

O‘ZBEKISTON RESPUBLIKASI OLIY VA O‘RTA

MAXSUS TA'LIM VAZIRLIGI

FARG‘ONA POLITEKNIKA INSTITUTI

"TILLARNI O‘RGATISH" KAFEDRASI

**Bakalavriatning texnik yunalish 3 bosqich 5-semestr talabalarning amaliy
mashg‘ulotlardan Ingliz tilidan yozma malakalarini rivojlantirish uchun
matnlar, mashqlar**

TO‘PLAMI

Improve your writing



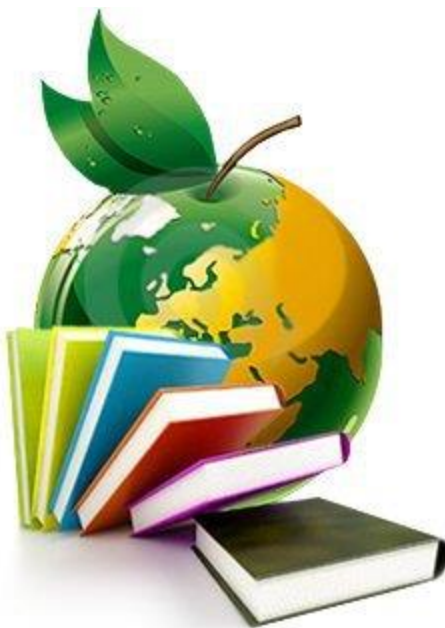
Farg‘ona 2018

**O‘ZBEKISTON RESPUBLIKASI OLIY VA O‘RTA
MAXSUS TA‘LIM VAZIRLIGI
FARG‘ONA POLITEKNIKA INSTITUTI
"TILLARNI O‘RGATISH" KAFEDRASI**

**Bakalavriatning texnik yunalish 3 bosqich 5-semestr talabalarning amaliy
mashg‘ulotlardan Ingliz tilidan yozma malakalarini rivojlantirish uchun
matnlar, mashqlar**

TO‘PLAMI

Improve your writing



Farg‘ona 2018

“Tasdiqlangan

“Ishlab chiqarishda boshqaruv”
fakulteti
uslubiy kengash raisi

_____ E.Mo‘minova
_____” _____ 2018y

“Tasdiqlangan”

Farg‘ona politexnika instituti
uslubiy kengash raisi

_____” _____ 2018y

TAVSIYA ETILGAN

“Tillarni o‘rgatish” kafedrası

_____ U.Nishonov

(kafedra majlisining № ____ sonli bayonnomasi)



Tuzuvchi:

Galiakberova A

Taqrizchi:

f.f.n. G‘aniyeva D

Mazkur to‘plam ixtisosi chet tili bo‘lmagan Bakalavriatning texnik yonalish 3-bosqich talabalariga 5 semestr mashg‘ulotlariga mo‘ljallangan bo‘lib bo‘lajak mutaxassislarda ixtisoslariga oid chet tilidagi adabiyotlarni o‘qitish, shu tilda suhbatlashish, ma‘lumot berish, Grammatik qoidalarga binoan mashq bajarish kabi malaka hamda ko‘nikmalarni tarkib toptirishdir.

***TO‘PLAM* berilgan matnlar, mashqlar talabalarning ingliz tili fanidan amaliy mashg‘ulotlarda yozma malakalarini rivojlantirish uchun mo‘ljallangan bo‘lib, ishlashning bu uslubi talabalarning nutqini oshiradi, yozish, eshitish, kichik xajmdagi situasialarni tasvirlashda ko‘nikmalarini va faol ishlash usulini rivojlantirishga imkon beradi deb umid qilamiz.**

Contents.

LESSON 1	6
Uzbekistan within 27 years of Independence.	
LESSON 2	9
Electric measuring units and instruments.	
LESSON 3	14
Electronic computer.	
LESSON 4	16
Modern digital computer.	
LESSON 5	21
Cybernetic as a science.	
LESSON 6	25
The transmission.	
LESSON 7	27
Oral review.	
LESSON 8	27
Telecommunication.	
LESSON 9	30
How computers operate.	
LESSON 10.....	33
Types of relay.	
LESSON 11.....	37
Power engineering system.	
LESSON 12.....	41
Data processing.	
LESSON 13.....	44
Electric circuit	
Automation glossary of terms	48

LESSON 1

Uzbekistan within 27 years of Independence.

Independence Day - this is the main national holiday of the Republic of Uzbekistan. Independence Day is celebrated annually ceremonial and colorful. National holiday embodies the dreams and expectations of the Uzbek people, who rely on the basic principles of friendship, solidarity, charity, and mutual

respect. The 1st of September, 1991, is the birthday of new independent republic of Uzbekistan. It is the first and most important public holiday of the country. The whole country celebrates the anniversary of Independence in wide, bright and funny way. Each region (there are 12 regions in Uzbekistan) prepare various festive programs. Wherever you find yourself this day, you will find a fascinating sight: performances of original folk groups, excitable sports events, various shows and noisy craft fairs. And of course what a holiday is without treats? Festive pilaf is served in the centre of a large table, which gathers members of a family, colleagues, neighbors, friends. The capital of Uzbekistan is preparing to the celebration in advance, because the festive show, which takes place on the main square of the country, the Independence Square, is so spectacular and grandiose that it just takes one's breath away. ¹



DISCUSSION

What is this text about? 2How do our people celebrate Independence Day?.3When is the birthday of a young democratic Republic?4. Each regions prepare various festive programs ,don't they?5. What meals associated with this holiday?

Read and remember

¹Journal of Discovery.Central Asia.2016.p5-6

State Symbols of the Republic of Uzbekistan.



The National Flag

The national flag was approved by the Extraordinary 8th Session of the Supreme Council of the Republic of Uzbekistan on November 18, 1991.



The flag of the Republic of Uzbekistan consists of blue, white and green stripes, separated by two narrow red stripes. A crescent and three rows of twelve stars are situated on the left side of the upper blue stripe.

The blue color symbolizes the sky and water as the principle sources of life. The National flag of Amir Timur was also blue in color. The white stripe is the traditional symbol of peace and of moral and spiritual purity. The green stripe symbolizes nature, the new epoch and abundance in the countries where the majority of the population is Islamic. Besides that, this is in harmony with the modern movement of Greenpeace, which protects nature. The red separating stripes symbolize the current of vital energy in any living body and also connect our pure and noble thoughts with the sky and the earth. The crescent of the new moon, along with its traditional historical symbolism, is at the same time a symbol of the birth of republic's independence. The symbolism of twelve stars is connected historically with the solar calendar year, which begins from Navruz and embodies the twelve principles laying in the foundation of state management.

The State Emblem

The state emblem of the Republic of Uzbekistan was approved by the 10th Session of the Supreme Council of the Republic of Uzbekistan on July 2, 1992. The state emblem of the Republic of Uzbekistan actually absorbed the centuries-old experiences of the Uzbek people. It reflects a blossoming valley and a shining sun. The right side of the valley is set off with wheat and to the left with a cotton plant garland. The octagonal star, symbolizing the unity of the Republic, crowns the state emblem. The holy Muslim symbols of the crescent and the star are placed inside the star. In the center of the emblem there is the holy bird, Khumo, with its spread wings symbolizing magnanimity, nobility and service. These symbols reflect the long way of the Uzbek people towards peace,



stability, happiness, wealth and prosperity. A little frame with the inscription "Uzbekistan" is placed in the lower part of the state emblem.

The National Anthem

The state anthem of the Republic of Uzbekistan was approved by the 11th Session of the Supreme Council of the Republic of Uzbekistan at the 12th convocation on December 10, 1992. The lyrics are by Abdulla Aripov and the music by Mutal Bourkhanov.

Basic Types of Writing

Expository Writing

Focuses on the facts. The goal is to provide explanations, information or definitions. There are no opinions, just clear, hard facts. Example: a Wikipedia entry.

Narrative Writing

Tells a story. It usually follows a sequence of events and is written in the first person. It can be fiction or non-fiction. Example: a What I Did Last Summer writing assignment.

Persuasive Writing

Expresses an opinion. It provides arguments as to why this opinion is correct and tries to convince the reader. It often mentions the opposing view but provides statistics, facts or proof that supports the opinion held. Example: an essay about Why Uniforms Are Good (or Why Uniforms Are Bad).

Descriptive Writing

Provides a vivid picture. The goal is to help the reader picture in their mind's eye that which is being described. It's like painting a picture with words. This is why descriptive language is very detailed. Example: describing a photo.

LESSON 2

Electric measuring units and instruments. Academic fields.



The development of electricity dates back to the late 17th century and the great discovery of the power source of energy was made by William Gilbert. A great number of further important discoveries were made over the next two centuries – among them are a light bulb and electromagnetic induction principle. The start of the electrical industry began in 1881 when the first power station in the world was constructed at Godalming in England. Then in 1882 the great inventor Thomas Edison and his Edison Electric Light Company started their first steam-powered station in New York. That was the beginning of the new era of electricity that changed the way people lived. By 1890 there were thousands of power systems in Europe and the USA.

But what is the electricity? From the scientific point of view, the electricity is a particular set of physical phenomena which is characterized by the presence and the distinctive flow of electric charge. It is created when the small particles – electrons move between the atoms. This process creates an electric current. And this current is used to energize different kinds of equipment. Electrical Power

Industry can be fair enough called a backbone of the modern industry and everyday life.

We use electrical power for heating, cooling and lighting our houses, for cooking food, and for numerous devices and gadgets such TV-sets, computers and smartphones. Electrical power has become the essential necessity for the modern society. But unfortunately not all people in the world have an access to this source of energy. Millions of people in poor countries have to survive without the advantages of electrical power.

Besides the obvious advantages that electrical power brings to our life there is a definite set of threats that this modern technology causes. The process of electricity generation on different kinds of power stations often is not so harmless to the nature. One of the most efficient but dangerous means of electricity generation is a nuclear power station. Though this is one of the most effective ways to generate electricity for the needs of the society, the disastrous catastrophes in Chernobyl and Fukusima showed us how dangerous nuclear power is.

The process of nature friendly electricity generation has been developing greatly these days. Wind power, solar power and the power of the ocean are used to generate safe and cheap electricity that will be able to bring our life to the next level of evolution.

Standard Electrical Units

Electrical Parameter	Measuring Unit	Symbol	Description
Voltage	Volt	V or E	Unit of Electrical Potential $V = I \times R$
Current	Ampere	I or i	Unit of Electrical Current $I = V \div R$
Resistance	Ohm	R or Ω	Unit of DC Resistance $R = V \div I$

Conductance	Siemen	G or Ū	Reciprocal of Resistance $G = 1 \div R$
Capacitance	Farad	C	Unit of Capacitance $C = Q \div V$
Charge	Coulomb	Q	Unit of Electrical Charge $Q = C \times V$
Inductance	Henry	L or H	Unit of Inductance $V_L = -L(di/dt)$
Power	Watts	W	Unit of Power $P = V \times I$ or $I^2 \times R$
Impedance	Ohm	Z	Unit of AC Resistance $Z^2 = R^2 + X^2$
Frequency	Hertz	Hz	Unit of Frequency $f = 1 \div T$

HOWTO: Teaching Argumentative Essay Writing

Topic Choice

When teaching a persuasive essay, you should make sure your students are clear on its purpose – *to persuade or convince the reader that the position the writer takes is correct*. This differs from other types of essays where the goal is *to present information or show how something is similar to or different from something else*. The persuasive essay is all about changing someone's mind. Some topics are better suited to this type of essay, topics that can be logically argued with facts, examples, expert opinions or logical reasoning. Still, they must be a topic on which someone can take an opposing viewpoint. Some writers may be tempted to choose a matter of preference or faith, but these do not make good topics for the argument essay since it is highly unlikely the writer will be able to alter the beliefs of the reader, so encourage your students to stay away from issues of faith or preference, like *'heaven is or isn't real'* (since they cannot prove it,) and to gravitate toward questions they can support, such as *'students should be able to choose their own college courses'*.

The Opposition

Though making assumptions is usually a bad idea, your students should start the argument essay with some assumptions about their readers. Since convincing the reader is the primary purpose of the essay, your students need to think about the person for whom they are writing, their audience. Knowing the audience can make the difference between a tolerable and a compelling essay. Your students should assume that the writer disagrees with the positions they are taking on their topic but they should not assume

that the reader unintelligent. There would be no purpose to writing this type of essay if the reader already agreed with the writer's position, but if the writer treats the reader as though he is less intelligent, the piece will have a condescending and offensive tone throughout. It is also important that your students think about why the reader holds the opposite point of view. This will be very important when it comes to writing the *refutation*.

The Arguments

To prepare to write the persuasive essay, challenge your students to make two lists. One list should be reasons that they hold their opinion (or *the pro side of the argument*), and the other list should be reasons that the opposition holds their opinion about the issue (or *the con side of the argument*). If you are teaching a simple argument essay, the list of pros should be longer than the list of cons. If this is not the case, you may need to encourage your student to change to the other side of the argument.

Your students can start with any style introduction that seems most effective, but the body of the essay should be rather straightforward. The writer should choose between two and four of the most convincing arguments and write one paragraph about each. It is very important that he supports his opinion with objective proof – *facts, statistics, typical examples, and opinions of established experts* – and not just statements of his own beliefs and opinions. Without this type of support, the argument will not be convincing. If you are teaching advanced students, this might be a natural place to look at *logical fallacies* and how to avoid them in this type of essay. Once the body paragraphs are written, have your students arrange their arguments in order – weakest to strongest – and end with the most compelling of the arguments.

The Refutation

In this type of essay, just as important as arguing your points is arguing against the points of the opposition. When writing this type of essay, your students should not only show why they are right but also why the opposition is wrong. This part of the essay is called *the refutation*. Looking at the list of the reasons against their arguments, tell your students to choose the strongest point the opposite side might present. Then challenge them to think about why this argument is invalid. A strong refutation will address the argument and prove it is not logical, there is a better answer, or it is not true. Your students should spend one paragraph on the refutation, and it should come after the arguments in favor of their positions on the topic.

LESSON 3

Electronic computer



A computer is a device that can be instructed to carry out arbitrary sequences of arithmetic or logical operations automatically. The ability of computers to follow generalized sets of operations, called programs, enables them to perform an extremely wide range of tasks.

Such computers are used as control systems for a very wide variety of industrial and consumer devices. This includes simple special purpose devices like microwave ovens and remote controls, factory devices such as industrial

robots and computer assisted design, but also in general purpose devices like personal computers and mobile devices such as smartphones. The Internet is run on computers and it connects millions of other computers.

Since ancient times, simple manual devices like the abacus aided people in doing calculations. Early in the Industrial Revolution, some mechanical devices were built to automate long tedious tasks, such as guiding patterns for looms. More sophisticated electrical machines did specialized analog calculations in the early 20th century. The first digital electronic calculating machines were developed during World War II. The speed, power, and versatility of computers has increased continuously and dramatically since then.

Conventionally, a modern computer consists of at least one processing element, typically a central processing unit (CPU), and some form of memory. The processing element carries out arithmetic and logical operations, and a sequencing and control unit can change the order of operations in response to stored information. Peripheral devices include input devices (keyboards, mice, joystick, etc.), output devices (monitor screens, printers, etc.), and input/output devices that perform both functions (e.g., the 2000s-era touchscreen). Peripheral devices allow information to be retrieved from an external source and they enable the result of operations to be saved and retrieved.

Rules for Writing Formal Letters

In English there are a number of conventions that should be used when writing a formal or business letter. Furthermore, you try to write as simply and as clearly as possible, and not to make the letter longer than necessary. Remember not to use informal language like contractions.

Addresses:

1) Your Address

The return address should be written in the top right-hand corner of the letter.

2) The Address of the person you are writing to

The inside address should be written on the left, starting below your address.

Date:

Different people put the date on different sides of the page. You can write this on the right or the left on the line after the address you are writing to. Write the month as a word.

Salutation or greeting:

1) Dear Sir or Madam,

If you do not know the name of the person you are writing to, use this. It is always advisable to try to find out a name.

2) Dear Mr Jenkins,

If you know the name, use the title (Mr, Mrs, Miss or Ms, Dr, etc.) and the surname only. If you are writing to a woman and do not know if she uses Mrs or Miss, you can use Ms, which is for married and single women.

Ending a letter:

1) Yours Faithfully

If you do not know the name of the person, end the letter this way.

2) Yours Sincerely

If you know the name of the person, end the letter this way.

3) Your signature

Sign your name, then print it underneath the signature. If you think the person you are writing to might not know whether you are male or female, put your title in brackets after your name.

Dear Mr. Leaf:

Let me begin by thanking you for your past contributions to our Little League baseball team. Your sponsorship aided in the purchase of ten full uniforms and several pieces of baseball equipment for last year's season.

Next month, our company is planning an employee appreciation pancake breakfast honoring retired employees for their past years of service and present employees for their loyalty and dedication in spite of the current difficult economic conditions.

We would like to place an order with your company for 25 pounds of pancake mix and five gallons of maple syrup. We hope you will be able to provide these products in the bulk quantities we require.

As you are a committed corporate sponsor and long-time associate, we hope that you will be able to join us for breakfast on December 12, 2016.

Respectfully yours,

LESSON 4

Modern digital computers

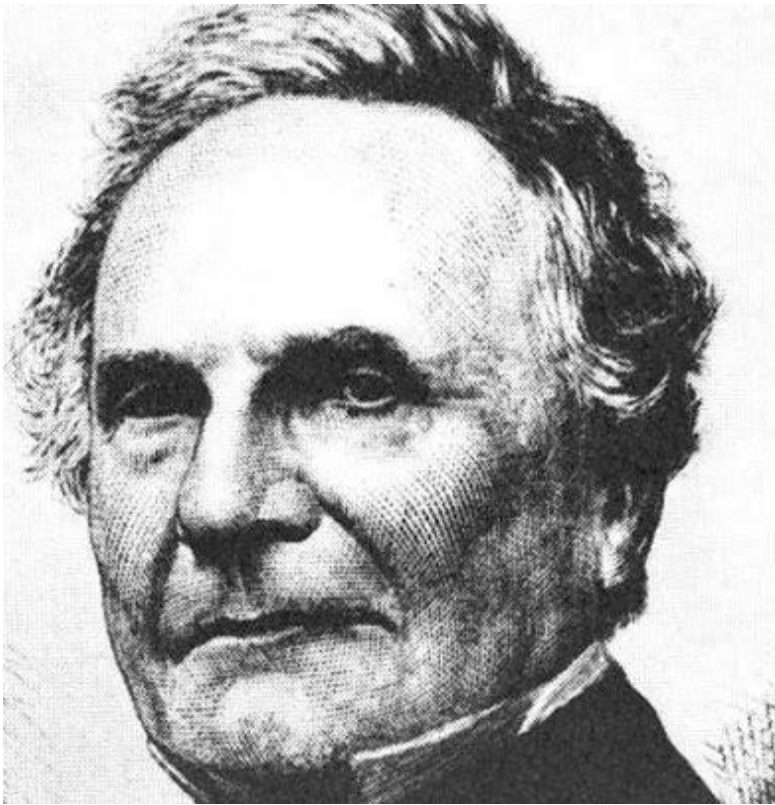
The earliest device that qualifies as a digital computer is the “abacus” also known as “soroban”. Abacus is the simplest form of a digital computer.

The device permits the users to represent numbers by the position of beads on a rack. The first mechanical adding machine was invented by French Mathematician Blaise Pascal in 1642. The machine became very popular and was produced on mass scale.

Charles Babbage, nineteenth century Professor at Cambridge University, is considered to be the father of modern digital computers. He was born on 26 December 1791 in his father’s house in Walworth, Surrey.

During his period, mathematical and statistical tables were prepared by a group of clerks. Even the utmost care and precaution could not eliminate human errors.

Babbage had to spend several hours checking these tables. Soon he became dissatisfied and exasperated with this type of monotonous job. The result was that he started thinking to build a machine which could compute tables guaranteed to



In this process, Babbage designed a “Difference Engine” in the year 1822 which could produce reliable tables.

In 1842, Babbage came out with his new idea of Analytical Engine that was intended to be completely automatic.

It is for his effort that he is today known as the 'Father of Modern Digital Computer'. It was to be capable of performing the basic arithmetic functions for any mathematical problem and it was to do so at an average speed of 60 additions per minute. His Engine could evaluate algebraic expressions correctly and was also able to produce mathematical and statistical tables correct up to 20 digits.

The Engine had five components:

- *A storage unit that held the numbers
- *An arithmetic unit called Mill, to perform the arithmetic calculations
- *A control unit that controlled the activities of the computer
- *An input device that gave the numbers and instructions to the computer
- *An output device that displayed the result

Unfortunately, he was unable to produce a working model of this machine mainly because the precision engineering required to manufacture the machine was not available during that period.

However, his effort established a number of principles which have been shown to be fundamental to the design of any computer.

Dr. Howard Aiken of Harvard University in association with IBM developed a large scale electro-mechanical computer in 1944. The computer nicknamed 'Mark I' was based on the concept of Charles Babbage's Analytical Engine.



What is an Informal Letter?

An informal letter is a letter that is written in a personal fashion. You can write them to relatives or friends, but also really to anyone with whom you have a non-professional relationship with, although this doesn't exclude business partners or

workers with whom you're friendly with either. There are different ways to carry out this type of letter depending on which country you're in. This article will address the English/American way.

We'll discuss the following elements:

- address
- date
- opening
- text / body / content
- closing / end
- signature

Address

Your personal address should be located at the top right corner of the page, since you do not always know if someone has your address in case they want to reply. Remember to also fill in your country of residence (if that is where you are writing from).

Example:

- Street name and number: 33 Downing Street
- Postal code and city: 7777 AS Amsterdam
- Country: The Netherlands

Addressee:

The addressee or receiver's address is usually located on the front of the envelope. You can, however, also choose to place it at the top left of the letter, just below your own address.

Example:

- Sur name, last name: John White
- Street name and number: 21 Madison Road
- Postal code, city: NP 194 Oxford
- State or Province: Oxfordshire
- Country: United Kingdom

Date

In a number of countries, people will insert the city where the letter is being written from. The English, however, do no such thing. The date is usually located below your own address. Simply leave one line below open, and insert the date.

The month, day and year are the normal thing to mention. Sometimes even only the month and day will be sufficient. (Do not forget that in English, the months are spelled with capital letters.)

Example:

- English letter: 22 November, 2011
- American letter: November 22, 2011

Body

The contents of your letter should be written in a personal and friendly tone. However, it's important to adjust your use of language to the person you are writing to. A good way of assessing how you should write is to think about how you would interact with each other in real life. Also, the English and the Americans are fond of exchanging social niceties. For example, they like asking a few polite questions "How are you?" or "How was your holiday?" for example. In general, they are not as direct as most Europeans.

- In the first paragraph of your body, you should state your reason for writing.
- In the second and following paragraphs, expand on what you mentioned in the first paragraph.
- In the final paragraphs, you can make some concluding remarks.

Opening

How do you address someone in English? This is fairly straightforward, and it is usually not as important as would be with a business or formal letter. However, there are still a few things that you should know about in terms of addressing someone properly in an informal letter.

- First of all, in England there is no period after "Mr," but in American letters there is one.
- Secondly, women are addressed as "Mrs." if they are married, and with "Ms." when they are not.

Examples:

This heavily depends on how well you know the person in question. Carefully consider your relationship with him or her. You could simply say: "Hi Richard," but it is always safer to just say "Dear Richard," (Never forget the comma!)

Sample Opening Sentences

Your opening should be casual, and not as stiff as they would be in business letters.

Examples:

- How are you?
- How have you been?
- How is life treating you?
- How are the kids?
- I hope you are doing well
- I hope you, Mike, and the kids are having a great time in. . .

Ending

Closing sentences examples:

- I am looking forward to seeing you.
- I can't wait to see you soon.
- I can't wait to hear from you.
- I am looking forward to hearing from you, I hope to be hearing from you soon.
- See you soon.
- Send my love to. . .
- I hope you are doing well.
- Give my regards to. . .

Signature

In terms of signing off, the choice is yours and you have a lot of freedom here. Here are some examples:

- Best wishes,
- Best,
- Kindly,
- Kind regards,
- Best regards,
- Lots of love,
- Love,

LESSON 5

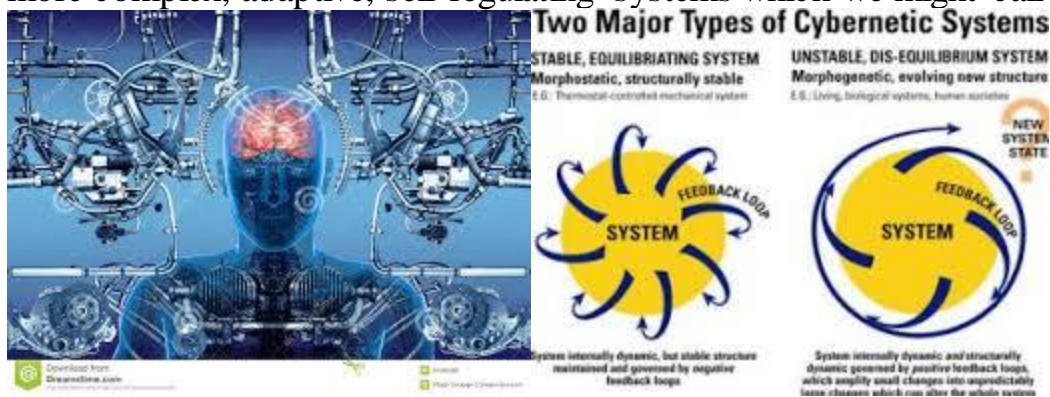
Cybernetics as a science

What are Cybernetics and Systems Science?

Cybernetics and Systems Science (also: "(General) Systems Theory" or "Systems Research") constitute a somewhat fuzzily defined academic domain, that touches virtually all traditional disciplines, from mathematics, technology and biology to philosophy and the social sciences. It is more specifically related to the recently developing "sciences of complexity", including AI, neural networks, dynamical

systems, chaos, and complex adaptive systems. Its history dates back to the 1940's and 1950's when thinkers such as Wiener, von Bertalanffy, Ashby and von Foerster founded the domain through a series of interdisciplinary meetings.

Systems theory or systems science argues that however complex or diverse the world that we experience, we will always find different types of organization in it, and such organization can be described by concepts and principles which are independent from the specific domain at which we are looking. Hence, if we would uncover those general laws, we would be able to analyse and solve problems in any domain, pertaining to any type of system. The systems approach distinguishes itself from the more traditional analytic approach by emphasizing the interactions and connectedness of the different components of a system. Although the systems approach in principle considers all types of systems, it in practice focuses on the more complex, adaptive, self-regulating systems which we might call "cybernetic".



Many of the concepts used by system scientists come from the closely related approach of cybernetics: information, control, feedback, communication... Cybernetics, deriving from the Greek word for steersman (*kybernetes*), was first introduced by the mathematician Wiener, as the science of communication and control in the animal and the machine (to which we now might add: in society and in individual human beings). It grew out of Shannon's information theory, which was designed to optimize the transmission of information through communication channels, and the feedback concept used in engineering control systems. In its present incarnation of "second-order cybernetics", its emphasis is on how observers construct models of the systems with which they interact (see constructivism).

In fact, cybernetics and systems theory study essentially the same problem, that of organization independent of the substrate in which it is embodied. Insofar as it is meaningful to make a distinction between the two approaches, we might say that systems theory has focused more on the *structure* of systems and their models, whereas cybernetics has focused more on how systems *function*, that is to say how they control their actions, how they communicate with other systems or with their own components, ... Since structure and function of a system cannot be understood in separation, it is clear that cybernetics and systems theory should be viewed as two facets of a single approach.

This insight has had as a result that the two domains have in practice almost merged: many, if not most, of the central associations, journals and conferences in the field include both terms, "systems" and "cybernetics", in their title. In spite of this lack of strict subdivisions, though, the domain is rather fragmented, with many different approaches, similar in some respects, different in others, existing side-by-side. Many of these "schools", such as autopoietic systems, anticipatory systems, living systems, viable systems or soft systems, are associated with a particular theorist or thinker, respectively Maturana, Rosen, Miller, Beer and Checkland. As a result, the cybernetics and systems domain lacks clear foundations. Yet, we, in the Principia Cybernetica Project, believe that the commonalities are much larger than the differences, and therefore it is worth attempting to integrate the different approaches in a common conceptual framework.

Some excellent, easy to read, introductory books on cybernetics and systems can be downloaded freely from our Principia Cybernetica library. Together with our dictionary, and bibliography of basic books and papers, this should be sufficient for an introductory course in the domain. The following links to other websites provide further introductory material and references.

Cybernetics is a transdisciplinary approach for exploring regulatory systems—their structures, constraints, and possibilities. Norbert Wiener defined cybernetics in 1948 as "the scientific study of control and communication in the animal and the machine." [2] In the 21st century, the term is often used in a rather loose way to imply "control of any system using technology." In other words, it is the scientific study of how humans, animals and machines control and communicate with each other.

Cybernetics is applicable when a system being analyzed incorporates a closed signaling loop—originally referred to as a "circular causal" relationship—that is, where action by the system generates some change in its environment and that change is reflected in the system in some manner (feedback) that triggers a system change. Cybernetics is relevant to, for example, mechanical, physical, biological, cognitive, and social systems. The essential goal of the broad field of cybernetics is to understand and define the functions and processes of systems that have goals and that participate in circular, causal chains that move from action to sensing to comparison with desired goal, and again to action. Its focus is how anything (digital, mechanical or biological) processes information, reacts to information, and changes or can be changed to better accomplish the first two tasks. Cybernetics includes the study of feedback, black boxes and derived concepts such as communication and control in living organisms, machines and organizations including self-organization.

Concepts studied by cyberneticists include, but are not limited to: learning, cognition, adaptation, social control, emergence, convergence, communication, efficiency, efficacy, and connectivity. In cybernetics these concepts (otherwise already objects of study in other disciplines such as biology and engineering) are abstracted from the context of the specific organism or device.

The word cybernetics comes from Greek κυβερνητική (kybernetike), meaning "governance", i.e., all that are pertinent to κυβερνάω (kybernao), the latter meaning "to steer, navigate or govern", hence κυβέρνησις (kybernesis), meaning "government", is the government while κυβερνήτης (kybernetes) is the governor or the captain. Contemporary cybernetics began as an interdisciplinary study connecting the fields of control systems, electrical network theory, mechanical engineering, logic modeling, evolutionary biology, neuroscience, anthropology, and psychology in the 1940s, often attributed to the Macy Conferences. During the second half of the 20th century cybernetics evolved in ways that distinguish first-order cybernetics (about observed systems) from second-order cybernetics (about observing systems).[4] More recently there is talk about a third-order cybernetics (doing in ways that embraces first and second-order).

Studies in cybernetics provide a means for examining the design and function of any system, including social systems such as business management and organizational learning, including for the purpose of making them more efficient and effective. Fields of study which have influenced or been influenced by cybernetics include game theory, system theory (a mathematical counterpart to cybernetics), perceptual control theory, sociology, psychology (especially neuropsychology, behavioral psychology, cognitive psychology), philosophy, architecture, and organizational theory.[6] System dynamics, originated with applications of electrical engineering control theory to other kinds of simulation models (especially business systems) by Jay Forrester at MIT in the 1950s, is aFrom

A sample of informal letter

Date-

To,

Dear _____ [name of person]

Hello! How're you? How's the weather there? It's extremely warm here. I hope you and everyone else is doing well.

I'm very busy here with _____. There's a lot of work to be done. Time is extremely precious. I cannot wait to meet _____.

I'll be coming to _____ for a conference/wedding/meeting. We have to meet up then. Do write back soon. I'm waiting for your reply.

Take care,

Love,

_____ (Name)

related field.

LESSON 6

The transmission

A **transmission** is a machine in a power transmission system, which provides controlled application of the power. Often the term transmission refers simply to the **gearbox** that uses gears and gear trains to provide speed and torque conversions from a rotating power source to another device.

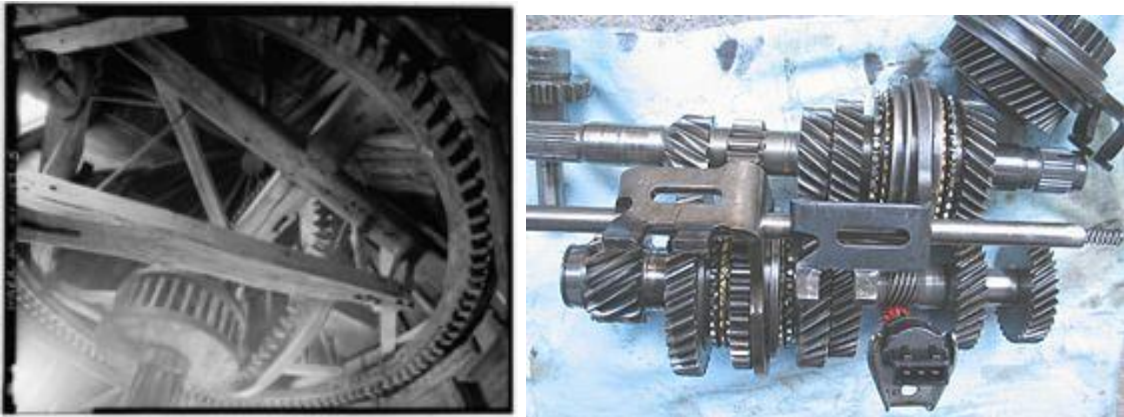
In British English, the term *transmission* refers to the whole drivetrain, including clutch, gearbox, prop shaft (for rear-wheel drive), differential, and final drive shafts. In American English, however, the term refers more specifically to the gearbox alone, and detailed usage differs

The most common use is in motor vehicles, where the transmission adapts the output of the internal combustion engine to the drive wheels. Such engines need to operate at a relatively high rotational speed, which is inappropriate for starting, stopping, and slower travel. The transmission reduces the higher engine speed to the slower wheel speed, increasing torque in the process. Transmissions are also used on pedal bicycles, fixed machines, and where different rotational speeds and torques are adapted.

Often, a transmission has multiple gear ratios (or simply "gears") with the ability to switch between them as speed varies. This switching may be done manually (by the operator) or automatically. Directional (forward and reverse) control may also be provided. Single-ratio transmissions also exist, which simply change the speed and torque (and sometimes direction) of motor output.

In motor vehicles, the transmission generally is connected to the engine crankshaft via a flywheel or clutch or fluid coupling, partly because internal combustion engines cannot run below a particular speed. The output of the transmission is transmitted via the driveshaft to one or more differentials, which drives the wheels. While a differential may also provide gear reduction, its primary purpose is to permit the wheels at either end of an axle to rotate at different speeds (essential to avoid wheel slippage on turns) as it changes the direction of rotation.

Conventional gear/belt transmissions are not the only mechanism for speed/torque adaptation. Alternative mechanisms include torque converters and power transformation (e.g. diesel-electric transmission and hydraulic drive system). Hybrid configurations also exist. Automatic transmissions use a valve body to shift gears using fluid pressures in conjunction with an ecm.



Writing Email Format

An informal letter is perhaps the most common of letters. It is any letter that is written to a friend, a member of the family, a close relative or to any person who is extremely close to you or well acquainted with you. Informal letters are written from time to time to deliver good news to people, or to inquire about their health, or to convey a festival's greetings, or even simply to maintain some contact with a person close to you.

Dear Ma,

How are you? How's Dad? And Ben? Is Ben alright? Has he tripped and broken his leg yet again? I can just imagine poor clumsy Ben falling and crying his eyes out. The poor lad does need to be more careful in his wandering. Very soon he'll turn ten and start calling himself a big boy!

I'm feeling quite excellent here. The academic requirements keep me so busy! I hardly have time to miss you. Though, sometimes, I do miss eating with you

people very much. I can't wait for vacations to begin! I'm going to gorge on all your dishes like there's no tomorrow!

I've started to develop a keen interest in architecture and am even taking an introductory course in it this term. Who knows, I might even major in it! Hopefully, though, my interest in architecture shouldn't wane—the way it did for medicine, remember, Ma?

I hope Dad's doing well. And please don't skip your meds, Ma. I miss you guys a lot and I cannot wait to see you.

Love,

ABC

LESSON 7

Oral review

LESSON 8

Telecommunication

We can not deny the role of telecommunications in our life. The Internet, phones, telegraph, cell phones, radio, television are all the means of communication or telecommunication. Nowadays we live in information era, when information is the key and engine of progress. Our society needs perfect means of information exchange that is why all types of telecommunication are under the permanent developing.

Currently hundreds of millions of people use wireless communication means. Cell phone is no longer a symbol of prestige but a tool, which lets to use working time more effectively. Considering that the main service of a mobile connection operator is providing high quality connection, much attention in the telecommunication market is paid to the spectrum of services that cell network subscriber may receive.

Today we can easily connect to the Internet using our cell phone or to take a picture or to take a short movie, using our video cell phone.

Late in the nineteenth century, communication facilities were augmented by a new invention — telephone. In the USA its use expanded slowly and by 1900 the American Telephone and Telegraph Company controlled 855,000 telephones.

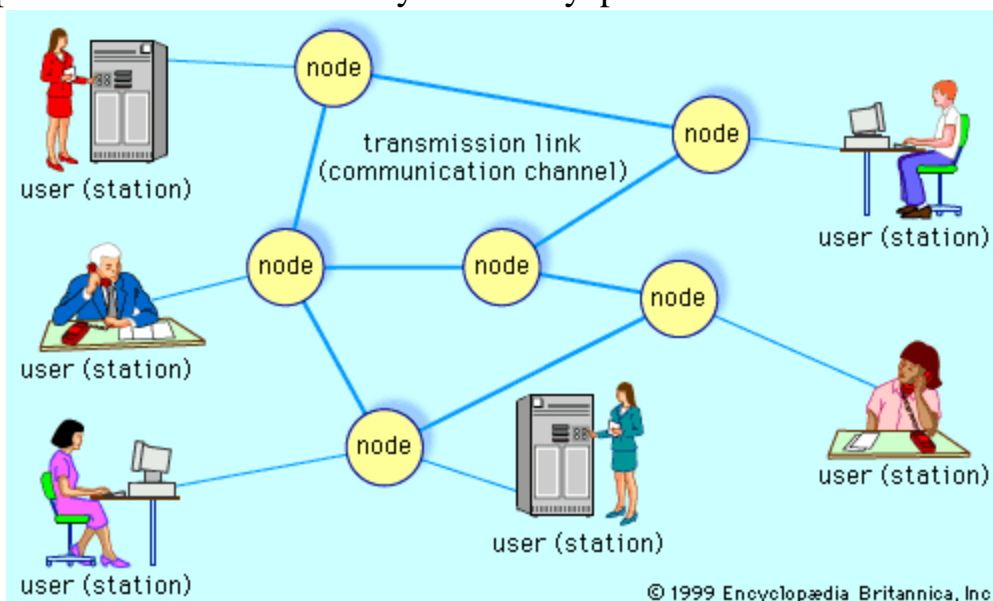
After 1900, telephone installations extended much more rapidly in all the wealthier countries. The number of telephones in use in the world grew at almost 100 per cent per decade. But long-distance telephone services gradually developed and began to compete with telegraphic business. A greater contribution to long-range communication came with the development of wireless technology.

Before the outbreak of the First World War wireless telegraphy was established as a means of regular communication with ships at sea and provided a valuable supplement to existing telegraph lines. In the next few years the telephone systems of all the chief countries were connected with each other by radio. Far more immediate was the influence that radio had through broadcasting and by television, which followed it at an interval of about twenty-five years.

Telephones are as much a part of infrastructure of our society as roads or electricity, and competition will make them cheaper. Losses from lower prices will be countered by higher usage. Most important of all, by cutting out the need to install costly cables and microwave transmitters, the new telephones could be a boon to the remote and poor regions of the earth. Even today, half the world's population lives more than two hours away from a telephone.

Satellite phones are not going to deliver all their benefits at once.

Lots of other new communication services — on-line film libraries, personal computers that can send video-clips and sound-bites as easily as they can be used for writing letters, terrestrial mobile-telephone systems cheap enough to replace old sets — are already technically possible.



Report Writing

The structure of a report is very important to lead the reader through your thinking to a course of action and/or decision. It's worth taking a bit of time to plan it out beforehand.

Step 1: Know your brief

You will usually receive a clear brief for a report, including what you are studying and for whom the report should be prepared.

First of all, consider your brief very carefully and make sure that you are clear who the report is for (if you're a student then not just your tutor, but who it is supposed to be written for), and why you are writing it, as well as what you want the reader to do at the end of reading: make a decision or agree a recommendation, perhaps.

Step 2: Keep your brief in mind at all times

During your planning and writing, make sure that you keep your brief in mind: who are you writing for, and why are you writing?

All your thinking needs to be focused on that, which may require you to be ruthless in your reading and thinking. Anything irrelevant should be discarded.

As you read and research, try to organise your work into sections by theme, a bit like writing a **Literature Review**.

Make sure that you keep track of your references, especially for academic work. Although referencing is perhaps less important in the workplace, it's also important that you can substantiate any assertions that you make so it's helpful to keep track of your sources of information.

The Structure of a Report

Like the precise content, requirements for structure vary, so do check what's set out in any guidance.

However, as a rough guide, you should plan to include at the very least an executive summary, introduction, the main body of your report, and a section containing your conclusions and any recommendations.

Executive Summary

The **executive summary** or **abstract**, for a scientific report, is a brief summary of the contents. It's worth writing this last, when you know the key points to draw out. It should be no more than half a page to a page in length.

Remember the executive summary is designed to give busy 'executives' a quick summary of the contents of the report.

Introduction

The **introduction** sets out what you plan to say and provides a brief summary of the problem under discussion. It should also touch briefly on your conclusions.

Report Main Body

The **main body of the report** should be carefully structured in a way that leads the reader through the issue.

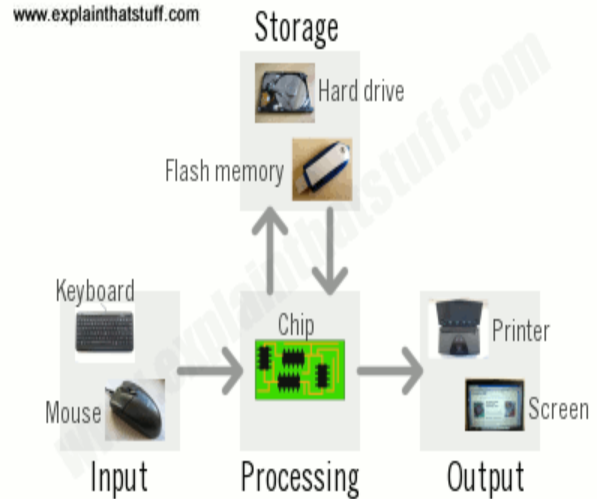
You should split it into sections using numbered sub-headings relating to themes or areas for consideration. For each theme, you should aim to set out clearly and concisely the main issue under discussion and any areas of difficulty or disagreement. It may also include experimental results. All the information that you present should be related back to the brief and the precise subject under discussion. Conclusions and Recommendations

The **conclusion** sets out what inferences you draw from the information, including any experimental results. It may include recommendations, or these may be included in a separate section.

Recommendations suggest how you think the situation could be improved, and should be specific, achievable and measurable. If your recommendations have financial implications, you should set these out clearly, with estimated costs if possible.

LESSON 9

How computers operate.



A computer is an [electronic](#) machine that processes information—in other words, an **information processor**: it takes in raw information (or **data**) at one end, stores it until it's ready to work on it, chews and crunches it for a bit, then spits out the results at the other end. All these processes have a name. Taking in information is called **input**, storing information is better known as **memory** (or storage), chewing information is also known as **processing**, and spitting out results is called **output**.

Imagine if a computer were a person. Suppose you have a friend who's really good at math. She is so good that everyone she knows posts their math problems to her. Each morning, she goes to her letterbox and finds a pile of new math problems waiting for her attention. She piles them up on her desk until she gets around to looking at them. Each afternoon, she takes a letter off the top of the pile, studies the problem, works out the solution, and scribbles the answer on the back. She puts this in an envelope addressed to the person who sent her the original problem and sticks it in her out tray, ready to post. Then she moves to the next letter in the pile. You can see that your friend is working just like a computer. Her letterbox is her input; the pile on her desk is her memory; her brain is the processor that works out the solutions to the problems; and the out tray on her desk is her output.

Once you understand that computers are about input, memory, processing, and output, all the junk on your desk makes a lot more sense:

- **Input:** Your keyboard and mouse, for example, are just input units—ways of getting information into your computer that it can process. If you use a microphone and voice recognition software, that's another form of input.
- **Memory/storage:** Your computer probably stores all your documents and files on a hard drive: a huge magnetic memory. But smaller, computer-based devices like digital cameras and cellphones use other kinds of storage such as flash memory cards.
- **Processing:** Your computer's processor (sometimes known as the **central processing unit**) is a microchip buried deep inside. It works amazingly hard

and gets incredibly hot in the process. That's why your computer has a little fan blowing away—to stop its brain from overheating!

- **Output:** Your computer probably has an LCD screen capable of displaying high-resolution (very detailed) graphics, and probably also stereo loudspeakers. You may have an inkjet printer on your desk too to make a more permanent form of output.

A Word on Writing Style

When writing a report, your aim should be to be absolutely clear. Above all, it should be easy to read and understand, even to someone with little knowledge of the subject area.

You should therefore aim for crisp, precise text, using plain English, and shorter words rather than longer, with short sentences.

You should also avoid jargon. If you have to use specialist language, you should explain each word as you use it. If you find that you've had to explain more than about five words, you're probably using too much jargon, and need to replace some of it with simpler words.

Consider your audience. If the report is designed to be written for a particular person, check whether you should be writing it to 'you' or perhaps in the third person to a job role: 'The Chief Executive may like to consider...', or 'The minister is recommended to agree...', for example.

A Final Warning

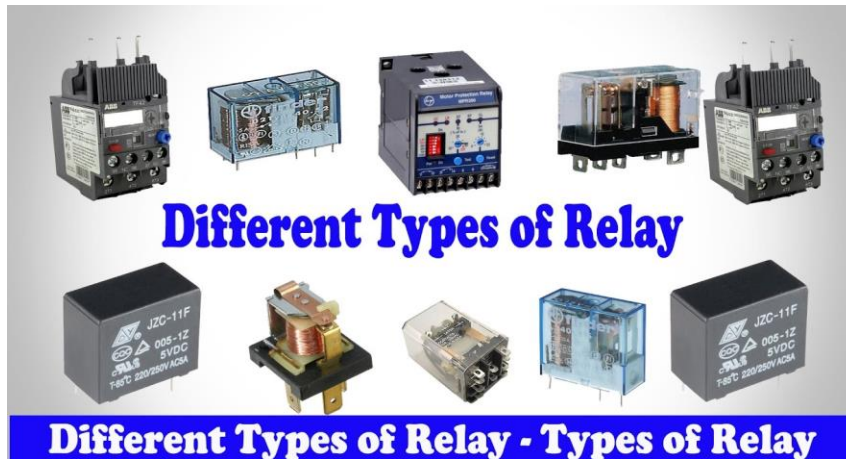
As with any academic assignment or formal piece of writing, your work will benefit from being read over again and edited ruthlessly for sense and style.

Pay particular attention to whether all the information that you have included is relevant. Also remember to check tenses, which person you have written in, grammar and spelling. It's also worth one last check against any requirements on structure.

For an academic assignment, make sure that you have referenced fully and correctly. As always, check that you have not inadvertently or deliberately plagiarised or copied anything without acknowledging it.

LESSON 10

Types of relay



1. Latching Relay

Latching relays are also called impulse relays. They work in the bistable mode, and thus have two relaxing states. They are also called keep relays or stay relays because as soon as the current towards this relay is switched off, the relay continues the process that it was doing in the last state. This can be achieved only with a solenoid which is operating in a ratchet and cam mechanism. It can also be done by an over-centre spring mechanism or a permanent magnet mechanism in which, when the coil is kept in the relaxed point, the over-centre spring holds the armature and the contacts in the right spot. This can also be done with the help of a remanent core.

In the ratchet and cam method, power consumption occurs only for a particular time. Hence it is more advantageous than the others.

2. Reed Relay

These types of relays have been given more importance in the contacts. In order to protect them from atmospheric protection they are safely kept inside a vacuum or inert gas. Though these types of relays have a very low switching current and voltage ratings, they are famous for their switching speeds.

3. Polarized Relay

This type of relay has been given more importance on its sensitivity. These relays have been used since the invention of telephones. They played very important roles

in early telephone exchanges and also in detecting telegraphic distortion. The sensitivity of these relays are very easy to adjust as the armature of the relay is placed between the poles of a permanent magnet.

4. Buchholz Relay

This relay is actually used as a safety device. They are used for knowing the amount of gas present in large oil-filled transformers. They are designed in such a way that they produce a warning if it senses either the slow production of gas or fast production of gas in the transformer oil.

5. Overload protection Relay

As the name implies, these relays are used to prevent the electric motors from damage by over current and short circuits. For this the heating element is kept in series with the motor. Thus when over heat occurs the bi-metallic strip connected to the motor heats up and in turn releases a spring to operate the contacts of the relay.

6. Mercury Wetted Relay

This relay is almost similar to the reed relay explained earlier. The only difference is that instead of inert gases, the contacts are wetted with mercury. This makes them more position sensitive and also expensive. They have to be vertically mounted for any operation. They have very low contact resistance and so can be used for timing applications. Due to these factors, this relay is not used frequently.

7. Machine Tool Relay

This is one of the most famous industrial relay. They are mainly used for the controlling of all kinds of machines. They have a number of contacts with easily replaceable coils. This enables them to be easily converted from NO contact to NC contact. Many types of these relays can easily be setup in a control panel. Though they are very useful in industrial applications, the invention of PLC has made them farther away from industries.

8. Contacor Relay

This is one of the most heavy load relay ever used. They are mainly used in switching electric motors. They have a wide range of current ratings from a few amps to hundreds. The contacts of these relays are usually made with alloys containing a small percentage of silver. This is done so as to avoid the hazardous effects of arcing. These type of relays are mainly categorized in the rough use areas. So, they produce loud noises while operated and hence cannot be used in places where noise is a problem.

9. Solid State relay

SSR relays, as its name implies are designed with the help of solid state components. As they do not have any moving objects in their design they are known for their high reliability.

10. Solid State Contactor Relay

These relays combine both the features of solid state relays and contactor relays. As a result they have a number of advantages. They have a very good heat sink and can be designed for the correct on-off cycles. They are mainly controlled with the help of PLC, micro-processors or microcontrollers.

Essay.Introduction

Every essay or assignment you write must begin with an introduction. It might be helpful to think of the introduction as an inverted pyramid. In such a pyramid, you begin by presenting a broad introduction to the topic and end by making a more focused point about that topic in your thesis statement. The introduction has three essential parts, each of which serves a particular purpose.

1. The first part is the “attention-grabber.” You need to interest your reader in your topic so that they will want to continue reading. You also want to do that in a way that is fresh and original. For example, although it may be tempting to begin your essay with a dictionary definition, this technique is stale because it has been widely overused. Instead, you might try one of the following techniques:
 - Offer a surprising statistic that conveys something about the problem to be addressed in the paper.
 - Perhaps you can find an interesting quote that nicely sums up your argument.
 - Use rhetorical questions that place your readers in a different situation in order to get them thinking about your topic in a new way.
 - If you have a personal connection to the topic, you might use an anecdote or story to get your readers emotionally involved.
 - For example, if you were writing a paper about drunk drivers, you might begin with a compelling story about someone whose life was forever altered by a drunk driver: “At eighteen, Michelle had a lifetime of promise in front of her. Attending college on a track

scholarship, she was earning good grades and making lots of friends. Then one night her life was forever altered...”

2. From this attention grabbing opener, you would need to move to the next part of the introduction, in which you offer some relevant background on the specific purpose of the essay. This section helps the reader see why you are focusing on this topic and makes the transition to the main point of your paper. For this reason, this is sometimes called the “transitional” part of the introduction.
 - In the example above, the anecdote about Michelle might capture the reader’s attention, but the essay is not really about Michelle. The attention grabber might get the reader thinking about how drunk driving can destroy people’s lives, but it doesn’t introduce the topic of the need for stricter drunk driving penalties (or whatever the real focus of the paper might be).
 - Therefore, you need to bridge the gap between your attention-grabber and your thesis with some transitional discussion. In this part of your introduction, you narrow your focus of the topic and explain why the attention-grabber is relevant to the specific area you will be discussing. You should introduce your specific topic and provide any necessary background information that the reader would need in order to understand the problem that you are presenting in the paper. You can also define any key terms the reader might not know.
 - Continuing with the example above, we might move from the narrative about Michelle to a short discussion of the scope of the problem of drunk drivers. We might say, for example: “Michelle’s story is not isolated. Each year XX (number) of lives are lost due to drunk-driving accidents.” You could follow this with a short discussion of how serious the problem is and why the reader should care about this problem. This effectively moves the reader from the story about Michelle to your real topic, which might be the need for stricter penalties for drinking and driving.
3. Finally, the introduction must conclude with a clear statement of the overall point you want to make in the paper. This is called your “thesis statement.”

It is the narrowest part of your inverted pyramid, and it states exactly what your essay will be arguing.

- In this scenario, your thesis would be the point you are trying to make about drunk driving. You might be arguing for better enforcement of existing laws, enactment of stricter penalties, or funding for education about drinking and driving. Whatever the case, your thesis would clearly state the main point your paper is trying to make. Here's an example: "Drunk driving laws need to include stricter penalties for those convicted of drinking under the influence of alcohol." Your essay would then go on to support this thesis with the reasons why stricter penalties are needed.
4. In addition to your thesis, your introduction can often include a "road map" that explains how you will defend your thesis. This gives the reader a general sense of how you will organize the different points that follow throughout the essay. Sometimes the "map" is incorporated right into the thesis statement, and sometimes it is a separate sentence. Below is an example of a thesis with a "map."
- *"Because drunk driving can result in unnecessary and premature deaths, permanent injury for survivors, and billions of dollars spent on medical expenses, drunk drivers should face stricter penalties for driving under the influence."* The underlined words here are the "map" that show your reader the main points of support you will present in the essay. They also serve to set up the paper's arrangement because they tell the order in which you will present these topics.
- A final note: In constructing an introduction, make sure the introduction clearly reflects the goal or purpose of the assignment and that the thesis presents not only the topic to be discussed but also states a clear position about that topic that you will support and develop throughout the paper. In shorter papers, the introduction is usually only one or two paragraphs, but it can be several paragraphs in a longer paper.

LESSON 11

Power engineering system

Power engineering, also called power systems engineering, is a subfield of electrical engineering that deals with the generation, transmission, distribution and utilization of electric power, and the electrical apparatus connected to such systems. Although much of the field is concerned with the problems of three-phase AC power – the standard for large-scale power transmission and distribution across the modern world – a significant fraction of the field is concerned with the conversion between AC and DC power and the development of specialized power systems such as those used in aircraft or for electric railway networks. Power engineering draws the majority of its theoretical base from electrical engineering.

History



A sketch of the Pearl Street Station, the first steam-powered electric power station in New York City

Electricity became a subject of scientific interest in the late 17th century. Over the next two centuries a number of important discoveries were made including the incandescent light bulb and the voltaic pile. Probably the greatest discovery with respect to power engineering came from Michael Faraday who in 1831 discovered that a change in magnetic flux induces an electromotive force in a loop of wire—a principle known as electromagnetic induction that helps explain how generators and transformers work.

In 1881 two electricians built the world's first power station at Godalming in England. The station employed two waterwheels to produce an alternating current that was used to supply seven Siemens arc lamps at 250 volts and thirty-four incandescent lamps at 40 volts. However supply was intermittent and in 1882 Thomas Edison and his company, The Edison Electric Light Company, developed the first steam-powered electric power station on Pearl Street in New York City. The Pearl Street Station consisted of several generators and initially

powered around 3,000 lamps for 59 customers. The power station used direct current and operated at a single voltage. Since the direct current power could not be easily transformed to the higher voltages necessary to minimise power loss during transmission, the possible distance between the generators and load was limited to around half-a-mile (800 m).

That same year in London Lucien Gaulard and John Dixon Gibbs demonstrated the first transformer suitable for use in a real power system. The practical value of Gaulard and Gibbs' transformer was demonstrated in 1884 at Turin where the transformer was used to light up forty kilometres (25 miles) of railway from a single alternating current generator. Despite the success of the system, the pair made some fundamental mistakes. Perhaps the most serious was connecting the primaries of the transformers in series so that switching one lamp on or off would affect other lamps further down the line. Following the demonstration George Westinghouse, an American entrepreneur, imported a number of the transformers along with a Siemens generator and set his engineers to experimenting with them in the hopes of improving them for use in a commercial power system.

One of Westinghouse's engineers, William Stanley, recognised the problem with connecting transformers in series as opposed to parallel and also realised that making the iron core of a transformer a fully enclosed loop would improve the voltage regulation of the secondary winding. Using this knowledge he built the world's first practical transformer based alternating current power system at Great Barrington, Massachusetts in 1886. In 1885 the Italian physicist and electrical engineer Galileo Ferraris demonstrated an induction motor and in 1887 and 1888 the Serbian-American engineer Nikola Tesla filed a range of patents related to power systems including one for a practical two-phase induction motor^{[11][12]} which Westinghouse licensed for his AC system.

By 1890 the power industry had flourished and power companies had built thousands of power systems (both direct and alternating current) in the United States and Europe – these networks were effectively dedicated to providing electric lighting. During this time a fierce rivalry in the US known as the "War of Currents" emerged between Edison and Westinghouse over which form of transmission (direct or alternating current) was superior. In 1891, Westinghouse installed the first major power system that was designed to drive an electric motor and not just provide electric lighting. The installation powered a 100 horsepower (75 kW) synchronous motor at Telluride, Colorado with the motor being started by a Tesla induction motor. On the other side of the Atlantic, Oskar von Miller built a 20 kV 176 km three-phase transmission line from Lauffen am Neckar to Frankfurt am Main for the Electrical Engineering Exhibition in Frankfurt.^[14] In 1895, after a protracted decision-making process, the Adams No. 1 generating station at Niagara Falls began transmitting three-phase alternating current power to Buffalo at 11 kV. Following completion of the Niagara Falls project, new power systems increasingly chose alternating current as opposed to direct current for electrical transmission.^[15]

Although the 1880s and 1890s were seminal decades in the field, developments in power engineering continued throughout the 20th and 21st century. In 1936 the first commercial high-voltage direct current (HVDC) line using mercury-arc valves was built between Schenectady and Mechanicville, New York. HVDC had previously been achieved by installing direct current generators in series (a system known as the Thury system) although this suffered from serious reliability issues. In 1957 Siemens demonstrated the first solid-state rectifier (solid-state rectifiers are now the standard for HVDC systems) however it was not until the early 1970s that this technology was used in commercial power systems.^[17] In 1959 Westinghouse demonstrated the first circuit breaker that used SF₆ as the interrupting medium.^[18] SF₆ is a far superior dielectric to air and, in recent times, its use has been extended to produce far more compact switching equipment (known as switchgear) and transformers. Many important developments also came from extending innovations in the ICT field to the power engineering field. For example, the development of computers meant load flow studies could be run more efficiently allowing for much better planning of power systems. Advances in information technology and telecommunication also allowed for much better remote control of the power system's switchgear and generators.

Writing annotation

Annotating a text or other media (e.g. a video, image, etc.) is as much about you as it is the text you are annotating. What are YOUR responses to the author's writing, claims and ideas? What are YOU thinking as you consider the work? Ask questions, challenge, think!

When we annotate an author's work, our minds should *encounter* the mind of the author, openly and freely. If you met the author at a party, what would you like to tell to them; what would you like to ask them? What do you think they would say in response to your comments? You can be critical of the text, but you do not have to be. If you are annotating properly, you often begin to get ideas that have little or even nothing to do with the topic you are annotating. That's fine: it's all about generating insights and ideas of your own. Any good insight is worth keeping because it may make for a good essay or research paper later on.

The Secret is in the Pen

One of the ways proficient readers read is with a pen in hand. They know their purpose is to keep their attention on the material by:

- *Predicting* what the material will be about
- *Questioning* the material to further understanding
- *Determining* what's important
- *Identifying* key vocabulary
- *Summarizing* the material in their own words, and

- *Monitoring* their comprehension (understanding) during and after engaging with the material

The same applies for mindfully viewing a film, video, image or other media.

Annotating a Text

Review the video, “How to Annotate a Text.” Pay attention to both how to make annotations and what types of thoughts and ideas may be part of your annotations as you actively read a written text.

LESSON 12

Data processing

Manual data processing

Although widespread use of the term *data processing* dates only from the nineteen-fifties, data processing functions have been performed manually for millennia. For example, bookkeeping involves functions such as posting transactions and producing reports like the balance sheet and the cash flow statement. Completely manual methods were augmented by the application of mechanical or electronic calculators. A person whose job was to perform calculations manually or using a calculator was called a "computer."

The 1890 United States Census schedule was the first to gather data by individual rather than household. A number of questions could be answered by making a check in the appropriate box on the form. From 1850 through 1880 the Census Bureau employed "a system of tallying, which, by reason of the increasing number of combinations of classifications required, became increasingly complex. Only a limited number of combinations could be recorded in one tally, so it was necessary to handle the schedules 5 or 6 times, for as many independent tallies. "It took over 7 years to publish the results of the 1880 census" using manual processing methods().

Automatic data processing

The term *automatic data processing* was applied to operations performed by means of unit record equipment, such as Herman Hollerith's application of punched card equipment for the 1890 United States Census. "Using Hollerith's punchcard equipment, the Census Office was able to complete tabulating most of the 1890 census data in 2 to 3 years, compared with 7 to 8 years for the 1880 census.... It is also estimated that using Herman Hollerith's system saved some \$5 million in processing costs" (in 1890 dollars) even with twice as many questions as during 1880.

Electronic data processing

Computerized data processing, or Electronic data processing represents a later development, with a computer used instead of several independent pieces of equipment. The Census Bureau first made limited use of electronic computers for the 1950 United States Census, using a UNIVAC I system, delivered in 1952.

Other developments

The term *data processing* has mostly been subsumed by the newer and somewhat more general term *information technology* (IT).^[*citation needed*] The term "data processing" is presently considered sometimes to have a negative connotation, suggesting use of older technologies. As an example, in 1996 the *Data Processing Management Association* (DPMA) changed its name to the *Association of Information Technology Professionals*. Nevertheless, the terms are approximately synonymous.

Applications[*edit*]

Commercial data processing

Main article: Electronic data processing

Commercial data processing involves a large volume of input data, relatively few computational operations, and a large volume of output. For example, an insurance company needs to keep records on tens or hundreds of thousands of policies, print and mail bills, and receive and post payments.

Data analysis

Main article: Data analysis

For science or engineering, the terms *data processing* and *information systems* are considered too broad, and the more specialized term data analysis is typically used. Data analysis uses specialized and precise algorithms and statistical calculations that are less often observed in a typical general business environment. For data analysis, software like SPSS or SAS, or their free counterparts such as DAP, gretl or PSPP are often used.

Ending the Essay: Conclusions

So much is at stake in writing a conclusion. This is, after all, your last chance to persuade your readers to your point of view, to impress yourself upon them as a writer and thinker. And the impression you create in your conclusion will shape the impression that stays with your readers after they've finished the essay.

The end of an essay should therefore convey a sense of completeness and closure as well as a sense of the lingering possibilities of the topic, its larger meaning, its implications: the final paragraph should close the discussion without closing it off.

To establish a sense of closure, you might do one or more of the following:

- Conclude by linking the last paragraph to the first, perhaps by reiterating a word or phrase you used at the beginning.
- Conclude with a sentence composed mainly of one-syllable words. Simple language can help create an effect of understated drama.
- Conclude with a sentence that's compound or parallel in structure; such sentences can establish a sense of balance or order that may feel just right at the end of a complex discussion.

To close the discussion without closing it off, you might do one or more of the following:

- Conclude with a quotation from or reference to a primary or secondary source, one that amplifies your main point or puts it in a different perspective. A quotation from, say, the novel or poem you're writing about can add texture and specificity to your discussion; a critic or scholar can help confirm or complicate your final point. For example, you might conclude an essay on the idea of home in James Joyce's short story collection, *Dubliners*, with information about Joyce's own complex feelings towards Dublin, his home. Or you might end with a biographer's statement about Joyce's attitude toward Dublin, which could illuminate his characters' responses to the city. Just be cautious, especially about using secondary material: make sure that you get the last word.
- Conclude by setting your discussion into a different, perhaps larger, context. For example, you might end an essay on nineteenth-century muckraking journalism by linking it to a current news magazine program like *60 Minutes*.
- Conclude by redefining one of the key terms of your argument. For example, an essay on Marx's treatment of the conflict between wage labor and capital might begin with Marx's claim that the "capitalist economy is . . . a gigantic enterprise of *dehumanization*"; the essay might end by suggesting that Marxist analysis is itself dehumanizing because it construes everything in economic -- rather than moral or ethical-- terms.
- Conclude by considering the implications of your argument (or analysis or discussion). What does your argument imply, or involve, or suggest? For example, an essay on the novel *Ambiguous Adventure*, by the Senegalese writer Cheikh Hamidou Kane, might open with the idea that the protagonist's development suggests Kane's belief in the need to integrate Western materialism and Sufi spirituality in modern Senegal. The conclusion might make the new but related point that the novel on the whole suggests that such an integration is (or isn't) possible.

Finally, some advice on how not to end an essay:

- Don't simply summarize your essay. A brief summary of your argument may be useful, especially if your essay is long--more than ten pages or so. But shorter essays tend not to require a restatement of your main ideas.
- Avoid phrases like "in conclusion," "to conclude," "in summary," and "to sum up." These phrases can be useful--even welcome--in oral presentations. But readers can see, by the tell-tale compression of the pages, when an essay is about to end. You'll irritate your audience if you belabor the obvious.

- Resist the urge to apologize. If you've immersed yourself in your subject, you now know a good deal more about it than you can possibly include in a five- or ten- or 20-page essay. As a result, by the time you've finished writing, you may be having some doubts about what you've produced. (And if you haven't immersed yourself in your subject, you may be feeling even more doubtful about your essay as you approach the conclusion.) Repress those doubts. Don't undercut your authority by saying things like, "this is just one approach to the subject; there may be other, better approaches."

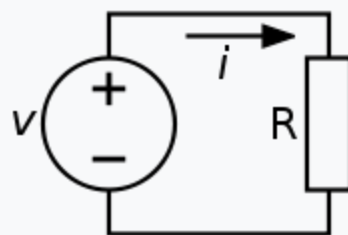
LESSON 13

Electric circuit.

An **electric circuit** is a path in which electrons from a voltage or current source flow.

The point where those electrons enter an electrical circuit is called the "source" of electrons. The point where the electrons leave an electrical circuit is called the "return" or "earth ground". The exit point is called the "return" because electrons always end up at the source when they complete the path of an electrical circuit.

The part of an electrical circuit that is between the electrons' starting point and the point where they return to the source is called an electrical circuit's "load". The load of an electrical circuit may be as simple as those that power home appliances like refrigerators, televisions, or lamps or more complicated, such as the load on the output of a hydroelectric power generating station..



Simple electrical circuit. Power source, path for electrons to flow, and a resistor as the load

Circuits use two forms of electrical power: alternating current (AC) and direct current (DC). AC often powers large appliances and motors and is generated by power stations. DC powers battery operated vehicles and other machines and electronics. Converters can change AC to DC and vice versa. High-voltage direct current transmission uses big converters.

How are IELTS essays marked?

The essay is marked according to 4 criteria, **Lexical resource** (vocabulary), **Grammatical range and accuracy**, **Coherence and Cohesion** and **Task Response**. Lets take a look at the criteria below for Task Response.

Task Response		
Band 5	Band 6	Band 7
<ul style="list-style-type: none">• addresses the task only partially; the format may be inappropriate in places.• expresses a position but the development is not always clear and there may be no conclusions drawn.• presents some main ideas but these are limited and not sufficiently developed; there might be irrelevant detail	<ul style="list-style-type: none">• addresses all parts of the task although some parts may be more fully covered than others• presents a relevant position although the conclusions may become unclear or repetitive• presents relevant main ideas but some may be inadequately developed/ unclear	<ul style="list-style-type: none">• addresses all parts of the task• presents a clear position throughout the response• presents, extends and supports main ideas, but there may be a tendency to overgeneralise and/or supporting ideas may lack focus

Source: British Council

Band 5 essay: *'expresses a position but the development isn't always clear'* This means that there is a topic sentence but there are very few, or no details, to back up your topic sentence. So there may not be relevant supporting sentences or examples. It also states that you *'have presented main ideas but these are limited and not fully developed'*, again it shows that this type of essay has not much detail or supporting points and no clear opinion.

Band 7 essay: *'presents a clear position throughout the essay'* This means you have stated your topic sentence, supported it with detail and given a specific example with your opinion clearly (if asked for). It also states: *'presents, extends and supports main ideas....'* clearly this shows that a Band 7 essay has good supporting sentences, relevant detail and a specific example with a stated opinion.

Band 8 essay: *'relevant, extended and supported ideas'*

It is clear that the main body paragraphs must have a topic sentence and just one central theme for each paragraph, don't state different ideas or go off topic, you only need one central idea per paragraph then support it, give a specific example and state why you agree or disagree (if the task asks for your opinion)

Important point about giving examples

IELTS essays are different from academic essays that you may have to write in University. In an academic essay in University you have to give citations, references and accurate data and it may be a few pages long. In an IELTS essay you are not expected to do this and you do not have time either, anyway the IELTS examiner is not marking your general knowledge or citations. They are testing your English ability, therefore you can just make up a recent study or a statistic.

When giving an example you should be specific and quote statistics such as ‘*a recent study showed that 37% of parents prefer home schooling..*’ (this was from an essay I marked recently)

However, if I said : ‘*a recent study showed that 98% of parents prefer home schooling..*’ This just does not sound believable, so be careful here when stating studies and statistics, they must sound plausible.

You can also give either your own personal examples or of people that you know, these do not have to be true as long as you can give a specific example. Another way to give a good example is to quote a recent newspaper report or a study from a journal. Again, these do not have to be accurate and you can make them up because the whole point here is to demonstrate your ability with English to extend main ideas and present examples.

Remember that you **do not have to be an expert** on the topic. IELTS is not a general knowledge test. The examiner will not check your statistics on Google so don't worry. The examples that you give are there to test your English ability.

Which paragraph do you think is better?

Here are example body paragraphs from a **problem solution essay**, the task question is below:

‘All over the world, societies are facing a growing problem with obesity. This problem affects both children and adults. What are the reasons for this rise in obesity, How could it be tackled?’

Note: this is a problem solution essay , not all essays will follow this structure.

Example 1:

One of the reasons people are becoming obese these days is that they eat junk food like hamburgers and chips. The solution is for the government to raise tax on fast food. I think that this is necessary to stop obesity. Also people eat big portions and do not do much exercise.

Example 2:

One of the reasons that people are becoming overweight these days is that they are eating more junk food, ready meals and convenience food rather than cooking healthy meals at home. This is because many people tend to lead a busy life and after a long day at work it is easier to just buy ready meals in the supermarket or get a take away. For instance, In the UK, sales of these types of foods have risen

by 48% since 1990, one reason is because busy people see cooking at home as time consuming. To tackle this issue the government should take steps to increase tax on high fat, high sugar or unhealthy foods. Therefore consumers would think twice about the foods they consume, which could lead to them losing weight.

It is obvious that example 2 is a much better paragraph because it follows the structure below:

Topic sentence: One of the reasons that people are becoming overweight these days is that they are eating more junk food ready meals and convenience food rather than cooking healthy meals at home.

Supporting sentence: This is because many people tend to lead a busy life and after a long day at work it is easier to just buy ready meals in the supermarket or get a take away.

Specific example: For instance, In the UK, sales of these types of foods have risen by 48% since 1990, one reason is because busy people see cooking at home as time consuming.

Possible solution: To tackle this issue the government should take steps to increase tax on high fat, high sugar or unhealthy foods.

Result: Therefore consumers would think twice about the foods they consume, which could lead to them losing weight.

Key point: In the Example 1 paragraph above, there was more than one central topic, it also states ‘...people do not do much exercise’ the main topic sentence was about eating junk food, not exercise...so this should be avoided. example paragraph 2 is much better

Lets try another one

This is a discussion essay where you have to give an opinion.

‘Some people believe that school children should not be given homework by their teachers, whereas other argue that homework plays an important role in the education of children. Discuss both views and give your own opinion.’

Example 1:

If teachers give out too many homework assignments it becomes a burden to the school children. That is to say that young children spend their whole day studying at school, so they feel tired after returning home. Then they need to finish their homework. Consequently, they get irritated by studying and feel that learning is not an enjoyable experience. For instance, when I was at school, I was always under pressure to complete lots of homework. Whenever I failed to finish my home assignments, I used to skip my classes. Due to this, there was a negative effect on my test results. I think that too many homework tasks are detrimental to a students education and teachers need to find other methods to motivate students to study.

Example 2:

If teachers give out too many homework assignments it becomes a burden to the school children. Young children spend their whole day studying at school which makes them feel tired after returning home. Also they have pressure to pass exams and get into a good university after they finish school. Many students have to do

well and think of a good career, and also they might have the responsibility of sports clubs after school. Lots of children prefer to come home and play in the park but they are stressed. They also lose interest in their hobbies or friends. As far as I'm concerned they should relax when they come home.
What do you think is the best paragraph above for a high band essay?

Automation Glossary of terms

3D LASER SCANNING SYSTEM

Unique, ultra-precise system that perfectly captures 3D shapes in order to inspect and analyze real-world objects or environments, and to measure and collect data on...

ABSOLUTE ENCODER

Maintains position information when power is removed from a system. Once power is restored the position of the encoder is available immediately...

ARC FLASH

A type of electrical explosion that results from a low-impedance connection to ground or another voltage phase in an electrical system.

ARCHAIC SYSTEM

Has the characteristics of a past language.

BILLETID

A robotic tagging system that eliminates the risk of losing track of billets in the manufacturing process. The automated system welds an identification tag...

BLEEDING EDGE

Refers to technology that is so new that it could have a high risk of being unreliable, and it may incur greater expense. See also [leading edge](#) and [cutting edge](#).

BOARDHOUND™

Concept Systems originally designed BoardHound, which was to be used in the wood products industry to track measurable realtime data with speeds up to 3,000 fpm...

BOARDMARK

Created for the wood products industry, BoardMark offers staple-free barcode application on board ends. This revolutionary board-marking system is...

CANBUS (CONTROLLER AREA NETWORK)

A vehicle bus standard designed to allow microcontrollers and devices to communicate with each other within a vehicle...

CNC (COMPUTER NUMERICAL CONTROL)

CNC systems are used for any process that can be described as a series of movements and operations...

COMMON MODE REJECTION RATIO (CMRR)

The CMRR of a differential amplifier (or other device) is the rejection by the device of unwanted input signals common to both input leads...

COMMON MODE

Also referred to as common impedance, common mode is conducted noise that appears in phase, in the same direction, on two conductors.

CONDUCTED NOISE

Noise that appears in phase (in the same direction) or out of phase (in opposite directions) on two conductors.

CONTROL CORE

Our ControlCore modular control rooms are perfect for managing large scale industrial projects that require managing the risks that can throw a project off track...

CONTROL NET

An open industrial network protocol for industrial automation applications.

CONTROLLER

A device that monitors and affects the operational conditions of a given dynamical system. The operational conditions are typically referred to as output variables of the system, which can be affected by adjusting certain input variables.

CONTROL LOGIX

A system that provides discrete, drives, motion, process, and safety control together with communication and state-of-the-art I/O in a small, cost-competitive package.

CONTROL LOGIX 5000

ControlLogix 5000 is hardware created by Rockwell Automation.

CSIA

Control System Integrators Association seeks to enable industries everywhere to have access to low-risk, safe and successful applications of automation technology.

CUTTING EDGE

Describes the newest, most advanced version of a product or service that has been proven to function reliably. See also leading edge and bleeding edge.

DATA HIGHWAY

A network of computer networks, other devices and switching systems used for the transfer of digitized information.

DCS (DISTRIBUTED CONTROL SYSTEM)

A control system for a manufacturing system, process or any kind of dynamic system, in which the controller elements are not central in location. More.

DEVICENET

A network system used in the automation industry to interconnect control devices for data exchange. It uses Controller Area Network as the backbone technology...

DIFFERENTIAL MODE

Conducted noise that appears out of phase (in opposite directions), on two conductors.

DISTRIBUTED I/O

Eliminates expensive point-to-point wires by networking just a few, or thousands of process signals onto one digital communication link.

ELECTRICAL DESIGN AND DRAFTING

A part of top-tier system integrators' service offerings, where electrical engineers, hand-in-hand with design services, provide custom electrical design and drafting...

EMBEDDED CONTROLLER (EC)

A microcontroller in computers that handles various system tasks that the operating system does not handle.

EMBEDDED I/O

A standard interface between an input device and machine actuators.

ETHERNET

A family of computer networking technologies for local area networks (LANs). Systems communicating over Ethernet divide a stream of data into individual packets called frames. Each frame contains source and destination addresses and error-checking data so that damaged data can be detected and retransmitted.

ETHERNET/IP (ETHERNET INDUSTRIAL PROTOCOL)

An application layer protocol that considers all the devices on the network as a series of "objects." Ethernet/IP makes seamless access to objects...

ETHERNET I/O

A system in which analog and/or digital inputs and outputs are connected to a host computer via some type of Ethernet link...

EXPANSION PORTS

Also referred to as a bus slot or expansion slot. An opening located inside a computer on the motherboard or riser board that allows additional boards to be connected to it.

FLEX I/O

Offers the functionality of larger rack-based I/O without the space requirements.

FRICION STIR WELDING (FSW)

A solid-state joining process (the metal is not melted) that uses a third body tool to join two facing surfaces. Heat is generated between the tool and material...

FUNCTION BLOCK (FB)

Code that contains input, output, through and internal variables, and an internal behavior description of the function block. Function blocks are used primarily to...

GRADEMARKPRO™

A cross-industry technology that provides a flexible and high-speed grade printing solution for many of Concept Systems' customers. In the wood products industry GradeMarkPro...

GROUND PLANE

An electrically conductive surface, usually connected to electrical ground.

HMI (HUMAN MACHINE INTERFACE)

NOISE REJECTION

Noise rejection is the hum or buzz that results when audio power amplifiers or similar devices create a good set of grounds or noise around the inputs that are not rejected properly.

OVERDAMPED RESPONSE

The response that does not oscillate about the steady-state value but takes longer to reach than the critically damped case. See also [underdamped response](#).

OSCILLATION

Oscillation is the repetitive variation, typically in time, of some measure about a central value (often a point of equilibrium) or between two or more different states.

OUTDATED

Anything that is obsolete, no longer current, or behind the times.

PARALLEL

From an electrical perspective, parallel refers to consisting or having component parts connect in parallel. From a computer perspective, parallel refers to the apparent or actual performance of more than one operation at a time, by the same or different devices.

P&ID (PIPING AND INSTRUMENTATION DIAGRAM)

A diagram in the process industry that shows the piping of the [process flow](#) together with the installed equipment and instrumentation.

PC (PERSONAL COMPUTER)

Any general-purpose computer whose size, capabilities, and original sales price make it useful for individuals, and which is intended to be operated directly by an end-user with no intervening computer operator.

PFD (PROCESS FLOW DIAGRAM)

A diagram commonly used in engineering to indicate the general flow of plant processes and equipment. The PFD displays the relationship between major equipment of a plant facility and does not show minor details such as...

PID (PROPORTIONAL INTEGRAL DERIVATIVE)

Calculates an "error" value as the difference between a measured process variable and a desired setpoint. The [controller](#) attempts to minimize the error by adjusting the [process control](#) inputs.

PLC (PROGRAMMABLE LOGIC CONTROLLER)

A digital computer used for control of machinery on factory assembly lines, amusement rides or light fixtures. PLCs are used in many industries and machines. Unlike general-purpose computers, the PLC is designed for...

PPE (PERSONAL PROTECTIVE EQUIPMENT)

Personal protective equipment refers to protective clothing, helmets, goggles or other garments or equipment designed to protect the wearer's body from injury by blunt impacts, electrical hazards, heat, chemicals and infection, for job-related occupational safety and health purposes.

PROCESS CONTROL

An engineering discipline that deals with architectures, mechanisms and algorithms for maintaining the output of a specific process within a desired range...

PROFIBUS

A standard for field bus communication in automation technology.

PROTOCOL

A protocol is a special set of rules that enables communication between two computers or devices. The commonly used protocols are Transmission Control (TCP/IP), File Transfer Protocol (FTP) and Hypertext Transfer Protocol (HTTP).

RADIATED NOISE

Noise resulting from the radiation of another component, circuit, device, piece of equipment, system or object.

RAILHAWK™

Designed to make grain more efficient to unload from railcars, RailHawk is capable of being applied to loading railcars across a variety of industries. The RailHawk system is engineered...

REMOTE I/O

A local area network designed to connect controllers to remote I/O chassis and a variety of intelligent devices such as operator interfaces and AC or DC drives.

RETROFIT

Retrofit refers to the addition of new technology or features added to older systems.

RS232 (RECOMMENDED STANDARD 232)

The traditional name for a series of standards for serial binary single-ended data and control signals connecting between a DTE (Data Terminal Equipment) and a DCE (Data Circuit-terminating Equipment). It is commonly used in computer serial ports.

RS422

A technical standard that specifies electrical characteristics of a digital signaling circuit. Differential-mode signals can be sent at rates as high as 10 million bits per second...

RS485 MULTIDROP

A standard defining the electrical characteristics of drivers and receivers for use in balanced digital multipoint systems. Multiple receivers may be connected to such a network in a linear, multidrop configuration.

RSLOGIX 5000

RSLogix 5000 is a programming software created by Rockwell Automation.

RESOLVER

A type of rotary electrical transformer used for measuring degrees of rotation. It is considered an analog device, and has a digital counterpart, the rotary (or pulse) encoder.

RESPONSIVE

A flexible service that is responsive to changing patterns that are often technical or economic.

ROBOTICS

The cutting-edge manufacturing option for many applications, robotics offers an increasingly affordable automation solution that provides unmatched flexibility in a traditional, but highly configurable package...

ROBOTIC PAINTING

Whether the desire is to paint dissimilar parts or increase throughput in small/large production runs, Concept Systems is the partner companies trust to gain a competitive advantage. As a Fanuc Robotic Paint Integrator, Concept Systems works with companies to enable the benefits of robotic painting...

S88

Also known as ANSI/ISA-88. A standard addressing batch process control. S88 provides a consistent set of standards and terminology for batch control and defines...

SAFETY SERVICES

Concept Systems has a team of safety experts ready to help meaning you can get on the road to safety compliance now...

SAFETY CATEGORY

A risk assessment of safety in electrical/circuit applications. There are five risk categories (B, 1, 2, 3, 4) that make up the Category Assessment Table. Circuits must be designed...

SAFETY RELAY

Relays designed to provide a convenient and economical solution for incorporating control reliability into a safety circuit. Power to the machine primary control elements (MPCE) is...

SCADA (SUPERVISORY CONTROL AND DATA ACQUISITION)

A computer system for gathering and analyzing real time data. SCADA systems are used to monitor and control a plant or equipment in industry.

SERIAL

One by one. Serial data transfer refers to transmitting data one bit at a time.

SERVO CONTROLS

Servos are controlled by sending a pulse of variable width. The control wire is used to send this pulse. The parameters for this pulse are that it has a minimum pulse, a maximum...

SERVO MOTOR

A rotary actuator that allows for precise control of angular position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback...

SERVO SYSTEMS

A control system that converts a small mechanical motion into one requiring much greater power; may include a negative feedback system.

SERVO VALVE

Valves that operate by transforming a changing analog or digital input signal into a smooth set of steps of movement in a hydraulic cylinder...

SHAFT ENCODER

An electro-mechanical device that converts the angular position or motion of a shaft or axle to an analog or digital code. The output of incremental encoders...

SHIELDED CABLE

An electrical cable of one or more insulated conductors enclosed by a common conductive layer.

SHIELDING

The practice of reducing the electromagnetic field in a space by blocking the field with barriers made of conductive or magnetic materials.

SHUNT

A device that allows electrical current to pass around another point in the circuit.

SINGULARITY

The singularity hypothesis is that accelerating progress in technologies will cause a runaway effect wherein artificial intelligence will exceed human intellectual capacity...

SIL (SAFETY INTEGRITY LEVEL)

A relative level of risk-reduction provided by a safety function, or to specify a target level of risk reduction. In simple terms, SIL is a measurement of performance...

SSI (SYNCHRONOUS SERIAL INTERFACE)

A widely used [serial](#) interface standard for industrial applications between a master [controller](#) and a sensor...

STABLE

A system that is resistant to change of position or condition. See also [unstable](#).

STANDALONE

Working offline. A system that does not necessarily require a network connection to function.

THEODOLITE

A precision instrument for measuring angles in the horizontal and vertical planes.

THERMAL BLOCK

A space or collection of spaces within a building having sufficiently similar space conditioning requirements so that those conditions could be maintained with a single thermal control device.

THREE-PHASE

An electric power system that has at least three conductors carrying voltage waveforms that are $2/3$ radians (120, $1/3$ of a cycle) offset in time.

TUV

TÜV Rheinland provides inspection and assessment services for Facility Safety. Concept Systems has two FS Engineers (TÜV Rheinland) on staff! .

[UNDERDAMPED RESPONSE](#)

One that [oscillates](#) within a decaying envelope. The more underdamped the system, the more oscillations and the longer it takes to reach steady state...

UNSTABLE

A system that is not constant. See also [stable](#).

[UNDERWRITER'S LABORATORY \(UL\)](#)

A global independent safety science company offering expertise across five key strategic businesses: Product Safety, Environment, Life & Health, University and Verification Services.

[UL PANEL SHOP & FAB](#)

Custom in-house electrical panel and fabrication services, usually associated with a System Integrators' [Electrical Design and Drafting](#) services...

[VFD \(VARIABLE FREQUENCY DRIVE\)](#)

A system for controlling the rotational speed of an alternating current (AC) electric motor by controlling the frequency of the electrical power supplied to the motor...

[VISIONFEED-3D](#)

List of used literature.

Huang, S., & Shanmao, C. (1996). **Self-efficacy of English as a second language learner: An example of four learners.** Bloomington.

Johns, A., & Dudley-Evans, T. (1991). **English for Specific Purposes**

Lomperis, A. (1998). **Best practices in EOP/EPP.**

Krashen, S. (2002). **Principles and practice in second language acquisition.** Oxford: Pergamon.

Taylor, C. (2006). **Systems and models for developing programs for the gifted and talented** Mansfield Center, CT: Creative Learning Press.

VanPatten, B., & Lee, J. (1990). **Second language acquisition - Foreign language learning.**

Yogman, J., & Kaylani, C. (1996). ESP program design for mixed level students. **English for Specific Purposes**

<http://my.voyager.net/azure/programl.html>