Random Process:

A random process is a collection of random variables $\{X(s,t)\}$ that are functions of a real variable t where $s \in S$, S is the sample space and $t \in T$.

A Comparison between Random Variable and Random process:

	Random Variable	Random Process
1.	A function of the possible outcomes of an experiment. ie., $X(s)$	A function of the possible outcomes of an experiment and also time ie., $X(s,t)$
2.	Outcome is mapped into a number 'x'	Outcomes are mapped into wave form which is a function of time 't'

Classification:

$X(t)$ \ t	Continuous	Discrete
Continuous	Continuous Random process	Continuous Random sequence
Discrete	Discrete Random process	Discrete Random sequence

Stationary Process:

A random process is said to be stationary if its mean and variance doesn't depend on time 't'.

i.e., $E[x(t)]$ = Constant

& $V[x(t)]$ = constant

Evolutionary Process:

A random process that is not stationary in any sense is called as evolutionary process.

First order Stationary Process:

A random process is called 1st order stationary if its first order density function doesn't depend on time 't'.

i.e. $E[x(t)]$ = constant

Wide Sense Stationary process (WSS):

A random process is said to be WSS if it satisfies

i). $E[x(t)]$ = Constant

ii). The Auto correlation $R_{xx}(\tau) = E[x(t)\, x(t+\tau)]$

Joint wide sense stationary Process (JWSS)

Two processes $x(t)$ & $y(t)$ are said to be JWSS if $R_{xy}(\tau) = E[x(t)\, y(t+\tau)]$

Strict sense stationary process (or) Strongly Stationary Process (SSS)

A random process is said to be SSS, if all its statistical properties do not change with time.