Information	Protocol	Transmission
Counters	Integrated circuits		Transponder
	Interference	Quality factor	Troposphere
Data	Intermodulation	Quantization	TWT
Decoding	Ionosphere	Quantum electronics	
Demodulation	Isolator		Ultra-high-frequency
Detector	Isotropic	Radar	Up-link
Dielectrics		Radiation pattern	
Diffraction	Jamming	Radio frequency	Video
Digital		Radio-link	VLSI
Dipole	Kalman filter	Real time	Voice channel
Directivity		Receiver	VSAT
Direct sequence	Link	Reflection	VSWR
Diversity	Line-of-sight	Refractivity	
Down link	Logic	Reliability	Waveguides
Drives and actuators		Remote sensing	Waves
Ducting	Matching	Repeaters	Wireless
	Memory	Resolution	
ECCM	Message		Yagi antennas
ECM	Meteors	Sampling	
Efficiency	microprocessor	SAR	

Laser, Optics and Opto-Electronics Engineering

Aberrations	Image	Physiological optics
Acousto-optical devices	Infrared	Photography
Apertures	Interconnects	Phase shifting
Atmospheric optics	Integrated optics	interferometry
	Interference	Polarization
Beam trapping		
Birefringence	Lasers	Quantum optics
	Laser diodes	Quantum fluctuations
Cherenkov radiation	Laser design and operation	Q-switching
Chemical lasers	Laser resonators	
Color detection	Laser modulation	Radiation
Color vision	Laser efficiency	Raman lasers
Coherence	Laser continuous operation	Range finders
	Laser applications	Reflectors
Design of optical systems	Laser measurements	
Diode-pumped lasers	Laser spectroscopy	Scales for light
Display devices	Lenses	Scanners
Dye lasers	Liquid crystals	Schlieren devices
Dynamic Stark shift	Light-sensitive materials	Semiconductor lasers
		Sensors, gyros
Edge and boundary effects	Magnetooptical devices	Solar collectors and
	Mechanical effects of light	concentrators
Fiber lasers	Modulation	Solitons in fibers
Filters		Synchrotron radiation
Fiber optics	Nonlinear optics	
Fiber-optic instruments		Ultrafast processes
Fiber fabrication	Optical system design	
Fiber testing	Optical spectrometers	Visible and ultraviolet sources
Fourier optics	Optical processors	Vision
Free-electron lasers	Optical communication	Volume holograms
	Optical computers	
	Optical storage systems	Wave fronts and ray tracing
Gas lasers	Optical coatings	Waveguides
Geometrical optics		Wave optics
Glasses, quartz	Pattern recognition	Wave propagation
Gratings	Phase retrieval	
	Photon statistics	X- and y-ray lasers
Harmonic generation		X-ray
Holography	Photonic bandgap materials	

Mechanical Engineering

Aerodynamic	Detect	Laminate	Solar energy
Aerolastisity	Detection	Linear	Stability
Air-conditioning	Dies	Loading	Static
Analysis	Divergence		Steady
Axial compressor	Dynamic	Mass transfer	Steam
		Material	Stiffened
Bar	Edge	Matrix	Stiffness
Beam	Elastic	Metal	Strain gauge
BEM	Energy	Modulus	Strength
Bending	Extrusion		Stress
Bevel		Non-linear	Structure
Blade	Fixed	Non-symmetric	Symmetric
Boundary layer	Fatigue	Nuclear power	
Buckling	FEM	Numerical	Tension
	Fillet		Tensional
CAD	Fluid	Ocean power	Thermal power
CAM	Flutter	Optimum	Thermo siphon
Centrifugal CNC	Fracture	Orthotropic	Thermodynamic
Centrifugal CFD	Free		Thermoelastic
Chamber		Photoelasticity	Thermoplastic
Collectors	Gas	Pipes	Tooth
Column	Gas dynamic	Plastic	Toughness
Compatibility	Gear	Plate	Transfer
Composite	Geometry	Ply angle	Transient
Compressor	Geometry power	Polymers	Tubes
Compustional		Power	Turbine
Computer	Heat	Power plant	Two phase flow
Concentration	Heat exchanger	Pressure	
Concentrators	Helical	Profile	Unstiffened
Conduction	Hoop		
Conical	Hydroelectric	Radial	Vibration
Convection		Radiation	Viscoelastic
Creep	I.C.E	Refrigeration	Viscoplastic
Cut out	Impact	Renewable	
Cyclic	Industrial	Resin	Wall
Cylindrical	Intersection	Restraints	Wind energy
	Involutes	Rigidity	Worm
Degradation	Isotropic	Rotation	
Delamination		Shearing	Yield
Deflection	Jet engine	Sheet	
Design	J-internal	Shell	

BioMedical Engineering

Accelerometer
Action Potential
Active Media
Alarm System
Amplifier(s)
Analog to Digital Converter
Angle(s)
Anthropometry
Argon Laser
Articulation
Artificial Organs
A-Scan
Atrial Fibrillation
Atrioventricullar node
Artifacts
Attenuation
Auto Analyzer

Balance
Bandwidth
Bed side monitor
Biocompatibility
Bioelectric Amplifier(s)
Bioinstrumentation
Biomaterials
Biomechanics
Biopotentials
Biosensors
Biostatistics
Blood Cell Counter
Blood Flow Measurement
Blood Viscosity
Body Mass Index
Body Weight
Bone(s)
Bradycardia
Brain Waves
Breathing Mechanics
B-Scan

Capacitor(s)
Cardio Pacemaker
Cardio Tachometer
Cardioverter
Cartilage(s)
Catheterization
Center of Gravity
Clinical Engineering
CO_2 Laser
Coefficient of Friction
Colorimeter
Common Mode Signal
Compartmental Modeling
Compression
Computerized Tomography
Continuos Wave
Control Unit
Coronary Care Unit

DC Shock
Defibrillator
Depolarization
Dental Chair Unit
Detector Circuit
Dialysis Machine
Diaphragm
Diastole
Differential Amplifier(s)
Digital to Analog Converter
Doppler Effect
Dye Laser

Efficiency
Electrical Safety
Electrocardiography
Electroencephalography
Electromyography
Electroneurography
Electroretinography
Electrode(s)
Electrosurgery
Endoscope
Equilibrium
Excimer Laser

Fatigue
Feedback
Fiber Optics
Filter(s)
Finite Element Analysis
Flame Photometer
Fluids
Fluoroscopy
Force(s)
Fracture(s)
Free Body Diagram
Frequency Response
Friction
Fulcrum

Gain
Gait Analysis
Galvanometer
Glucometer
Goniometer

Haemostasis
Hb-Meter
Heart-Lung Machine
He:Ne Laser
Hospital Organization
Human Joint(s)
Image Processing
Implants
Inductor(s)
Infrared Radiation
Intensity
Intensive Care Unit
Interaction
Isolation transformer

Joint Movements

Kinesiology

Lever(s)
Ligament(s)
Lubrication
Lung Volumes

Magnetic Resonance Imaging
Medical Imaging
Moment Arm
Moment of Inertia
Motor Unit
M-Scan
Muscle(s)
Muscloskeletal modeling
Myoelectrical activity

Nd:YAG Laser
Neural Networks
Newtonian Properties
Noise

Occupational Biomechanics
Optical Resonator
Oscillators
Osteoarthritis
Oximeter

Paddles
Piezoelectric Effect
Penetration
PH Meters
Physiological Modeling
Plethysmograph
Population Inversion
Pressure Manometers
Probe(s)
Prostheses
Pulmonary Ventilators
Pulsed Wave

QRS-Complex

Range of Motion
Rectifier(s)
Reflex Action
Reflection
Refraction Index
Rehabilitation Engineering
Respiratory Monitors
Resting Potential
Rotation Axis
R-R Interval
Ruby Laser
R-Wave

SA Node
Sagittal Plane
Simulation
Spectrophotometer
Sphygmomanometer
Spirometer
Stethoscope
Stimulation
Strain Gauge(s)
Stress Distribution
Synovial Fluid
Systole

Tachycardia
Telemetry Medicine
Temperature
Tendon(s)
Tension
Tissue Engineering
Thermistor
Threshold
Transducer(s)
Transmittance
Tribology
Torsion

Ultrasonic Waves
Ultraviolet Radiation

Valve(s)
Vector(s)
Ventricular Assist Device
Vibration Analysis

Wheatstone Bridge

X-Ray Machine
X-Ray Tube

Young Modulus