



Absolute time & space – the view that space and time are basic entities ontologically independent of the objects they contain.

abstract – existing only in theory or idea, not concrete or tangible

accidental – A property of an object that it could lose and still itself. (Not essential)

actual – the state of existing. (Not merely possible, not necessary)

ad hoc – Latin: "and this" added for one specific purpose

Analytic claim – statements that are true (or false) in virtue of the way their meanings fit together. (Not synthetic) The analytic/synthetic distinction, which is about meaning, is closely related to the necessary/contingent distinction, which is about possibility, and the a priori/a posteriori distinction, which is about knowledge. Some think that the three distinctions amount to the same thing, others do not.

analytic philosophy – the style of doing philosophy we do in this class. It usually sees philosophy as a matter of clarifying important concepts in the sciences and life, rather than providing an independent source of knowledge. (Not continental philosophy)

Anomaly – (Kuhn) an observation that resists explanation within a theory. (See Normal Science, Revolutionary Science)

antecedent – a preceding cause or event

antithesis – exact opposite

Anthropic Principle – any observation of the Universe must be compatible with the observer existing in that universe.

appearance – outward or visible aspect of a person or thing

a priori – reasoned from a general principle to a necessary effect

a posteriori – reasoned from experience to general principles.

assumption – the act of taking something for granted

auxiliary hypothesis – an unstated, but assumed hypothesis. (e.g., "the instruments work")

axiom – an assumption necessary for a proof

Bayes' Theorem:

Probability \mathcal{P} of (a hypothesis h given | evidence e) is:

$$P(h|e) = \frac{P(e|h) \cdot P(h)}{P(e|h) \cdot P(h) + P(e|\sim h) \cdot P(\sim h)}$$

Bayesian Probability – Probabilities are statements about beliefs and

new evidence can adjust our credence according to **Bayes' Theorem**. (Subjective) Evidence will eventually guide us to the 'truth' regardless of our priors. (Objective) There are reasonable constraints on what our prior beliefs should be.

belief – cognitive content held as true

Bell's Theorem – experiment showing **Quantum Mechanics** does not comport with any **determinism** prediction for independent particles.

brute fact – something assumed to be true with no justification

byproduct – an property that occurs by virtue of its link to another effect rather than by direct causation.

category – A group of similar objects. this is closely related to **class**, which is contrasted with **individual**, as well as **natural kind**, which implies nature objectively divides the world into certain groupings, **set**, which is a mathematical group, and **type**, which is typically about language. Frustratingly, these terms are often used interchangeably.

causal – involving an entity that produces an effect

Causal Explanation – Scientific explanations advert to causes, usually by appeal to manipulations, mechanisms, causal models, or, more rarely, **constant conjunctions** and **counterfactuals**. (See Mechanism, Scientific Explanation)

causation – the relation between reasons and effects

ceteris paribus – Latin: "other things equal." Conditions that are exceptions to a rule.

circular reasoning – reasoning in which a **conclusion** is implicitly assumed as a **premise**.

class – a group of similar objects. (Not individual) Similar to **category**, **natural kind**, **set**, **type**.

Classical Probability – **ceteris paribus**, the ratio of favorable outcomes to possible outcomes. Possibly too simplistic (See probability)

cognitive – relating to or involving the mental process of knowing

coherentism (truth) – true sentences are those that cohere with all or most of their other beliefs.

coherentism (justification) – an epistemological theory opposing **foundationalism** and holding that a belief can be justified by cohering with other beliefs.

concept – abstract basic units of thought and belief

- conclusion** – the final sentence in an argument
- conditional** – depending on an **antecedent**; or imposing/containing an assumption
- conjunction** – "and," "&," or "+." Conjunctions of claims are true if both claims are true.
- consciousness** – a cognitive state in which one is aware of oneself
- consequent/consequence** – a phenomenon caused by some previous phenomenon
- consistent** – logical coherence, such that all **truth claims** could possibly be true.
- constant conjunction** – for Hume, the most we could ever say about **causation** was that we could see causes and effects always in temporal sequence. (See **Causal Explanation**)
- context** – the set of **facts** or circumstances that surround a situation
- Constructive Empiricism** – Scientific **theories** aim to describe the way the world appears to us, but accepting scientific theories means only that we accept the accuracy of their **description** of observable entities. (See **Scientific Anti-realism**)
- Constructivism** – the view that our **understanding** of reality is a value-laden subjective construction within local norms of explanation rather than the passive acquisition of objective features. (See **Scientific Anti-realism**)
- Context of Discovery** – for **Logical Positivists**, a non-rational process where one arrives at new ideas
- Context of Justification** – for **Logical Positivists**, a rational process that
- continental philosophy** – the sort of philosophy that has been more dominant in France, Germany, Spain, Italy, and some other European countries. Focused on worldview and ideals. (Not **analytic philosophy**)
- contingent** – determined by conditions or circumstances that follow
- contradiction** – affirming statement and its opposite. All contradictions are false. (Not **consistent**)
- Copenhagen Interpretation** – dominant interpretation of **Quantum Mechanics** in which quantum states occupy **superpositions** until measured and **Heisenberg Uncertainty** rules. (See **Bell's Theorem**).
- correlation** – a reciprocal connection between two or more things
- counterargument** – an argument offered in opposition to a stated position
- counterfactual** – a set of events that is not **actual**, but is **possible**. "If I had..."
- criterion/criteria** – the aspect or ideal in terms of which something can be judged
- crucial experiment** – For **Falsificationism**, an experiment whose results could possibly reject a theory.
- Darwinism** – theory of biological evolution stating that organisms change over time through the natural selection of small, inherited variations that increase the individual's ability to survive and reproduce.
- deduction** – reasoning from the general to the particular. Truth preserving. (Not **induction**)
- Deductive-Nomological Model/D-N Model/Covering Law Model** – Scientific explanations are logical **arguments** that involve a law of nature. **Prediction & Explanation** are symmetrical. (Not **Causal Explanation**, **Pragmatic Explanation**, nor **Unificationism**)
- definition** – (philosophical) **necessary and sufficient conditions**, (dictionary) summary of current use, (stipulative) a **posited** term, (operational) a **pragmatic** guide, (demonstrative) a **category** known from experience, (theoretical) **criteria** given a theoretical understanding,
- derivation** – the source or origin from which something comes
- descriptive** – about how things are rather than how they should be (Not **normative**)
- determinism** – theory holding that all events are inevitable consequences of earlier causes
- dichotomy** – the division of a subject into two alternatives.
- dilemma** – state of uncertainty in a choice between unfavorable options.
- disciplinary matrix** – (Kuhn) replaces the worldview use of **paradigm**,
- disjunction** – "or," or "v." Disjunctions of claims are true if either claim is true.
- dualism** – the doctrine that reality consists of two basic opposing elements, often taken to be mind and matter
- The Dutch Book** – if one's subjective probabilities violate **probability axioms**, it is trivial to take advantage of them.
- dynamic** – a state that is active and continuously changing. (Not **static**)
- eliminativism** – the view that a phenomenon in question does not exist. An extreme form of **anti-realism**.
- emergent** – the **property** of an entity not shared by any of its parts. (not **reducible**)
- empiricism** – the doctrine that all **knowledge** derives from experience. (Not **rationalism**)
- energy** – the **property** transferred onto objects to affect them

- Entity Realism** – The un/observable entities that science **posits**, actually refer to something that exists. (See **Scientific Realism**)
- epiphenomenon** – a secondary **phenomenon** that is a by-product of another **phenomenon**.
- Epiphenomenalism** – the view that physical events have mental effects, but mental events have no effects of any kind.
- epistemological/epistemic** – about how we know things rather than about the things themselves. (Not **metaphysical**, not **ethical**)
- essence/essential** – A property of an object that it needs to exist and be itself. (Not **accidental**)
- Eternalism** – a philosophical view that time is just another dimension, future events are "already there", and that there is no objective *flow* of time. (Not **Presentism**)
- etiological** – of or relating to the philosophical study of causation
- evidence** – knowledge on which to base belief
- evolution** – sequence of events involved in the descent, with modification, of a species
- exemplar** – (Kuhn) replaces the key experiment use of **paradigm**, (concepts) theory that concepts are learned by appeal to key cases.
- experiment** – the act of conducting a controlled test or investigation
- explanandum** – that which is to be explained. (Not **explanans**)
- explanans** – that which does the explaining. (Not **explanandum**)
- explanatory sketch** – a partial explanation
- external** – happening or arising outside some limits or surface
- extrinsic** – not forming an essential part of a thing
- fact** – **actual** existence, about the world. (Not **value**)
- fallacy** – incorrect reasoning
- fallibilism** – doctrine that all knowledge claims (weak) could, in principle, be mistaken (strong) are probably false. See **Scientific Anti-realism**)
- Falsificationism** – (Popper) a proposition or **theory** cannot be scientific if it no possible experiment can show it to be false.
- Foundationalism** – the view that **beliefs** are **justified** when they are based on **basic** or **self-evident** beliefs. (Not **Coherentism**).
- Frequentism/Long-Run Probability** – Probabilities are summaries of what would happen if the conditions were repeated indefinitely. (See **probability**, **Reference Class Problem**)
- functionalism** – Mental states can be accounted for without taking into account the underlying physical medium (the neurons), instead attending to higher-level functions such as beliefs, desires, and emotions. Currently the dominant theory of mental states.
- General Relativity** – (Einstein) **gravity** and acceleration both bend **spacetime** in equivalent ways. Spacetime is non-Euclidean.
- gravity** – (Newton) a universal force attracting objects, (Einstein) the bending of spacetime by matter, equivalent to acceleration.
- heuristic** – a commonsense rule to help solve some problem
- historical/narrative explanations** – a summary of events showing how a situation came to be
- holism** – the parts must be understood in relation to the whole. (Not **reductionism**)
- how-actually explanations** – **narrative descriptions** of how a **phenomenon** came to be in our world.
- how-necessarily explanations** – **narrative descriptions** of how **phenomena** of a certain **category** most come to be in any **possible world**.
- how-possibly explanations** – **narrative descriptions** of how a **phenomenon** could occur given our understanding of history and reality. Typically used to challenge a presumption of impossibility.
- humanism** – a range of ethical views that consider human nature to be the source of values.
- hypothesis** – a tentative insight that is not yet verified or tested
- ideal** – something that one hopes to attain
- idealism** – the doctrine that reality or **knowledge** is founded on ideas (mental experience). (Not **materialism** or **realism**)
- inconsistent** – a **set** of claims whose **conjunction** is a **contradiction**. (Not **consistent**)
- indeterminate/indeterminism** – not fixed or known in advance. (See **Quantum Mechanics**, **Copenhagen Interpretation**)
- induction** – reasoning from detailed facts to general principles
- Inductive-Statistical Model/I-S Model** – Hempel's account of some **scientific explanations**, which subsume **individual events** into statistical **laws** such that the **explanans** provides a high probability for the **explanandum**. Counterpart to **Deductive-Nomological Model**.
- inference** – drawing a conclusion on the basis of circumstantial evidence
- infinite** – without end
- innate** – present at birth but not necessarily hereditary

inquiry – a line of questioning

instinct – inborn pattern of behavior often responsive to stimuli

instrumentalism – The view that ideas should be judged by their utility and not their truth-value. Or that scientific theories are not attempts to describe reality beyond experience. (See **Scientific Anti-realism**)

intentionality – expressive of intentions

intrinsic – belonging to a thing by its very nature

introspection – contemplation of your own thoughts and desires and conduct

intuition – instinctive knowing, without the use of rational processes

justification – the act of defending or explaining by reasoning

knowledge – the result of perception, learning, and reasoning

law of nature – approximately true, **synthetic** sentences that are **universal**, **explanatory** and support **counterfactuals**.

logic – the study of correct reasoning

Logical positivism/empiricism – a philosophy that originated in the Vienna Circle in the 1920s, which holds that philosophy should aspire to the same sort of rigor as science. Philosophy should provide strict criteria for judging sentences true, false and meaningless. A form of realism, materialism, philosophical naturalism, and empiricism.

mass – extension **property** of objects as measured by resistance to acceleration

matter – that which has **mass** and occupies **space**

meaning – the content of a sentence.

mechanism (theory) – theory that all natural phenomena can be explained by physical causes. (Not **vitalism**)

mechanism (explanation) – an explanation that adverts to clear, delineated, causal processes

metaphysics – the philosophical study of being and what the world that encompasses it is like.

methodology – the techniques followed in a particular discipline

monism – the doctrine that reality consists of a single basic substance or element

moral – what one ought to do

narrative explanations – see **historical explanations**.

natural kind – entities that are members of some group on the basis of some objective criteria. Elements are the paradigmatic natural kinds.

naturalism – belief that (methodological) the world can be understood in scientific terms or (metaphysical) that supernatural things do not exist.

necessary – could not be otherwise. (Not merely **possible** or **actual**, See **sufficient**)

negate – make ineffective by counterbalancing the effect of

negation – "¬", "∼", or "¬." The opposite of a claim, such that if a claim is true, its negation is false.

nominalism – the belief that universals or mental concepts have no objective reality but exist only as words or 'names.'

nomological – law-like

normative – about how things should be rather than how they are (Not **descriptive**)

Normal Science – (Kuhn) the science that is done within a **paradigm**, which ignores **anomalies**.

Occam's Razor – the principle that entities should not be multiplied needlessly; the simplest of two competing theories is to be preferred

ontology – the metaphysical study of the nature of being and existence

orthodox – adhering to what is commonly accepted

ostension – learning a **concept** by experience

overdetermination – multiple causes individually **sufficient** for an **event**. (Not **underdetermination**).

paradigm – an exemplar or pattern; a worldview or model

paradox – an apparently valid argument with apparently true premises, but an apparently false conclusion.

perception – the process of becoming aware through the senses.

Pessimistic Meta-Induction: (Laudan) The fact that past theories have been successful shows that it is possible for even very well corroborated theories to be false. (Putnam) All of our past scientific theories have been shown to be false, so induction says that will be true for all of our theories. (See **Scientific Anti-realism**)

phenomenology – the study of human experience in which considerations of objective reality are not taken into account

phenomenon/phenomena – any state or process known through the senses

Physicalism – the metaphysical position asserting that there are no kinds of things other than physical things.

plastic – able to be modified

pluralism – the view that there are many equally acceptable paths/options/substances.

posit – take as a given; assume as a postulate or **axiom**

positivism – a form of **empiricism** that bases all **knowledge** on perceptual experience (Not on **intuition**, **reason** or revelation)

possible – a state that could be (see actual/necessary)

Possible world – fancy way to talk about a way reality could be, but is not.

post hoc – the logical fallacy of believing that temporal succession implies a causal relation

practical – guided by experience and observation rather than theory.

Pragmatic Explanation – A model of **explanation** that claims explanations are acts of communication. Successful explanations result in others' **understanding**.

pragmatism – the doctrine that consequences, utility and practicality are vital components of meaning and truth. Pragmatism objects to the view that human concepts and intellect represent reality

premise – a statement that is held to be true for an **argument**.

Pre-paradigmatic Science – (Kuhn) research that is done prior to an overarching worldview.

Presentism – a philosophical approach that the future and past are not real. Only the present *flow* of time is real. (Not **Eternalism**)

principle – a basic generalization that is accepted as true

probability – the quantitative estimation of something **possible** becoming **actual**. (See **Probability axioms**, **Bayesianism**, **Classical Probability**, **Frequentism**, and **Propensity**)

Probability axioms – for Kolmorov, all probabilities are between 0 & 1, sum up to 1, the probabilities of either are the probabilities of each added to each other, and the probability of one given the other is equivalent to the probability of both divided by the probability of the latter. Written as:

1. $0 \leq P(A) \leq 1$
2. If A is trivially true, $P(A) = 1$

3. If A & B are exclusive alternatives, $P(A \text{ or } B) = P(A) + P(B)$

4. $P(A|B) = P(A \ \& \ B)/P(B)$

Problem of induction – any justification for inductive reasoning seems to itself depend on induction.

Progressivism – The view that science progresses toward truth. Whether our theories truly represent the world or not, future scientific theories will likely do so.

Propensity – **Probabilities** are **dispositions** of outcomes occurring. Asymmetric: **causes** have propensities, **effects** do not.

property – a characteristic of an object

proposition – a suggestion offered for acceptance or rejection

pure – concerned with theory and data rather than practice

quantum entanglement – (**Quantum Mechanics**) a relation between two particles such that they behave in predictably similar ways for an amount of **time**.

Quantum Mechanics/QM – the study of subatomic matter and energy

realism – a view of a reality **ontologically** independent of conception, perception, etc. (See **Scientific Realism**)

reason – a logical motive for a belief or action

reasonable – showing sound judgment

reducible – able to be explained by virtue of its parts alone.

reductio/reductio ad absurdum – Latin: "reduction to the absurd" A disproof by showing that the consequences of the proposition are absurd or contradictory

reductionism (explanatory) – the nature of complex things can always be reduced to (be explained by) simpler or more fundamental things.

reductionism (ontological) – the idea that everything that exists is made from a small number of basic sub-stances that behave in regular ways.

reductionism (methodological) – explanations ought to be continually reduced to the very simplest entities possible (but no simpler). (see Occam's Razor)

reductionism (theoretical) – the idea that older theories or explanations are generally replaced outright by refinements or reductions of the old theory in greater detail.

refer/reference – indicates an actual object. "Scientific theories refer" means science indicates objective reality.

Reference Class Problem/Problem of the Single Case – Any event is a member of many **classes**, each of which have their own **probability**. How can we non-arbitrarily decide between them? Considered by some to be devastating to the **Frequentist Interpretation of Probability**, although versions of it arise for other accounts as well.

reification – regarding something abstract as a material thing

relativism – the doctrine that judgment is based on situational context. the meaning and value of human beliefs and behaviors have no absolute reference.

Revolutionary Science – (Kuhn) a scientific **theory** that begins to replace the prevailing **paradigm**.

rhetoric – study of the technique for using language effectively

Scientific Anti-realism – the thesis that what science dictates is not (approximately) true.

Scientific Explanation – any account of how **truth claims** work in science.

- Scientific Realism** – the thesis that what science dictates is (approximately) true. (See **realism**, **naive realism**, **progressivism**, **theory realism**, **entity realism**, or **structural realism**. Not **Scientific Anti-realism**)
- scientific method** – method of observation to test scientific hypotheses
- scientism** – the belief that science has primacy over other ways of obtaining knowledge (used as derogatory).
- self** – your consciousness of your own identity
- semantic** – concerning the **meaning** of something rather than its structure. (Not **syntax/syntactic**)
- sense** – the faculty through which the external world is apprehended
- skepticism** – method of doubt about what is held as the true.
- solipsism** – the philosophical theory that the self is all that exists
- somatic** – characteristic of the body as opposed to the mind or spirit
- sophistry** – a deliberately invalid argument in the hope of deceiving
- space** – (Leibniz) serial relation between objects, (Newton/Clarke) an absolute. (See **Absolute space & time**)
- spacetime** – (Einstein) the **Eternalist absolute** manifold in which objects exist and affect.
- Special Relativity** – (Einstein) The speed of light is fixed, but time, matter, and energy are relative. (See **General Relativity**)
- static** – unchanging
- subjective** – taking place within the mind and modified by individual bias
- subsequent** – following in time or order
- substance** – the real physical matter of which a person or thing consists
- substantial** – real; having a material or factual existence
- sufficient** – enough to bring about a result. (See **necessary**)
- supernatural** – not able to be explained by physical laws
- superposition** – (Quantum Mechanics) states exhibit multiple positions or probability distributions simultaneously until interaction.
- Structural Realism** – The mathematical relations that underlie scientific theories are accurate descriptions of the world, regardless of whether the entities or interpretation are refer. (See **Scientific Realism**)
- syntax/syntactic** – concerning the structure of something rather than its meaning. (Not **semantic**)
- synthesis** – the combination of ideas into a complex whole
- synthetic claim** – statements that are true (or false) in virtue of facts about the world (Not **analytic claim**).
- tautology** – unnecessary repetition of an idea in a different word or phrase; redundant
- teleology** – the study of natural processes based on their final cause, ends, goals, or purpose.
- tenet** – an opinion, principle, or belief asserted to be true and important.
- theory** – a **belief system**
- Theory-ladenness of Observation** – for Kuhn, the view that observations are mediated by our theories. Counter to the **Context of Discovery/Context of Justification** distinction
- thesis** – an unproved statement advanced as a premise in an argument
- time** – (Leibniz) sequential relation between objects, (Newton/Clarke) an absolute. (See **Absolute space & time**)
- The Twin Paradox** – (Special Relativity) if reference frames are symmetric, it seems that a stationary twin and a moving twin should each be aging, (General Relativity) acceleration slows the aging of the moving twin.
- token** – a single instance of a **type**.
- Theory Realism**: Mature scientific theories accurately describe the world. (See **Scientific Realism**)
- tradition** – a specific practice of long standing
- truth claim** – a statement that is either true or false, and claimed to be true
- type** – a **kind** to which **token** sentences belong. (Not **token**, See **category**, **class**, **natural kind**, **set**)
- underdetermination** – insufficient data to decide between interpretations. (Not **overdetermination**)
- understanding** – the experiential phenomenon of grasping of an explanation
- Unificationism** – Explanations are descriptions that reduce the brute number of unjustified phenomena.
- universal** – applicable to or common to all members of a group or set
- valid** – a property of deductive arguments such that if the premises are true, the conclusion must be as well.
- value** – about underlying preferences. (not **fact**)
- verificationism** – an **epistemic theory** of **truth** based on the idea that truth is reducible to a process of verification. "Snow is white" is true if snow actually is white.
- Vitalism** – the doctrine that "vital forces" are active in living organisms, so that life cannot be explained solely by mechanism.
- will** – the capability of conscious choice and decision